GSMA

AI in Ethiopia: Promising use cases for development

April 2025

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The Central Insights Unit (CIU) sits at the core of GSMA Mobile for Development (M4D) and produces in-depth research on the role and impact of mobile and digital technologies in advancing sustainable and inclusive development. The CIU engages with public and private sector practitioners to generate unique insights and analysis on emerging innovations in technology for development. Through our insights, we support international donors to build expertise and capacity as they seek to implement digitisation initiatives in low- and middle-income countries through partnerships within the digital ecosystem.

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iCog, formerly iCog-ACC, is an Ethiopian company democratizing access to technology and driving positive social impact by empowering youth with digital skills and innovative solutions, including expertise in Artificial Intelligence (AI). As an affiliate of iCog Labs, a pioneer in AI research and development with over 11 years of experience, iCog leverages this expertise to address grassroots challenges through AI-focused training programmes, impactful product development in sectors like Health, Education, and Agriculture, and expert consultancy services that help organisations integrate AI and other cutting-edge technologies. Over the past eight years, iCog has positively impacted more than 36,000 individuals across 17 Ethiopian cities, partnering with government and community stakeholders to build a democratised tech future powered by AI.

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Acronyms and abbreviations

AASTU	Addis Ababa Science and Technology University
AI	Artificial intelligence
AWS	Amazon Web Services
B2B	Business to business
B2C	Business to consumer
CDR	Call detail records
CSO	Civil society organisation
DFI	Development finance institutions
EAII	Ethiopian Artificial Intelligence Institute
GPU	Graphics processing unit
HPC	High-performance computing
IaaS	Infrastructure as a service
IoT	Internet of things
IVR	Interactive voice response
KYC	Know your customer
LLM	Large language model
LMIC	Low- and middle-income country
ML	Machine learning
MNO	Mobile network operator
MoH	Ministry of Health
MSME	Micro, small and medium enterprise
NLP	Natural language processing
PSNP	Productive Safety Net Programme
R&D	Research and development
RAG	Retrieval augmented generation
SaaS	Software as a service
SML	Small language model
SMS	Short messaging service
USSD	Unstructured supplementary service data
VC	Venture capital

Definitions

Algorithm: A process or set of rules to be followed in calculations, especially by a computer, to solve a problem.

Artificial intelligence: Artificial intelligence (AI) is comprised of widely different technologies that can be broadly defined as "self-learning, adaptive systems."[1] AI has the capability to understand language, solve problems, recognise pictures and learn by analysing patterns in large sets of data.

Compute: The process of performing calculations or computations required for a specific task, such as training an AI model. It also encompasses the hardware components, like chips, that carry out these calculations, as well as the integrated hardware and software systems used to perform computing tasks.[2]

Computer vision: A type of AI that enables computers and other machines to identify and interpret visual inputs from images and videos.[3]

Deep learning: Deep learning is a subset of machine learning that uses multilayered neural networks, called deep neural networks, to stimulate the complex decision-making power of the human brain. Deep learning models can make accurate outputs from raw, unstructured data.[4]

Generative AI: A type of AI that involves generating new data or content, including text, images or videos, based on user prompts and by learning from existing data patterns.

Machine learning: A subfield of AI, broadly defined as the capability of a machine to imitate intelligent human behaviour and learn from data without being explicitly programmed.[5]

Natural language processing: Natural language processing (NLP) is a field of machine learning in which machines learn to understand natural language as spoken and written by humans, instead of the data and numbers normally used to program computers.

Predictive AI: A type of AI that uses statistical analysis and machine learning algorithms to make predictions about potential future outcomes, identify causation and assess risks.[6]

Remote sensing: Acquiring information from a distance via remote sensors on satellites, aircrafts and drones that detect and record reflected or emitted energy. All objects on Earth reflect, absorb or transmit energy, with the amount varying by wavelength. Researchers can use this information to identify different Earth features as well as different rock and mineral types.[7]

1 Definition by the International Telecommunication Union (ITU).
2 AI Now Institute. (2023). Computational Power and AI.
3 Definition taken from Microsoft Azure's dictionary on cloud computing.
4 Definition by IBM.
5 Definition by the MIT Sloan School of Management, based on the definition by AI pioneer Arthur Samuel.
6 Definition by the Carnegie Council for Ethics in International Affairs.
7 Definition by NASA Earthdata.

Executive summary

AI in Ethiopia

Artificial intelligence (AI) has the potential to drive economic growth and address critical development challenges in Ethiopia. While adoption of AI is still in early stages, the country is laying the groundwork for digital transformation. The regulatory environment is evolving, with recent initiatives like the National AI Strategy and the Personal Data Protection Proclamation signalling a growing commitment to responsible AI governance.

The government plays a central role in the development of Ethiopia's AI ecosystem. The Ethiopian Artificial Intelligence Institute (EAII) is spearheading the development of AI solutions across multiple sectors in line with national development priorities. However, the deployment of AI solutions across the ecosystem remains constrained by limited private sector involvement and challenges in attracting investment. Unlike regional tech hubs like Kenya and Nigeria where private sector-led innovation has flourished, Ethiopia's AI ecosystem is predominantly state-driven, with a growing but still underdeveloped startup and research landscape.

Major structural barriers remain. Limited access to high-quality datasets, particularly for local languages and sector-specific applications, restricts the development of AI models. Infrastructure constraints, including a lack of computing power, high import costs for hardware and an unstable power supply, further limit innovation. The country also faces an AI talent shortage with few specialised training programmes and ongoing brain drain, reducing the availability of skilled professionals. Despite this, the recent liberalisation of Ethiopia's telecommunications sector, increasing investment in digital infrastructure, government commitment and the emergence of AI-driven solutions across sectors are all reasons for optimism about the growth of AI.

High-potential use cases

Based on a sector assessment of AI readiness, this study identifies six priority AI use cases with high potential for impact and deployment. These are illustrated by case studies, with examples from Ethiopia and other African markets.

Figure 1

High-potential AI use cases for impact in Ethiopia

Digital inclusion (NLP):
dataset crowdsourcing for small language models

Case study: Leyu, iCog

Finance:
alternative credit scoring

Case study: Qena Decision, Kifiya

Agriculture:
data-driven advisory services

Case study: Farmer.Chat, Digital Green

Education:
adaptive and personalised learning

Case study: Eneza Education/ Knowledge Platform

Healthcare:
disease prediction and detection

Case study: Breast cancer detection, Ethiopia AI Institute

Government services:
smart targeting for social and humanitarian assistance

Case study: MobileAid, Give Directly

This report identifies some of the key considerations for AI deployment and adoption across these use cases. For example, mobile technology presents a major opportunity for AI-driven data generation, processing and service delivery. However, reliance on mobile-generated data risks excluding individuals with limited digital access, particularly in rural and marginalised communities. Ensuring data collection methods are inclusive and addressing bias in AI models will be essential. At the same time, mobile-based AI optimisation for low-end devices, SMS and USSD platforms can help bridge infrastructure gaps and improve accessibility.

Given the central role of government in Ethiopia's AI landscape, securing government buy-in and aligning AI solutions with national priorities will be key to enabling deployment at scale. Additionally, building capacity among key intermediaries, such as agricultural extension agents, teachers and healthcare workers, can help ensure AI solutions reach underserved populations and are integrated effectively in service delivery.

Key recommendations

Realising the full potential of AI in Ethiopia requires targeted investments, policy support and multistakeholder collaboration. Addressing current barriers, including data accessibility, infrastructure gaps, digital inclusion and financing constraints, will be essential to scale the adoption of AI and support emerging use cases.

Table 1
Priority actions for AI deployment in Ethiopia

- **Strengthen Ethiopia's data ecosystem** by expanding efforts to collect, digitise and improve data accessibility while promoting responsible data-sharing frameworks.
- **Advance digital inclusion and capacity building in AI** through targeted literacy programmes, training for key intermediaries and increased awareness at all levels.
- **Enhance AI infrastructure and computing resources** by investing in high-performance computing, reducing import barriers for hardware and improving access to cloud computing.
- **Foster public-private partnerships** to drive adoption of AI, align incentives and establish AI innovation hubs and research collaborations.
- **Leverage mobile technology and edge computing to expand access to AI,** particularly through affordable mobile tools, inclusive data collection methods and AI optimisation for low-power devices.
- **Develop innovative financing models to de-risk AI investments** by promoting blended finance, sustainable revenue approaches and technical support for scaling AI solutions.
- **Invest in AI talent and collaborative innovation** by fostering collaboration between industry and academia, supporting talent retention and establishing AI innovation hubs and research centres.

1. Introduction

1.1 Background

AI holds immense potential to boost Africa's economy and support the Sustainable Development Goals (SDGs) on the continent. AI applications can have transformational social and economic impacts, especially in low- and middle-income countries (LMICs) where innovative approaches to development are most needed. Today, Africa represents only 2.5% of the global AI market yet estimates suggest that AI could boost Africa's economy by $2.9 trillion by 2030 – the equivalent of increasing GDP growth by 3%.[8] This could have a significant impact on development in the continent and help to lift millions out of poverty.

Ethiopia has a comparatively less mature ecosystem than other major economic leaders in the region and faces challenges in areas such as mobile and internet connectivity, smartphone access and foundational infrastructure like energy supply. However, there are key factors that indicate its potential for future growth. The outlook for the country's digital economy remains positive, with increasing efforts from the government to address gaps and provide an enabling environment for AI to develop. The government has been proactive in enhancing the policy environment and is leading the development of multiple AI initiatives, including collaborations with international partners and local research institutions. Although still nascent, the private sector is growing, with some startups deploying AI solutions. Market liberalisation in the telecommunications sector has unlocked investments, enhancing mobile connectivity and driving improvements in digital infrastructure.

8 AI4D Africa. (2024). AI in Africa: The state and needs of the ecosystem.

1.2 Research objectives and methodology

This research seeks to identify AI-enabled use cases that address development challenges across various sectors in Ethiopia. More specifically, it aims to:

- **Assess the current state of AI development in Ethiopia**, identifying key gaps and opportunities within the ecosystem to help AI use cases to grow and scale.
- **Highlight the sectors with the most potential for AI integration,** particularly those that can address significant development challenges in Ethiopia.
- **Conduct a deep analysis of existing AI use cases to understand their practical application,** the challenges faced and the role of ecosystem enablers in deploying them.
- **Provide practical recommendations on how ecosystem actors can further support the deployment of AI solutions in these sectors,** and how they can create a more enabling environment for the development of AI.

To achieve these objectives, the study relied on a combination of desk-based research and key informant interviews. Desk research involved reviewing existing literature, national policy documents and relevant reports. Key informant interviews were conducted with a range of stakeholders, including government officials, private sector representatives and experts in the field. A full list of organisations consulted for the study is provided in Annex 2.

Given the central role of the government in shaping Ethiopia's economy, the research pays particular attention to public sector-led initiatives and their efforts to foster a conducive environment for the adoption and development of AI. At the same time, the study considers the growing contribution of private sector-driven AI solutions, highlighting how these efforts interact with and complement public-sector strategies. The study explores the dynamic interplay between both sectors, looking at the opportunities, challenges and potential for collaboration in the evolving AI landscape. As the Ethiopia AI ecosystem is still nascent, the research features both domestic solutions and relevant innovations from other African countries. These were selected based on their relevance and applicability to Ethiopia in terms of the challenges they address or the enablers they require.

Importantly, the study offers a focussed analysis of selected use cases rather than a comprehensive review of all AI applications in Ethiopia. As such, the findings may not capture the entire – and rapidly evolving – landscape of AI solutions across the country. Instead, they suggest emerging trends. More sector-specific research will be needed to explore the various challenges and considerations in different sectors.

The following section outlines Ethiopia's development priorities and assesses the current state of the AI ecosystem. Section 3 explores high-potential AI use cases in selected sectors, introducing a framework for prioritising sectors and providing case studies of AI applications. Section 4 summarises the key takeaways and lessons learned, and section 5 offers recommendations for stakeholders to support the scaling of AI solutions and create a more enabling environment for AI development in Ethiopia.

2. Development priorities and the state of AI in Ethiopia

2.1 National development priorities and digital initiatives

Ethiopia's development trajectory is anchored in strong government leadership and guided by the 10-Year Development Plan for Ethiopia (2021–2030). This comprehensive roadmap highlights key sectors for growth, cross-cutting priorities and strategic areas of investment. With an average growth target of 10.2% over the duration of the plan, it envisions Ethiopia becoming an "African Beacon of Prosperity" by 2030. The plan builds on past development efforts while addressing persistent challenges and leveraging new opportunities. It is structured around 10 strategic pillars: quality economic growth and shared prosperity, economic productivity and competitiveness, technological capability and digital economy, sustainable development financing, private sector-led economic growth, resilient green economy, institutional transformation, gender and social inclusion, access to justice and efficient civil services and regional peace building and economic integration.

In recent years, the government has also launched ambitious initiatives such as the Homegrown Economic Reform Programme (HGER), the Ethiopian Education Development Roadmap (2018–2030) and the Green Legacy Initiative, which collectively shape priority sectors for AI-led innovation. These include agriculture, healthcare, manufacturing, tourism, education, energy and infrastructure, financial services and government services.

To foster a technology-enabled environment, Ethiopia introduced the Digital Ethiopia 2025 Strategy, aimed at guiding the country's digital transformation journey towards inclusive prosperity. This strategy focuses on building a robust digital economy to support job creation, foreign exchange earnings and equitable growth across sectors. It identifies four pathways to leverage digital technologies based on Ethiopia's economic drivers and national priorities, while emphasising critical imperatives for successful digital transformation.

Figure 2

Key priorities of the Digital Ethiopia 2025 Strategy

Four pathways to prosperity...

Unleashing value from agriculture:
This pathway aims to transform Ethiopian agriculture using digital technologies to improve productivity, efficiency, and market access for farmers. It includes the adoption of technologies such as the Internet of Things (IoT) and blockchain to enhance agricultural practices, supply chain management, and traceability.

The next version of global value chains in manufacturing:
Focused on integrating Ethiopian manufacturing into global value chains through digital innovations, this pathway involves adopting advanced manufacturing technologies, improving digital skills in the workforce, and creating a conducive environment for the digital transformation of manufacturing processes.

Building the it enabled services sector:
This pathway is about expanding the IT and services sectors by developing skilled human capital and infrastructure that support IT businesses and outsourcing. It aims to make Ethiopia a hub for IT services and data processing by leveraging its strategic location and young, educated workforce.

Digital as the driver of tourism competitiveness:
This pathway focuses on utilising digital technologies to enhance the tourism sector's competitiveness. This includes digital marketing of tourist destinations, enhancing the visitor experience through technology, and improving the management of tourist sites through digital tools.

...enabled by seven key imperatives

- Connectivity
- Power
- Enabling systems
- E-Gov
- E-commerce
- Digital skills
- Tech entrepreneurship

Source: Digital Ethiopia 2025 (adapted)

Recognising the potential of AI to accelerate development goals, the Ethiopian Government has initiated several AI-focused efforts. These include partnerships with the Tony Blair Institute for Global Change and the AI for Good Foundation to draft a policy recommendations document that informed Ethiopia's National AI Policy. Finalised in 2024, the policy was shaped through an inclusive process, incorporating insights from Ethiopian experts across AI and various sectors.[9] At the continental level, Ethiopia has contributed to the African Union's Digital Transformation Strategy for Africa (2020–2030) and its AI Strategy, published in July 2024. Aligning the national AI strategy with African Union frameworks presents an opportunity for Ethiopia to advance its AI development goals.

A key milestone in Ethiopia's AI journey was the establishment of the Ethiopian Artificial Intelligence Institute (EAII) in 2020.[10] Overseen by the government, the Institute's mandate includes promoting digital infrastructure for AI, developing and experimenting with AI solutions for socio-economic advancement, shaping AI-related policies and regulations and fostering collaboration with the private sector and academia. Notably, the EAII has partnered with higher education institutions like Addis Ababa University to develop and test AI-driven products, particularly in healthcare and agriculture.[11]

9 Artificial Intelligence Institute. (27 June 2024). "The Council of Ministers Unanimously Decide to Implement the National Artificial Intelligence Policy".
10 See Ethiopian Artificial Intelligence Institute website.
11 ENA News Network. (24 November 2023). "Nation enhancing AI tech to modernise, enhance efficiency: Institute Director General".

Table 2

Key technology and AI-related policies in Ethiopia and Africa

Domestic policies

National AI Strategy (2024)	The policy envisions Ethiopia becoming a centre of AI development excellence in Africa by 2035. It focuses on investing in data infrastructure, enhancing AI accessibility through improved infrastructure and connectivity, supporting AI startups, investing in education and training for skilled personnel and establishing a comprehensive regulatory framework for sustainable and ethical growth in AI. The policy also acknowledges the potential of AI in key sectors such as agriculture, healthcare, water and energy.
Personal Data Protection Proclamation (2024)	Establishes significant safeguards for data privacy and security. The law delineates the rights of data subjects, imposes obligations on data processors and controllers and sets requirements for the protection of these rights during cross-border data transfers. These regulatory measures also support the implementation of the Ethiopian Digital Identification Proclamation, which aims to develop a national ID System.[12]
Digital Strategy 2020–2025	The strategy acknowledges Ethiopia's nascent digital economy, with limited private sector involvement and ongoing government-led digitalisation efforts. It aims to create a unified vision to advance Ethiopia's development, foster an inclusive digital economy and serve as a framework for specific, actionable plans. It focuses on enhancing infrastructure, enabling systems like digital ID and cybersecurity and improving digital interactions through e-governance and e-commerce. It outlines short-term projects to strengthen these areas, boost tech entrepreneurship and advance digital payments and e-commerce.
10-Year Development Plan of Ethiopia 2021–2030	The 10-Year Development Plan aims to transform Ethiopia into an "African Beacon of Prosperity" by improving income levels, ensuring access to essential services and creating an environment where citizens can thrive. It focuses on 10 strategic pillars: quality economic growth, productivity, technological advancement, sustainable financing, private sector growth, a green economy, institutional transformation, gender inclusion, efficient civil services and regional peace and integration. The plan addresses macroeconomic and structural challenges to achieve long-term prosperity.

Regional policies

Continental AI Strategy: Harnessing AI for Africa's Development and Prosperity (2024)	The strategy identifies five areas where the benefits of AI can help unlock socio-economic development in African countries: maximising the benefits of AI across key sectors, building capabilities for AI, minimising risks, enhancing collaboration and partnerships, and encouraging public and private sector investments in AI.
African Union's Digital Transformation Strategy for Africa (2020–2030)	The strategy emphasises the crucial role of digital technologies, including AI, in advancing socio-economic development in Africa. It aims to establish a secure digital single market in Africa by 2030, ensuring universal, affordable and high-speed internet access. It focuses on creating a harmonised policy environment, closing digital infrastructure gaps and enhancing digital skills. It also emphasises strong cybersecurity, digital identity and sector-specific digitalisation while supporting the Pan-African "E" programme for transformative e-services.

12 Kaaniru, J. and Muindi, P. (12 November 2024). "Ethiopia's Personal Data Protection Proclamation of 2024 and its Budding Digital Identity Regime".

2.2 The state of AI in Ethiopia: an overview of the ecosystem

The growth of the AI ecosystem depends on an enabling environment that promotes research and development (R&D), fosters partnerships and encourages funding, as well as strengthening AI fundamentals, including data, computing and skills. While Ethiopia has made strides in these areas, addressing gaps will be crucial to unlocking the full potential of AI across the country.

Ecosystem overview

The Ethiopian AI ecosystem, while featuring a mix of local and international actors, is still relatively nascent, with limited diversity and maturity. Local institutions and organisations are driving efforts to establish the ecosystem while international actors, such as development organisations and development finance institutions (DFIs), help address critical gaps, particularly in funding. Unlike other African countries, Ethiopia has not yet attracted global technology giants like Google's AI research lab in Ghana, IBM's research labs in Kenya and South Africa, or Microsoft's AI for Good Labs in Kenya and Egypt. Recent liberalisation efforts mean the public sector still leads most AI initiatives, with government agencies, such as the EAII, playing a prominent role as solution providers, often through partnerships with local organisations.

Figure 3

Key tech and AI actors in Ethiopia

Source: Author's analysis

Startups are emerging, with some working on AI-related software and product development to provide AI solutions.[13] These include iCog Labs, Guzo Technologies, Garri Logistics and Telliscope – the latter two supported by the Google for Startups Accelerator Programme.[14] These companies highlight the growing potential of private-sector contributions to Ethiopia's AI ecosystem. Historically, startup activity in Ethiopia has been minimal, with limited funding and few companies prior to 2015, primarily due to underdeveloped entrepreneurial infrastructure, restricted access to capital and a lack of enabling policies. However, the past decade has seen a significant increase in new ventures, particularly in sectors aligned with global trends such as technology. The total enterprise value of Ethiopian startups reached just over $300 million in 2024, with significant growth from firms founded since 2020. Despite this progress, the startup ecosystem is still in early stages, especially compared to more established markets in Africa.[15]

Lack of access to financing continues to restrict the ability of startups to scale their products and services. Of the 562 companies identified in the ecosystem, 516 have secured some funding, a sign of growing investor interest and a flourishing ecosystem.[16] However, early-stage funding remains sparse and mid-size funding inconsistent, with most funding concentrated among a few standout firms. The most funding raised by a single company to date is $42 million, yet average funding remains modest at $0.24 million, reflecting the challenges many startups face in accessing substantial capital to scale.[17] Limited venture capital (VC) activity, reflected in Ethiopia's low Global Innovation Index score for VC deals,[18] is compounded by high borrowing costs, weak investor networks, a nascent entrepreneurial culture, high aversion to risk and limited exit opportunities. Together, these factors hinder the development of private sector leaders in AI deployment, leaving most innovation efforts reliant on public and international support.

Academic and research institutions face similar obstacles in their efforts to encourage innovation. With inadequate access to critical infrastructure and resources for R&D, innovation remains nascent. Only two companies have reported holding patents, highlighting a potential gap in intellectual property creation and protection.[19] These limitations restrict the ability of institutions to produce cutting-edge AI research or train the skilled workforce needed to sustain ecosystem growth. As a result, public-sector institutions such as the EAII and the Bio and Emerging Technology Institute (BETin) play a dominant role in driving R&D and shaping the national AI agenda. Meanwhile, universities, despite their potential, remain constrained by chronic underfunding and resource limitations. Institutions like Addis Ababa Science and Technology University (AASTU), which has established a dedicated AI Centre of Excellence, struggle to bridge these gaps. This is reflected in Ethiopia's poor performance in global rankings such as the Global Innovation Index, which highlights deficits in R&D.

Table 3
Country ranks for investment and R&D
(rank out of 133 countries, 2024)

	Investment	R&D
Ethiopia	115**	98
Kenya	31	89
Nigeria	55	99
South Africa	23*	51

*strength relative to income group
** weakness relative to income group
Source: Global Innovation Index

13 Jima, W.D., Tarekegn, T.A. and Debelee, T.G. (23 February 2024). "State of artificial intelligence eco-system in Ethiopia". AI and Ethics.
14 Africa.com. (10 October 2023). "Google announces 11 African Startups for Inaugural Africa AI First Accelerator Program".
15 Research and Innovation Systems for Africa (RISA) Fund. (December 2024). The State of Startup Innovation in Ethiopia: Mapping Valuations, Investment and Employment.
16 Via the Startup Data Hub.
17 Research and Innovation Systems for Africa (RISA) Fund. (December 2024). The State of Startup Innovation in Ethiopia: Mapping Valuations, Investment and Employment.
18 World Intellectual Property Organization (WIPO). (2024). Global Innovation Index 2024: Unlocking the Promise of Social Entrepreneurship. 17th Edition.
19 Research and Innovation Systems for Africa (RISA) Fund. (December 2024). The State of Startup Innovation in Ethiopia: Mapping Valuations, Investment and Employment.

The government is taking steps to address these gaps through investments in tech hubs. Examples include the Ethio ICT Village (€87 million), the 1888 EC Venture Studio, which co-invests in digital startups and the Orbit Innovation Hub, supporting early-stage solutions and scientific research. International collaborations, such as Google's AI accelerator programme, bolster innovation efforts while development actors and DFIs are also helping to fill financing gaps. The Mastercard Foundation supports startups and Gates Foundation invests in AI-driven health initiatives. Similarly, initiatives such as the Artificial Intelligence for Development (AI4D) programme, a collaboration between Canada's International Development Research Centre (IDRC), the UK's Foreign Commonwealth and Development Office (FCDO) and the Swedish International Development Cooperation Agency (Sida), aim to address research gaps by establishing multidisciplinary research labs.

2.3 The state of AI in Ethiopia: the AI fundamentals

Data

Ethiopia's data ecosystem faces persistent challenges, especially with government data that remains largely inaccessible, fragmented and poorly curated. Efforts to organise and share data through government partnerships have been hindered by structural inefficiencies and lack of coordination. Each ministry maintains separate datasets without systematic cross-sectoral sharing, limiting decision-making potential and innovation. This siloed approach, combined with monopolistic structures in sectors like energy, reduces incentives for adopting AI and innovation. This is illustrated by Ethiopia's Open Data Inventory ranking, at 132nd worldwide with an overall score of 41, underscoring the need for more accessible and complete statistical data that meet international standards.[20]

Domain-specific data necessary for building AI solutions and making data-driven decisions have been limited due to inefficiencies. For example, it was anecdotally reported that Ethiopia's satellite programme, supported by China, was initially intended for agricultural data collection but may have focussed primarily on mapping the Renaissance Dam. This shift in focus highlights potential areas where greater alignment could have benefited crucial sectors such as agriculture and climate monitoring. Like other African countries, Ethiopia also lags in curating data for its diverse languages, but some ongoing initiatives are addressing gaps. iCog has developed Leyu, a platform that uses a hybrid crowdsourcing model to create accurate and diverse datasets for low-resource languages, enabling AI applications in agriculture, healthcare and education. Similarly, Lesan AI, a startup developing automated translation products, has launched translation tools for Amharic and Tigrinya. The startup uses offline print resources to create a new benchmark dataset for local languages.[21]

The lack of clear data-sharing frameworks undermines private-sector investments that gather, curate and make data accessible. A limited number of startups use data that is internally generated or data from third parties such as government or private institutions. Ethiopian companies have limited experience with digital data capturing and sharing, and private players are reluctant to share their company data. As a result, most local developers and researchers must rely on third-party and open-source data that is not always locally relevant.[22]

Establishing systematic, high-quality data collection frameworks could bridge these gaps, creating pathways to better infrastructure and resources for AI solutions addressing Ethiopia's local needs. The National AI Policy, released in 2024, recognises the need to invest in data collection, storage and management systems to develop and integrate data infrastructure, as well as tackle issues of data privacy and ethics through the implementation of a comprehensive AI regulatory framework. The 2024 Personal Data Proclamation also establishes significant safeguards for data privacy and security. As with any new policy, the early stages of implementation will reveal practical challenges and complexities that can only be identified and addressed through real-world implementation, providing valuable opportunities for refinement and improvement.

20 Open Data Inventory 2022/2023. (2023). "Ethiopia".
21 Deck, A. (11 July 2023). "The AI startup outperforming Google Translate in Ethiopian Languages". Rest of World.
22 Jima, W.D., Tarekegn, T.A. and Debelee, T.G. (23 February 2024). "State of artificial intelligence eco-system in Ethiopia". AI and Ethics.

Infrastructure and compute capacity

Ethiopia's compute capacity is still in early stages but growing rapidly, with substantial investments from the public and private sectors driving its development. The government and private companies are increasingly setting up data centres. With the launch of the EAII in 2020, the government established a Tier III data centre, which provides services for government agencies and financial institutions.[23] Companies have also established data centres, primarily in Addis Ababa's ICT Park. Ethio Telecom, the country's leading MNO, initiated co-location services in 2021 while Safaricom Ethiopia has built multiple Tier III data centers, with future plans to deploy Tier IV infrastructure if demand rises. New private-sector entrants, such as Wingu Africa, RedFox Solutions and Raxio have invested in data centre facilities focussing primarily on co-location, cloud and digital services, and targeting sectors like finance, media and telecommunications.[24,25]

Table 4

Data centre announcements and launches after liberalisation

Date	Company	Event	Details
May 2021	Ethio Telecom	Data centre inaugurated	800-rack Tier III data centre, replacing an existing data centre
December 2021	Safaricom Ethiopia	First data centre in Addis Ababa	1,000m², 26-rack Tier III data centre
March 2022	Safaricom Ethiopia	Second data centre in Addis Ababa	1,000m², 26-rack Tier III data centre
September 2022	Safaricom Ethiopia	Announced plans to upgrade first data centre	2,000m², 52-rack Tier III data centre
September 2022	RedFox	Data centre went live	5,733m²
September 2022	RedFox	Announced plans for three modular data centres	N/A
June 2023	Wingu.Africa	Data centre inaugurated	15,000m², 10MW, 800-rack Tier III data centre
October 2023	Safaricom Ethiopia	First data centre upgraded, third data centre delivered	10,000m², 126-rack Tier III data centre in the ICT park
November 2023	Raxio Ethiopia	Data centre launched	2,000m², 3MW, carrier-neutral, Tier III data centre located in the ICT park in Addis Ababa that can house up to 800 racks with 99.9% uptime
Planned	ScutiX	N/A	N/A
Planned	Sun Data World	N/A	N/A

Source: British International Investment
Note: Data centre tiers are a standardised ranking system that indicates the reliability of data centre infrastructure. This classification ranks facilities from 1 to 4, with 1 being the worst performing and 4 the best performing.

23 A Tier III data centre is a data centre with multiple paths for power and cooling, and redundant systems that allow staff to work on the setup without taking it offline. This tier has an expected uptime of 99.982% per year. See Uptime Institute.
24 Jima, W.D., Tarekegn, T.A. and Debelee, T.G. (23 February 2024). "State of artificial intelligence eco-system in Ethiopia". AI and Ethics.
25 Streule, I. et al. (October 2024). "Impact of investment in the Ethiopian telecoms market – the story so far". British International Investment (BII).

Despite increasing investment, computing capacity remains limited and faces substantial challenges. Existing facilities focus mainly on co-location services, which, while essential, do not fully address broader needs for high-performance computing (HPC) and the data processing capabilities required for advanced AI applications.[26]

"Data storage space is accessible, but compute power for training is not available. We can get it from abroad, but it makes it very expensive."

– Tech company

The instability of the power grid significantly hampers the scaling of HPC in Ethiopia, posing a particular challenge for sustaining energy-intensive AI models and supercomputing environments. Alongside these infrastructure limitations, local organisations face high costs for specialised hardware and limited access to affordable computing power. The cost barrier is compounded by heavy import taxes, which inflate the price of essential equipment. Access to cloud services, such as Amazon Web Services (AWS), represents another challenge due to foreign exchange restrictions. Financial regulations limit the ability of local entities to pay for services in foreign currencies, necessitating conversion through local banks, which adds bureaucratic layers and incurs significant costs.

"Computers priced at $2,000 internationally can reach $5,000 to $6,000 after import duties, making them unaffordable for many developers and companies."

– Tech entrepreneur

There are opportunities to optimise energy use by leveraging surplus power from Ethiopia's hydropower resources. The country is uniquely positioned to support the growth of data centres through its abundant natural resources, particularly hydropower. Ethiopia is home to some of Africa's largest hydropower plants, including the Grand Ethiopian Renaissance Dam, which, once fully operational, will generate more than 6,000 megawatts (MW) of renewable energy.

This clean power could be used to fuel data centres, reducing the carbon footprint of energy-intensive computing. The government is also increasingly working with international private sector stakeholders. For example, in 2024, Ethiopia Electric Power earned more than $55 million through power purchase agreements (PPAs) for affordable renewable energy with bitcoin miners. Similar collaboration with AI infrastructure providers will go a long way towards supporting the development and growth of AI solutions in Ethiopia.[27]

There is also great potential to leverage edge computing.[28] Ethiopia has made significant strides in the telecoms sector since the liberalisation of the sector over the past few years. Safaricom's entry into the market has considerably reduced mobile data costs by up to 70%, increased mobile network coverage and improved access to high-quality data services, particularly through the expansion of 4G networks.[29] This opens opportunities to leverage mobile-based edge computing to facilitate processing and analysis closer to end users.

However, access to mobile devices is still limited by affordability. In 2022, 56% of men and 44% of women who do not own a mobile phone reported that the lack of an affordable handset was the top reason why.[30] High costs of smartphones are particularly prohibitive – as of 2021, the cost of a smartphone represented almost 97% of average monthly income in Ethiopia.[31] Despite this, smartphone adoption is expanding rapidly and is expected to reach 80% of the population by 2030. Ethiopia is expected to be the third-leading smartphone market in Sub-Saharan Africa by 2030, with 97 million connections.[32]

26 Co-location services involve renting physical space and power for servers and network equipment in a secure data centre, which businesses then use to house their own IT infrastructure. Co-location-only facilities do not provide the computing power, storage or flexible resources required for AI, machine learning or advanced analytics.

27 Harter, F. (4 November 2024). "Ethiopia turns to bitcoin miners to power growth and green energy". The Africa Report.

28 Edge computing complements traditional cloud computing by providing a decentralised approach to data processing, with tasks taking place entirely on devices such as mobile devices or laptops.

29 Streule, I. et al. (October 2024). "Impact of investment in the Ethiopian telecoms market – the story so far". British International Investment (BII).

30 GSMA Consumer Survey 2022.

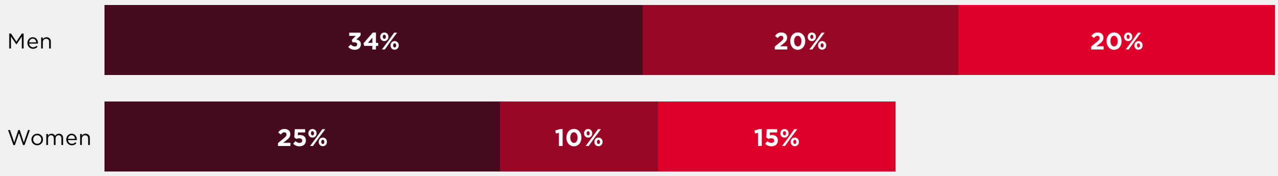
31 Alliance for Affordable Internet (A4AI). (7 October 2021). "Device Pricing 2021".

32 GSMA. (2024). The Mobile Economy Sub-Saharan Africa 2024.

Figure 4

Total population by handset type

Percentage of total adult population, 2023



Source: GSMA

Skills

To advance Ethiopia's digital strategy, the country has prioritised training youth in ICT and has introduced a quota requiring 70% of university students to enrol in science, technology, engineering and mathematics (STEM) courses.[33] With 53% of the population under 25, there is strong potential to build a robust AI talent pool. Multiple universities across Ethiopia are offering programmes in AI and related courses. AASTU houses the Artificial Intelligence and Robotics Centre,[34] which provides MSc and PhD courses as well as workshops and training programmes to disseminate knowledge in interdisciplinary areas. The Government of Ethiopia and the Government of the United Arab Emirates have also launched a joint programme to create 5 million coders in Ethiopia with basic skills in programming, data science and AI.[35] However, limited access to cutting-edge equipment, including robotics materials and computing infrastructure, affects the quality of the programme and research outputs.

Private-sector initiatives are addressing some gaps, but to a limited extent. For example, Microsoft and Gebeya, a pan-African software as a service (SaaS)-enabled tech talent marketplace, partnered in 2023 to upskill developers across eight African countries, including Ethiopia, over the next three years.[36] As part of this initiative, Ethiopia's first SkillsLab was launched, which provided apprenticeship training to more than 1,200 university graduates, building their digital skills and coding capabilities. 10 Academy, a not-for-profit headquartered in Ethiopia, is also upskilling African youth in AI and machine learning (ML).[37] In addition, many young developers are self-taught, using online resources to build their skills independently.

Despite these positive initiatives, several challenges hinder the development and retention of AI talent in Ethiopia. A significant issue is the job market, where graduates struggle to find opportunities and often turn to remote work as an alternative. The local market remains underdeveloped and offers limited competitive salaries, contributing to a brain drain as talented developers seek more rewarding opportunities abroad. There is a concern that Ethiopia risks becoming an outsourcing hub rather than developing AI solutions for domestic needs in areas such as agriculture, healthcare and education. Outsourcing limits the creation of a sustainable local market, reducing the potential impact of AI on the country's economic and social development. Market limitations exacerbate these issues, and government projects account for a substantial portion of available work, limiting private-sector growth and leaving little room for local companies to flourish.

"Many young developers graduate with a good understanding of AI and machine learning and quickly advance to mid-level roles, but many then leave Ethiopia, contributing significantly to the brain drain. We need to retain more senior experts to develop innovative services and guide younger talents."

– Tech startup

33 Global Information Society Watch. (2019). The thriving AI landscape in Ethiopia: Its implications for human rights, social justice and development.
34 See: Artificial Intelligence & Robotics Center of Excellence.
35 See: 5 Million Ethiopian Coders initiative.
36 Business Insider Africa. (14 December 2023). "Microsoft and Gebeya join forces to take 30,000 African software developers to the cloud with AI."
37 See: 10 Academy.

3. High-potential AI use cases for Ethiopia

AI has the potential to have a significant impact across various sectors in Ethiopia. Domestic use cases are already emerging, highlighting the growing role of AI in sectors crucial for the country's development, from agriculture to healthcare, education and finance. There are also substantial opportunities to harness AI in sectors grappling with significant challenges, such as energy and humanitarian assistance. Within these sectors, we identify high-potential use cases where AI can make a transformative difference. In our analysis, we draw on both existing local innovations and relevant solutions from other Sub-Saharan African countries.

3.1 A framework for prioritising sectors

To systematically identify Ethiopia's high-potential AI use cases, we developed a framework based on three criteria: alignment with national development priorities, supply-side momentum and the scale of potential impact. This approach ensures that sectors are evaluated holistically, balancing their current readiness with their potential to deliver impactful solutions.

1. **Alignment with national development priorities:** assesses how closely a sector aligns with Ethiopia's strategic goals and policy frameworks. Such alignment ensures buy-in from key stakeholders and is more likely to encourage public-private partnerships (PPPs).
2. **Supply-side momentum:** refers to the current state of innovation, identifying existing solutions and initiatives and reflecting the sector's readiness for AI integration and scaling.
3. **Scale of potential impact:** evaluates the scale of potential impact, considering how many people or stakeholders stand to benefit from AI-driven solutions and the urgency of addressing the sector's challenges.

The framework categorises sectors into four maturity levels – Advanced, Intermediate, Emerging and Nascent – based on their readiness for AI integration and transformative impact. Each level reflects the sector's combination of alignment with national priorities, readiness for AI adoption and potential for transformative impact.

- **Advanced:** Sector is aligned with national priorities, demonstrates high potential for impact and some innovation on the supply side, but still needs to achieve scale. These sectors, such as agriculture and healthcare, have significant potential to scale in the short to medium term.
- **Intermediate:** Sector is closely aligned with national priorities and has high potential for impact, but has only moderate supply-side momentum. These sectors, like finance and government services, require further investment in infrastructure, capacity building and scaling efforts to accelerate AI adoption.
- **Emerging:** Sector has low supply-side momentum but high potential for impact. These sectors align either closely (e.g. digital inclusion, education) or moderately (e.g. climate action and humanitarian assistance) with national priorities. Given Ethiopia's nascent AI ecosystem, most sectors fit into this category, requiring foundational work, ecosystem investments and proof-of-concept projects to realise their potential.
- **Nascent:** Sector is in early stages of development with few opportunities for AI integration and limited momentum on the supply side. These sectors, such as energy and infrastructure, tourism and manufacturing, are currently smaller scale and have less potential for immediate impact. However, they represent long-term economic opportunities, contingent on substantial investment in foundational infrastructure, market awareness and ecosystem development to unlock their potential at scale.

Table 5
Sectoral assessment of AI readiness in Ethiopia

	Alignment with national development priorities	Supply-side momentum	Scale of potential impact	AI readiness and maturity
Digital inclusion (NLP)	High	Moderate	High	Emerging
Agriculture	High	High	High	Advanced/ Potential to scale
Healthcare	High	High	High	Advanced/ Potential to scale
Financial services	High	Moderate	High	Intermediate
Education	High	Low	High	Emerging
Government services*	High	Moderate	High	Intermediate
Energy and infrastructure	High	Low	Moderate	Nascent
Tourism	High	Low	Moderate	Nascent
Manufacturing	High	Low	Moderate	Nascent
Climate action	Moderate	Low	High	Emerging
Humanitarian/ social assistance	Moderate	Low	High	Emerging

*Note: Government services include social services, public safety, regulatory and economic services.
Source: Author's analysis. See Annex 1 for details.

3.2 AI use cases and case studies by sector

Building on this assessment, we now focus our analysis on sectors with advanced, intermediate and emerging maturity levels. These include digital inclusion, agriculture, healthcare, education, finance and government services. By concentrating on these sectors, we aim to identify actionable AI use cases that can drive short- to medium-term development while laying the groundwork for longer-term opportunities. For each sector, we highlight one promising use case and include case studies from domestic and regional contexts to illustrate how AI can address sector-specific challenges.

USE CASE SPOTLIGHT

Digital inclusion (NLP): dataset crowdsourcing for small language models

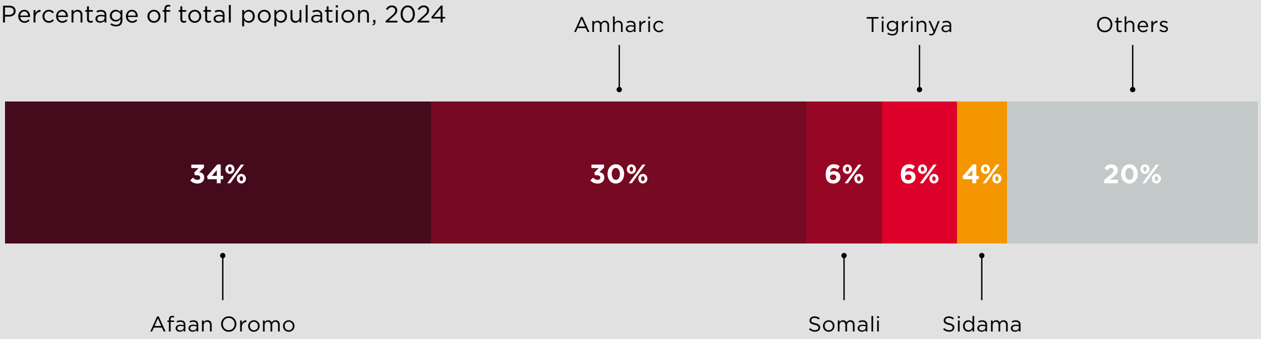
The problem: The development of relevant AI solutions in Sub-Saharan Africa is hindered by a lack of local and indigenous languages data. This exacerbates the digital divide and prevents countries from benefitting from generative AI. Only 0.02% of internet content is in African languages, compared to 53% in English.[38] As a result, existing large language models (LLMs), primarily trained on data from Western and English-speaking countries, fail to capture regional realities, leading to biases and inaccuracies when applied in African contexts.[39] In Ethiopia, where more than 80 languages are spoken, only Amharic (the official language) has some digital content. Other languages are considerably underrepresented and limited compared to international languages. Existing digital content is also often protected by copyright, which means scraping data from the internet for model training is not always a legal option. This increases the need for ethical and transparent approaches to data collection.

Use case description: Dataset crowdsourcing for low-resource languages involves collecting high-quality linguistic data to develop AI models, including small language models (SLMs), optimised for specific, underserved languages and dialects. Unlike LLMs, which require vast amounts of generalised data and HPC, SLMs focus on efficiency and contextual relevance, making them ideal for regions with limited infrastructure or specialised linguistic needs. NLP techniques are central to these models, enabling them to understand and generate human language. Crowdsourcing plays a key role by allowing communities to contribute locally relevant data, such as conversations, voice recordings and cultural texts, that reflect their linguistic diversity. This approach ensures that datasets are collected ethically, obtain informed consent from contributors and comply with legal frameworks. This mitigates the risks associated with web scraping while also demonstrating transparency regarding data sources. Once collected, these high-quality, domain-specific datasets can be used to train AI models that support applications in key sectors such as education, agriculture and health, providing tools that work effectively in local languages.

Figure 5

Languages spoken in Ethiopia

Percentage of total population, 2024



Source: World Population Review

38 African Observatory on Responsible Artificial Intelligence. (1 August 2024). AI in Africa: The state and needs of the ecosystem – Diagnostic and solution set for data.
39 Humeau, E. and Deshpande, T. (2024). AI for Africa: Use cases delivering impact. GSMA.

Key considerations

Data quality and diversity: Collecting linguistic data from diverse contributors can result in inconsistent contributions. Clear annotation standards, community training and validation by linguistic experts are essential to ensure data is accurate and relevant. Additionally, a slow process of collecting domain-specific terms and contextual phrases, particularly for sectors like healthcare, education or agriculture, requires the integration of secondary specialised data.

Community engagement and incentives: Crowdsourcing relies on active community participation, which requires meaningful incentives and clear communication of benefits. Incentives include the opportunity to earn an income, as well as to contribute to digital development and feel part of a growing ecosystem, empowering local communities to make an impact. In addition, establishing consent mechanisms and ensuring data privacy through anonymisation and aggregation are crucial for sustaining engagement and trust.

Technical limitations and resource scarcity: Limited internet access, unreliable electricity and low digital literacy may impede data collection and submission. Developing SLMs through crowdsourcing in underserved areas must consider technical limitations like the availability of high-performance computing infrastructure, requiring lightweight models and efficient NLP techniques tailored to local contexts. Offline solutions, such as paper-based transcription or mobile apps working without internet, can help address these barriers.

Regional applications

GH — **Ghana NLP**: open-source initiative focused on NLP of Ghanaian languages and its applications to local problems.

ET — **Leyu:** crowdsourcing initiative building low-resource language datasets.

RW — **Pindo AI:** provides voice recognition and NLP services to tailor AI models to Africa language and dialects.

Digital Umuganda: creates and promotes open-source datasets, models and tools that make it possible for NLP and LLMs to work for low-resourced languages.

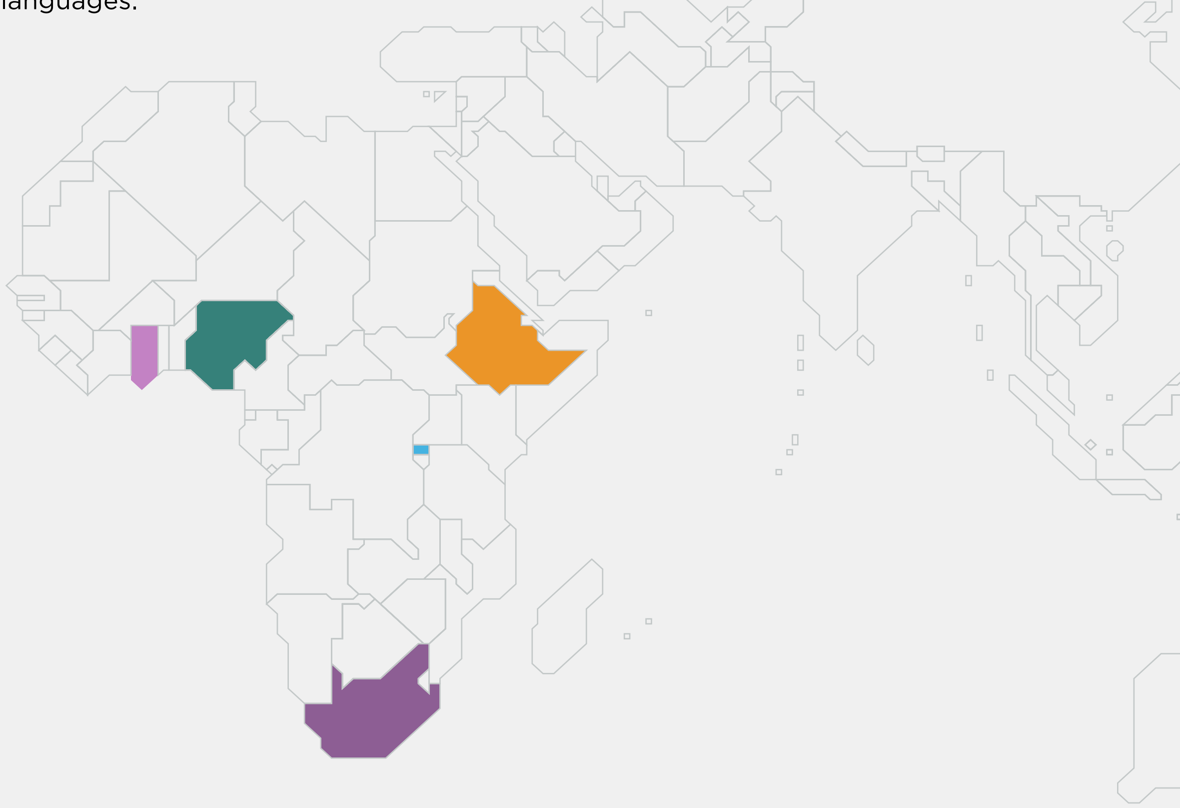
NG — **Awarri:** developing an LLM based on both text and audio datasets.

SA — **Lelapa AI:** developed a multilingual LLM aimed at supporting and enhancing low-resource African languages.

REGIONAL

Masakhane: grassroot initiative that aims to strengthen and spur NLP research in African languages.

Mozilla Common Voice: crowdsourcing project to create an open-source voice dataset and mitigate bias in AI.



Case study:
Leyu, iCog – Ethiopia

Technology company iCog, an affiliate of iCog Labs – an AI research and development lab – focuses on enabling children and youth in Ethiopia to access technology. Through tech education, innovative AI research and solutions development, iCog addresses pressing challenges faced by children and young people across the nation. Over the past eight years, iCog has built a network of young people in 17 cities, reaching more than 36,000 individuals. iCog is working to build a more inclusive and decentralised tech ecosystem in Ethiopia by fostering partnerships with government, academia and community organisations.

AI solution

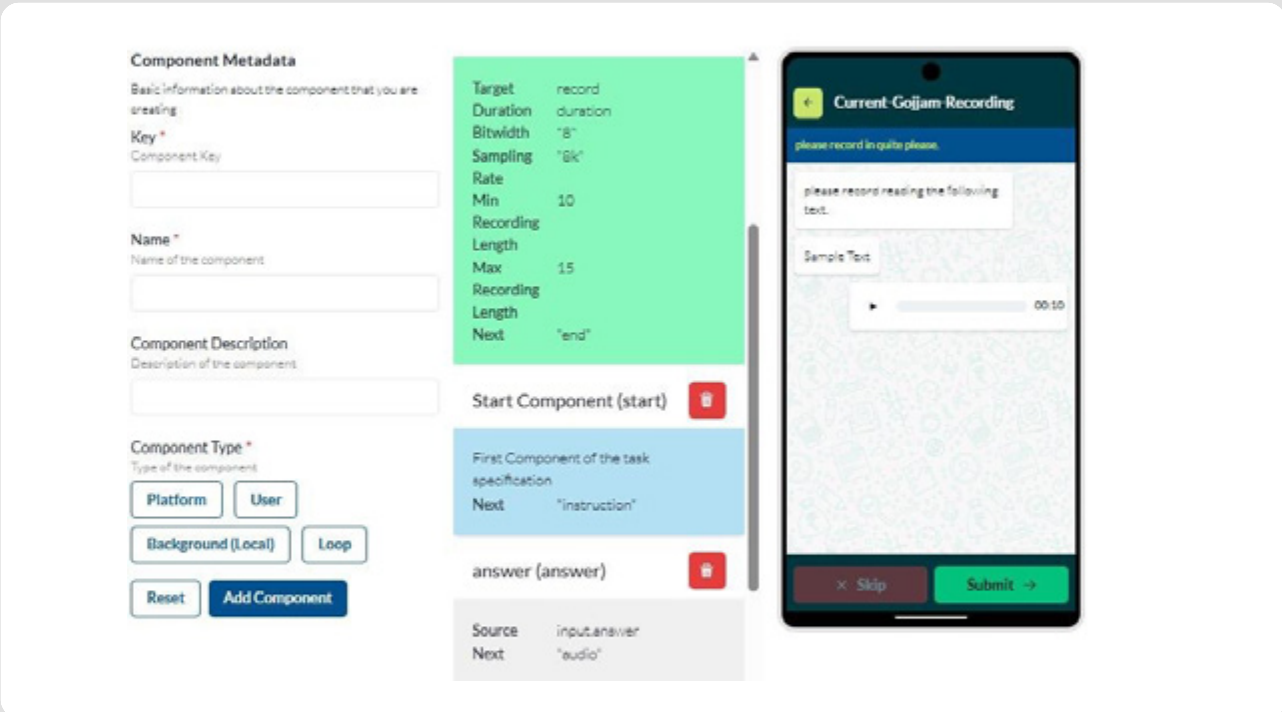
iCog developed Leyu, a platform designed to provide high-quality datasets for low-resource languages using a crowdsourcing model. Named after the Amharic word for "identify" or "label", Leyu promotes inclusivity and accuracy in language data, making technology more accessible and culturally relevant. It enables businesses and organisations to enhance their AI and digital solutions through NLP. With Leyu, iCog is initially targeting five Ethiopian languages and their dialects: Amharic, Afaan Oromo, Tigrinya, Af-Somali and Sidama.

Leyu uses an ethical crowdsourcing model to source, collect and deliver high-quality linguistic datasets, through engagement with local communities. Native-speaking contributors, particularly women, youth and underrepresented groups, are recruited and trained to ensure the authenticity and cultural relevance of the data and adherence to stringent quality and privacy standards. Contributors submit text and speech datasets, guided by data prompts and supplemented by curated text data from publicly available sources, such as books, government documents and online platforms, ensuring diverse and comprehensive datasets.

Figure 6

Leyu platform: Speech data collection configuration and recording interface

Percentage of total population, 2024



Source: Leyu[40]

40 Provided by the iCog team

These datasets undergo rigorous review and categorisation by language experts from universities and linguistic professionals in target areas. Both contributors and reviewers are compensated fairly, earning double the minimum wage. Verified datasets are made accessible for AI and digital solutions, with an emphasis on sector-specific data for industries like healthcare, education and agriculture. Additionally, Leyu is developing a youth-focused AI chatbot to deliver personalised, confidential and culturally relevant sexual and reproductive health information.

Once datasets are fully developed and verified, they are made accessible on the Leyu marketplace, providing organisations with high-quality, ready-to-use linguistic data to power AI models and digital solutions. These datasets also support Leyu's ongoing innovation efforts, enabling the development of NLP tools and AI models that address pressing local challenges.

Solution profile:

Year established: 2024

Business model: B2B/B2C

Cost model: freemium, paid for commercial users

Funding: grants

Target users: businesses, individuals

Delivery channel: mobile app, web app

Technology:

Data: text, speech, labels, annotations, multilingual audio

Team: in-house (data scientists, data engineers, data annotators/labellers, ML engineers, NLP engineers, speech recognition engineers)

Type of AI: generative AI (in development)[41]

Progress and impact

Although its models are still under development, iCog has begun collecting and analysing data for speech-to-text and text-to-speech applications. It has partnered with Karya, an Indian crowdsourcing platform with extensive experience in data collection. This collaboration enabled Leyu to launch its platform and complete its initial implementation phase, laying the technical foundation. iCog has also collaborated with government ministries, academic institutions and community organisations on data collection, outreach and validation efforts.

In February 2025, iCog released its first voice dataset for letters and words in Amharic, Tigrinya, Somali and Afaan Oromo on its marketplace. It aims to collect 50,000 hours of voice data for these languages before building domain-specific datasets tailored to sectors like agriculture and healthcare. iCog plans to make these datasets freely available to researchers and fine-tune existing language models with its data. In parallel, iCog aims to develop commercial applications for its language models, subject to licensing fees.

Ecosystem constraints

iCog is facing several challenges that affect its ability to scale Leyu and ensure accuracy, particularly in managing and supporting its crowdsourcing approach. A key focus is providing training and digital literacy support to data contributors to ensure high-quality data collection. This requires sustained investment in capacity building, quality assurance mechanisms and technical infrastructure to streamline the data annotation and validation process. iCog's ability to train NLP models is also constrained by limited access to high-performance hardware like graphics processing units (GPUs), essential for processing large datasets and training deep learning models. The organisation allocates a significant proportion of its available resources to acquiring this infrastructure, leaving less room for investments in other areas.

Leyu benefits from AI talent through iCog Labs but faces challenges in retaining skilled professionals due to brain drain and high turnover. The company has felt the effects of outsourcing, with many trained individuals leaving for higher-paying remote jobs. The shortage of senior experts in particular hinders skill development, as young talent require guidance from experienced professionals to contribute to local innovation. Financing challenges also limit iCog's capacity to hire additional talent and scale operations. Leyu is funded primarily by mission-aligned grants that support its operations. In an early-stage tech ecosystem, the lack of VC, accelerators and sustainable PPPs also limit their potential for scale.

41 Leyu is in the developmental phase for a generative AI system, with the first datasets expected to be released in Q1 2025.

USE CASE SPOTLIGHT

Agriculture: data-driven advisory services

The problem: Agriculture is a cornerstone of many African economies, employing 52% of the workforce and contributing 17% to GDP, on average.[42] The majority of the continent's food is produced by smallholder farmers, who often rely on outdated practices and lack access to critical information to improve planning, reduce inefficiencies and boost yields. Agricultural extension services, usually government-supported, provide essential support by offering advice on best practices, providing training and disseminating information. However, these systems face challenges such as resource constraints and inefficiencies. In Ethiopia, around 70,000 extension agents serve 17 million smallholder farmers who produce 95% of the country's agricultural output.[43,44] With one agent supporting approximately 250 farmers, it is difficult to have a positive impact at the farm level.

Use case description: AI-enabled advisory services provide a scalable solution to enhance agricultural extension, leveraging AI tools to deliver actionable insights directly to farmers through mobile devices. These services integrate a variety of data sources – weather and climate data, farm-level agronomic data, remote-sensing data and domain-specific data – to generate precise, localised advice. By offering recommendations on optimal planting times, crop rotation, irrigation schedules and pest management strategies, AI-enabled advisory services enable farmers to make informed decisions. Additionally, these tools help farmers anticipate and respond to climate shocks, promoting the adoption of climate-smart practices that improve yields, increase income and strengthen resilience to environmental changes.

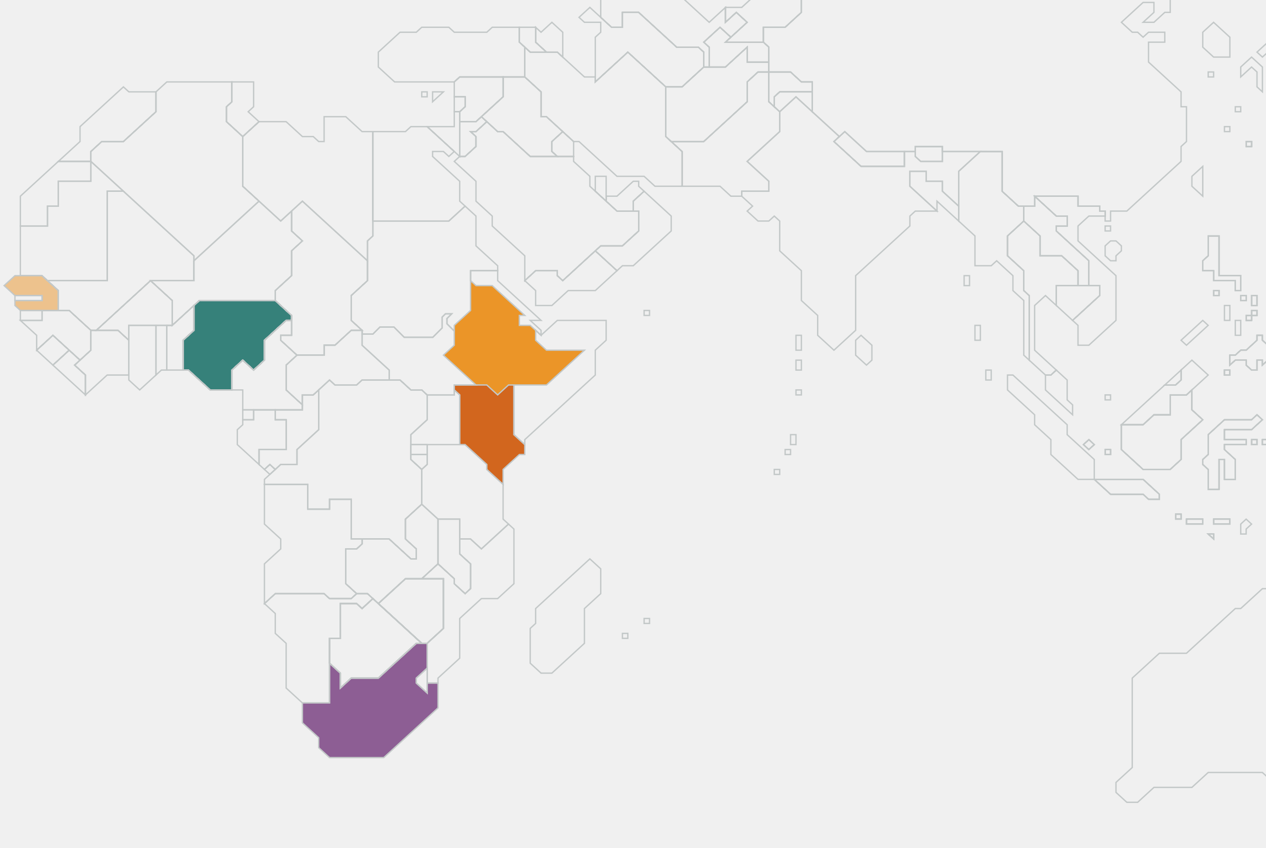
Key considerations

Data availability: Successful deployment of AI for tailored advisory depends on the availability and accessibility of diverse data sources like agronomic, weather and geospatial data, along with domain-specific secondary and local language data. However, data quality and representation issues, such as a lack of gender-disaggregated data or research focused on commercial farming, can lead to biases, limiting the effectiveness of AI-enabled services for smallholder farmers.

Affordability of data-generating technologies: Farm-level agronomic data, such as soil health, crop yields and irrigation needs, is critical for delivering actionable and customised advice. Collecting this data often depends on access to IoT devices, sensors and drones. In many cases, these technologies are inaccessible to smallholder farmers due to cost or infrastructure barriers.

Rural digital divide: In rural areas, limited access to smartphones, unreliable connectivity and low digital literacy can hinder the uptake of digital advisory services. While awareness campaigns through established community networks (e.g. extension agents) can promote adoption, wider deployment depends on accessibility through feature phones and low-tech channels like SMS and USSD. This is crucial to prevent exacerbating inequalities, particularly for women and less literate farmers.

42 World Bank data.
43 Grossi, A. (22 January 2024). "To Reach a Farmer: Foundational Curriculum to Manage Climate Risk Ripples Across Africa". Columbia Climate School, International Research Institute for Climate and Society.
44 Tafesse, Y. "National Policy on Fostering Productive Capacities in Ethiopia for Industrialization, Export Diversification & Inclusive Growth". The Ethiopian Agricultural Transformation Institute.



Regional applications

KE

Amini: seeks to bridge the environmental data gap in Africa and develops holistic solutions using AI and space tech

Synnefa: integrates satellite imagery in its farm management platform, FarmCloud, to provide real-time data on crop health and weather patterns to smallholder farmers.

TomorrowNow: uses AI to provide weather and climate information and customised recommendations on climate-smart agricultural practices to smallholder farmers.

UjuziKilimo: uses AI to analyse soil health and provide farmers with tailored insights on fertilising, irrigation and crop rotation to optimise yields.

NG KE

Crop2Cash: launched FarmAdvice, an AI-powered national hotline, providing smallholder farmers with real-time, personalised agricultural advice in local languages through IVR and USSD

NG

Ignitia: uses ML, satellites and predictive analytics to generate accurate weather forecasts and give farmers timely advice and warnings via SMS to optimise field performance.

ThriveAgric: provides AI-enabled input financing, digital advisory and market intelligence to smallholder farmers.

ET

Digital Green: launched Farmer.Chat, an AI chatbot providing farmers with on-demand, localised advisory services in multiple formats and languages to deliver crop and livestock management advice

Lersha: uses ML to offer tailored agricultural advice, inputs, mechanisation, and finance in local languages, with voice features to address low digital literacy.

SE

Tolbi: leverages AI to develop tools for more accurate agricultural estimates, improved resilience and climate adaptation for smallholder farmers.

SA

Jokalante: integrating AI into its platform providing access to climate services and farming advice in local languages via radio, SMS, social media and voice calls.

Aerobotics: uses AI to provide pest/disease detection, drone imagery services, orchard management, and yield management.

Case study: Farmer.Chat, Digital Green – Ethiopia

Founded in 2008, Digital Green is a nonprofit organisation that focuses on enhancing agricultural productivity and climate resilience by supporting public extension systems. It operates in India, Ethiopia, Kenya, Nepal and Nigeria. Digital Green provides context-specific advisory for smallholder farmers and trains extension agents to use technology and digital tools to enhance the efficiency, relevance and impact of their work. Digital Green has worked in Ethiopia, supporting the country's 70,000 extension agents in areas like agriculture, natural resource management and livelihood diversification, with a primary focus on women and youth.

AI solution

Digital Green initially began delivering advisory services through its video-based programmes, conducted in group sessions to ensure it was accessible to farmers. In Ethiopia, Digital Green launched multiple projects and use cases, such as site-specific recommendations to optimise soil health and feed ration formulations to improve livestock productivity, collaborating with experts and development partners.[45]

Building on these efforts, Digital Green introduced Farmer.Chat, an AI chatbot designed to empower extension agents and farmers with localised, on-demand advisory services. It provides customised recommendations in multiple formats – voice, video and photo – and supports local languages, including Amharic, Oromo and English, ensuring accessibility for diverse user groups. The platform also delivers push notifications for dynamic crop management tailored to local conditions, facilitates real-time content improvement based on user feedback and offers automated dashboards to track usage patterns and refine content delivery. Digital Green follows a rigorous content development process to ensure the delivery of high-quality, localised advisories. This involves prioritising value chains that are widely produced in the target regions, translating and reviewing content for accuracy and generating expert-verified Q&A pairs in local languages.

Digital Green partnered with tech leaders, including OpenAI, Microsoft, Google, HuggingFace and Meta, to develop the underlying tech stack for Farmer.Chat. Farmer.Chat uses Retrieval-Augmented Generation (RAG) technology,[46] built on a foundation that incorporates pre-trained LLMs like GPT and Llama. Digital Green fine-tunes these models for specific tasks, integrating resources from its extensive library of agricultural information and contributions from government partners, such as the Government of Ethiopia and the Agricultural Transformation Institute (ATI). These resources include annotated call centre logs, training video transcripts and crop research factsheets, enabling Farmer.Chat to deliver locally relevant and context-specific recommendations. By layering domain-specific knowledge onto existing foundational models, Farmer.Chat bridges the gap between global AI advancements and locally relevant agricultural advisory.[47]

Solution profile:

Year established: 2023

Business model: B2B/B2C

Cost model: free for farmers

Funding: grant funding, revenue model for private sector (planned)

Target users: development agents (DAs), farmers with smartphones

Delivery channel: Farmer.Chat App (through voice and text)

Technology:

Data: package of practices (advisories generated by the Ministry of Agriculture), community videos, agricultural research from national and international centres, disease detection tool (Plantix), weather (Tomorrow.io), decision support tools (e.g. site-specific fertiliser recommendations)

Team: tech partners (OpenAI, Microsoft, Google, Hugging Face and Meta), in-house domain experts

Type of AI: generative AI

45 Digital Green website and KIIs.
46 Retrieval-Augmented Generation (RAG) is a method that combines the generative capabilities of an LLM with a structured retrieval system to access and integrate specific, relevant information from external knowledge bases.
47 Singh, N. et al. (13 September 2024). "Farmer.Chat: Scaling AI-Powered Agricultural Services for Smallholder Farmers". arXiv:2409.08916v2.

Figure 7

Farmer.Chat system architecture: data flow and AI processing

Percentage of total population, 2024

Source: Digital Green

Progress and impact

Digital Green initially piloted Farmer.Chat on WhatsApp in 2023 with 60 extension agents in Amhara, Oromia and Southern regions. Building on this experience, it launched a phased pilot programme in six additional woredas in Jimma and Arsi Zones (Oromia region),[48] targeting around 130 extension agents and 270 farmers equipped with smartphones. This programme focuses on year-round value chain production, including crops like coffee, maize, wheat, teff, fruits, vegetables and apiculture. It also incorporates the Afaan Oromo language, spoken by a third of Ethiopia's population, to ensure it is accessible and relevant.

The pilot highlighted areas for improvement, including content quality and diversification, response accuracy in the local language and language customisations. Current efforts focus on identifying ways to improve the user experience, identify additional use cases and explore partnerships to diversify content. Plans are in place to expand the programme to 10 additional woredas and reach more than 1,000 users.

Beyond Farmer.Chat, Digital Green operates its traditional extension services programme in six regions across Ethiopia. For more than a decade, the organisation has trained more than 20,000 frontline workers, reaching 40,000 farmer development groups in more than 13,500 villages – equivalent to 3.3 million farmers, a third of whom are women.[49] In areas where Digital Green equips extension agents with digital tools, farmers have seen their incomes increase up to 24% and crop yields up to 17%.[50] Leveraging the trust built through integrated programme activities such as self-help groups, youth-led enterprises, village-based enterprises and agricultural advisory services, Digital Green aims to transition from extension-intensive models to direct farmer tool usage. As each extension agent typically supports around 300 farmers, Farmer.Chat presents an opportunity to offer personalised, one-to-one advisory services that enhance efficiency and have an impact, down to the farm level. Digital Green plans to launch randomised control trials to quantify the impact of Farmer.Chat compared to its traditional video-based approach.

48 Woredas are the third administrative level in Ethiopia and zones are the second administrative level, below regions.
49 See: Digital Green.
50 See: Digital Green.

Ecosystem constraints

Digital Green faces several ecosystem constraints that impact the effectiveness of its digital and AI services. Limited internet coverage in rural areas makes it difficult for farmers and extension agents to fully benefit from platforms like Farmer.Chat. Low smartphone penetration and digital literacy pose significant barriers, as many farmers lack access to smartphones or struggle with using digital tools. The high cost of internet services also limits consistent access to the platform. Infrastructure challenges, such as unreliable electricity and a lack of technical support, further hinder the usability of digital tools in rural areas. While Digital Green has secured multiple partnerships to develop Farmer.Chat, financing remains a challenge as the organisation operates as a nonprofit, limiting its financial flexibility and sustainability.

In addition, Digital Green faces challenges in content development due to the fragmented nature of agricultural value chains. Diverse farming practices, crop types and regional differences – such as weather conditions, soil types, local pests and diseases – demand localised, context-specific information, rather than standardised solutions. This complexity makes it difficult to build a unified knowledge base capable of serving all farmers effectively. Instead, it necessitates the creation of multiple tailored datasets, limiting the scalability and efficiency of AI-driven tools.

USE CASE SPOTLIGHT

Healthcare: Disease prediction and detection

The problem: LMICs are experiencing a rising incidence of cancer. Poorly developed health systems tend to have inadequate resources to implement early detection and adequate basic treatment. Inequalities in social determinants of health, lack of awareness of cancer and preventive care, lack of efficient referral pathways and patient navigation, and nonexistent or inadequate healthcare funding can lead to advanced disease presentation at diagnosis.[51] In Ethiopia, breast cancer is the most prevalent cancer among women, accounting for 33% of female cancers and 23% of cancers in the country.[52] Despite this high incidence, early detection remains a significant challenge. More than 72% of breast cancer cases are diagnosed at advanced stages, leading to higher mortality rates.[53] Contributing factors include delays in seeking care, reliance on traditional medicine and health system delays.

Use case description: AI-powered computer vision and ML solutions offer significant potential for improving early detection and diagnosis across a wide range of diseases, including breast cancer, lung conditions, cardiovascular diseases and infectious diseases. These technologies can analyse medical imaging data, such as X-rays, MRIs and ultrasounds, to identify patterns and abnormalities that may be imperceptible to the human eye. AI models are trained on large datasets to recognise disease-specific patterns, such as tumours, lesions or signs of infection. This can help reduce the risk of diagnostic errors and accelerate decision-making, enabling earlier intervention. These tools are especially valuable in resource-constrained settings, where access to specialists may be limited. By flagging potential concerns early, AI supports healthcare providers in delivering timely and accurate diagnoses, bridging gaps in care delivery.

Key considerations

Data quality, availability and cost of equipment: AI-powered diagnostic tools rely on high-quality medical imaging data (e.g. X-rays, MRIs, CT scans) to be accurate and effective. In low-resource settings, however, outdated and costly equipment often leads to poor-quality data. The lack of digitised data and limited access to diverse datasets, such as medical images and patient histories, further hampers the development of AI-driven diagnostic tools.

Edge devices deployment: AI diagnostics in remote areas relies on edge devices like handheld ultrasounds, mobile phones, and portable tools. These devices enable local AI processing, reducing reliance on cloud infrastructure. In regions with limited connectivity, mobile phones can process medical images in real time, making diagnostics quicker and more accessible. Portable AI-integrated devices also lower costs, helping healthcare systems in low-resource settings provide timely, accurate diagnoses.

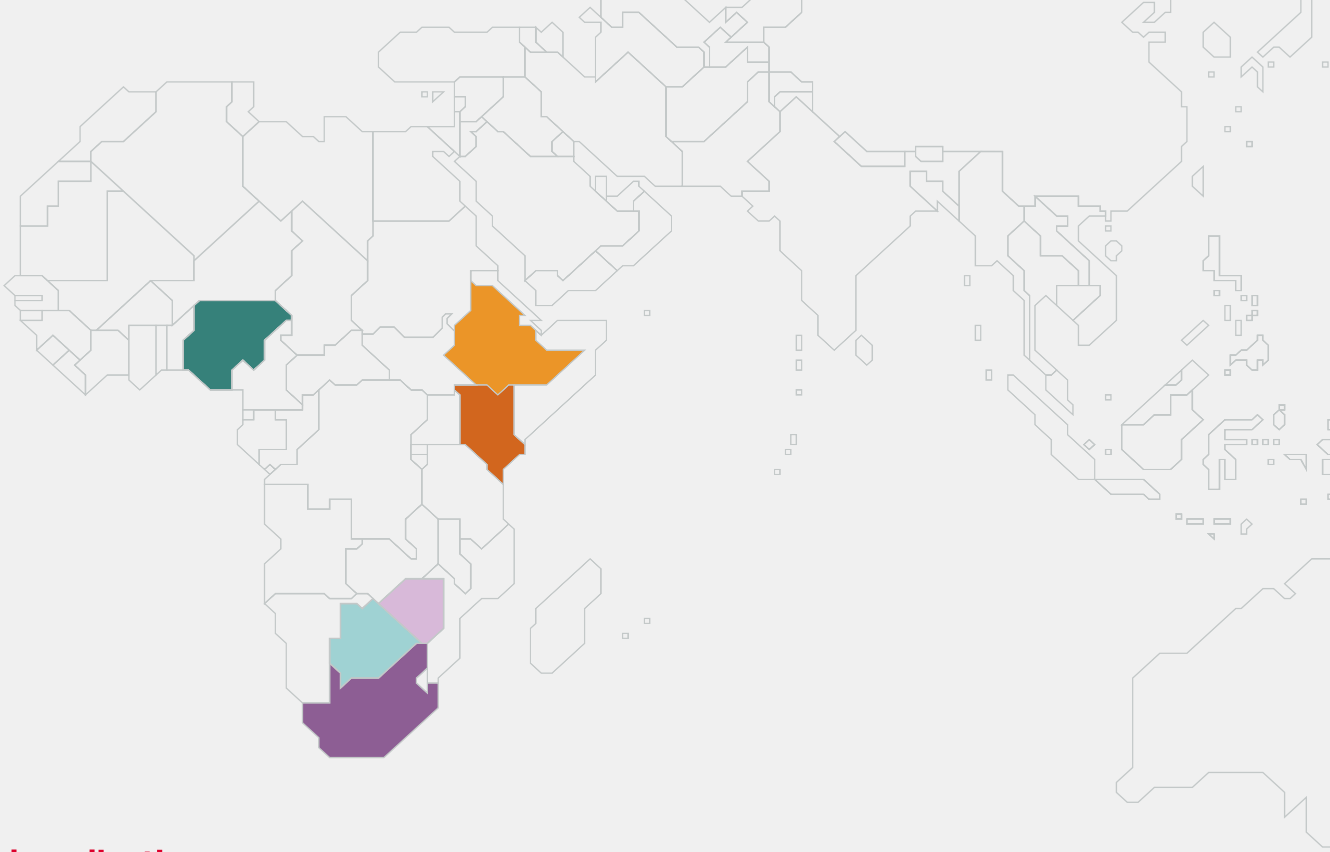
Community awareness and behavioural change: The successful adoption of AI in healthcare depends on behavioural shifts within the community. In many regions, people may underestimate the long-term benefits of early detection and preventive care due to biases such as time-inconsistent preferences.[54] Public education campaigns that emphasise the value of timely health interventions and AI-driven diagnostics can help address these challenges and encourage proactive healthcare practices, leading to improved health outcomes.

51 Kamaraju, S. et al. (5 March 2021). "Cancer Prevention in Low-Resource Countries: An Overview of the Opportunity". American Society of Clinical Oncology Educational Book.

52 Tesfaw, A. et al. (November 2019). "Late-Stage Diagnosis and Associated Factors Among Breast Cancer Patients in South and Southwest Ethiopia: A Multicenter Study". Clinical Breast Cancer, Vol. 21, Issue 1, pp. e112–e119.

53 Zewdie, A. (11 May 2024). "Advanced-stage breast cancer diagnosis and its determinants in Ethiopia: a systematic review and meta-analysis". BMC Women's Health, 24.

54 Time-inconsistent preferences refer to a tendency where individuals place greater value on immediate rewards while undervaluing long-term benefits, leading to decisions that may not align with their future well-being.



Regional applications

KE

WFP: developed the Meza app, an AI-enabled app that digitalises handwritten health records, helping health workers to collect and analyse nutrition data efficiently.

Ilara Health: provides AI and tech-powered diagnostic equipment to medical facilities at a fraction of the normal cost.

SA

EnvisionDeep AI: uses AI to streamline and improve medical imaging (X-rays, CT scans, MRIs) diagnosis for radiologists.

ET

EAII: developed an AI-powered breast cancer detection tool using ML algorithms to analyse mammograms, enabling early detection and improving diagnostic efficiency in public health facilities.

NG

Xolani Health: using ML and deep learning to improve the speed and accuracy of reporting and diagnoses.

ZI

Dr CADx: created an AI image analysis platform that provides medical staff with fast and accurate insights when reading X-rays.

BO

Peek Vision: uses AI for eyecare, enabling visual acuity tests in low-resource settings through smartphones and develop personalised treatment plans for patients.

Case study:
Breast cancer detection tool, Ethiopian AI Institute – Ethiopia

The EAII was established by the government in 2020 to develop and apply AI for national development and economic growth. The Institute plays a pivotal role in Ethiopia's digital transformation by fostering innovation, building local capacity and creating an enabling environment for AI adoption. Its mission includes advancing AI research, advising on policy and fostering collaborations to address local challenges with tailored solutions in sectors such as agriculture, healthcare, education and NLP for Ethiopian languages.

AI solution

The EAII has developed and tested an AI-powered breast cancer detection tool to address challenges related to limited early detection. This tool uses ML algorithms to analyse mammograms from facilities, enabling early and accurate detection of breast cancer. By leveraging local health data, the AI model is tailored to the Ethiopian context, making it more relevant and effective. The EAII aims to integrate the tool in public health facilities and help radiologists focus on critical cases that need further analysis. This allows facilities to provide faster and mass screening capabilities that can reach underserved communities. By reducing reliance on scarce radiologists and improving diagnostic efficiency, this AI solution has the potential to significantly reduce breast cancer mortality rates in the country.

Solution profile:

Year launched: 2023

Business model: G2G2C or G2C

Cost model: government subsidised

Funding: government funded

Target users: public health facilities

Delivery channel: web and mobile device

Technology:

Data: demographic data, mammogram diagnostic data (e.g. breast X-rays)

Team: in-house (software engineers, data scientists, AI experts), external domain experts (oncologists) and partners (Pioneer Diagnostics)

Type of AI: predictive AI

Progress and impact

The EAII has successfully piloted its tool in four public health facilities, including St. Paul's Hospital in Addis Ababa, Ethiopia's largest hospital, where it was validated by medical professionals. It is also collaborating with Pioneer Diagnostics, a private diagnostic centre, to further test and refine the tool. The Institute is currently working on refining its AI model, ensuring it uses locally relevant data and is tailored to Ethiopia's specific healthcare needs. The tool is still in the pilot phase, but it is already leveraging partnerships that could support wider implementation and adoption.

The institute's commitment to applied research has been important for the development of the tool. In collaboration with oncologists and medical experts, the EAII ensured the model meets required clinical standards, although fine-tuning is necessary to handle a wider range of data and healthcare conditions. The successful implementation of the tool in several health facilities demonstrates its potential for early breast cancer detection and broader applications for other diseases. Ongoing research efforts now focus on integrating more diverse data sources, refining the model's predictions and adapting it for use in regional settings across Ethiopia.

Scaling the tool will require expanding data collection efforts in regional health centres. Key areas for continued development include incorporating data from underserved and rural areas, adapting the tool to diverse healthcare environments and ongoing R&D to enhance diagnostic accuracy. As the tool expands to rural areas, it must be tailored to local healthcare infrastructure and resource availability to ensure it continues to be effective.

Ecosystem constraints

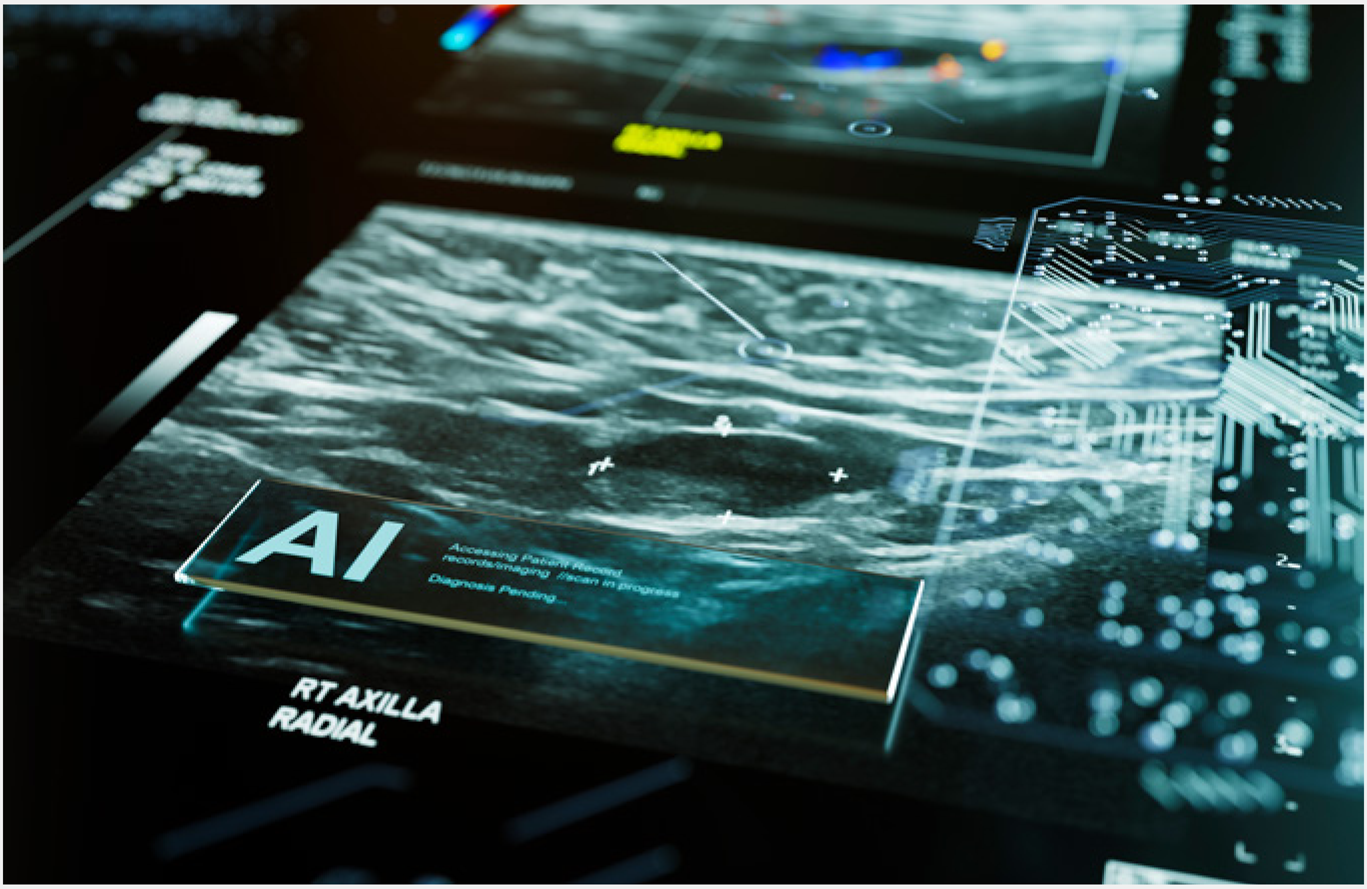
One of the primary challenges in deploying AI-driven diagnostics in Ethiopia is data availability, quality and consistency. Many hospitals lack standardised data collection and storage methods, with a significant proportion of medical records still on paper, making integration in ML algorithms difficult. While diagnostic data such as mammography reports exist in Addis Ababa, they are often fragmented and inconsistent across hospitals.

In rural areas, mammography services are scarce due to a lack of specialised equipment, trained personnel and supporting infrastructure. As a result, many women are referred to Addis Ababa for screenings, increasing the demand for efficient diagnostic services. The EAII's AI tool has the potential to address these gaps when widely implemented in public health facilities. Mobile mammography units have been considered for rural areas, but high costs and logistical barriers to collecting and transmitting diagnostic data remain key challenges.

Although computing power itself is not a major barrier, as EAII processes AI models in centralised data centres, the real challenge lies in collecting and transmitting diagnostic data efficiently. Medical imaging files, such as mammograms, can be large, making real-time transmission over slow or unreliable networks costly and impractical. Deploying models on local networks or PCs in rural health facilities could help streamline data transfer and reduce latency and costs associated with internet-based transmission.

While the EAII has established collaborations with local health facilities, securing full support from the Ministry of Health (MoH) has been slow, delaying broader adoption. Government support was instrumental in launching the tool, but long-term funding remains a challenge. EAII is actively exploring public-private partnerships, international funding and impact investment opportunities to sustain and scale the initiative.

Beyond funding, there is resistance to AI adoption in some regional medical centres, where physicians are concerned about the complexity and reliability of AI-driven diagnostics. Many doctors in public healthcare facilities already operate under extremely demanding conditions, and without incentives or workflow support they are reluctant to adopt new AI tools. Additionally, physicians have not received a directive from the MoH mandating the use of AI diagnostics, limiting its adoption. Addressing these concerns through capacity-building initiatives, stakeholder engagement and aligning incentives will be key to driving uptake.



USE CASE SPOTLIGHT

Finance: Alternative credit scoring

The problem: Traditional credit assessment models in LMICs are largely collateral-based, using metrics like income and transaction histories. These models often prevent unbanked or underbanked individuals and businesses, particularly micro, small and medium enterprises (MSMEs) in the informal economy from accessing financial services. Estimates suggest that just 20% of all firms have a bank loan or line of credit in Africa – the lowest share of any continent.[55] In Ethiopia, MSMEs constitute more than 90% of businesses and contribute approximately 33% to GDP, yet only a minority have access to credit – just 130,000 out of 800,000 – equivalent to a financing gap of $4.2 billion.[56] The lack of formal documentation, such as national IDs or financial records, further limits access to credit and hampers economic growth.

Use case description: AI technologies, including ML and data analytics, present an opportunity to improve credit scoring and risk assessment for individuals traditionally excluded from formal financial systems. By analysing diverse data sources beyond traditional credit histories – such as mobile phone usage, social media activity, utility payments, psychometric assessments and undocumented transactions – AI can automate the credit evaluation process. This reduces approval times and increases access to credit for underserved populations. Studies show that AI-powered credit scoring can increase access to credit by 40% for individuals without credit histories.[57] This can translate into greater investment in key productive assets across sectors like energy and agriculture (e.g. solar panels, irrigation equipment, clean cooking stoves), ultimately driving economic opportunities and resilience.

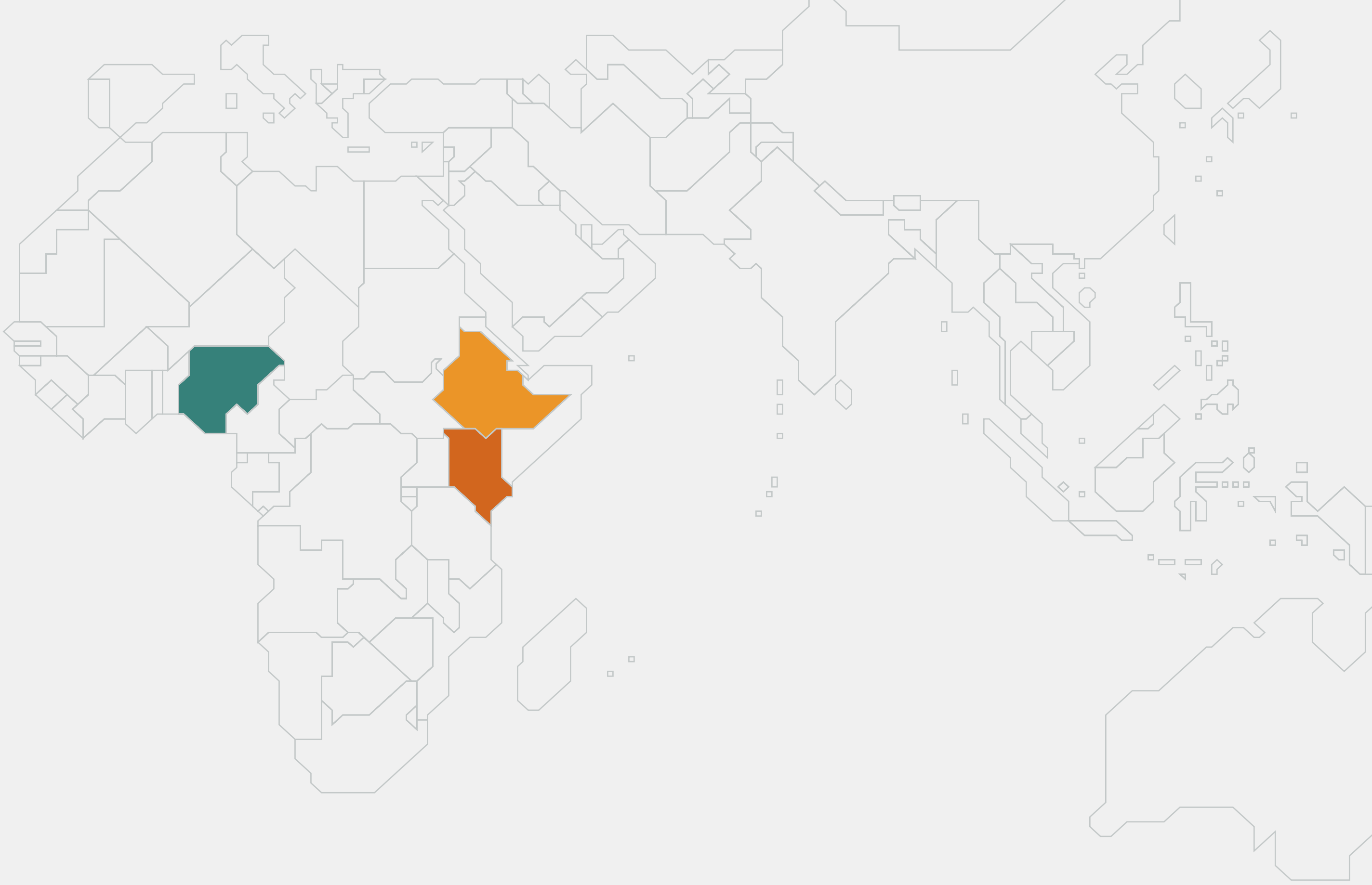
Key considerations

Data availability and quality: Alternative credit scoring relies on diverse and untraditional data sources to assess creditworthiness. In rural areas, mobile, utility and transaction records may be incomplete or inconsistent, or simply unavailable where mobile penetration is low, and reliance on feature phones may limit the types of data available (e.g. location tracking, app usage).

Bias in AI models: There are specific risks of bias in ML models, especially when using untraditional data sources. For example, mobile phone usage patterns may differ based on gender, income level or rural/urban residence. If not properly managed, AI models may inadvertently favour certain demographics, leading to unfair credit scoring practices and exacerbate societal inequalities.

Regulatory uncertainty and data privacy: The lack of clear regulations for alternative credit scoring models can slow adoption and create legal risks for financial institutions. Local laws and resistance from traditional institutions may limit scale. In addition, the use of sensitive alternative data like mobile usage and utility payments raises privacy concerns.

55 The Economist. (6 January 2025). "Africa has too many businesses, too little business".
56 Itana, K. and Grant, W. (September 2020). Transforming Financial Service Markets for Micro, Small and Medium Enterprises (MSMEs) in Ethiopia through Direct Technical Assistance to Financial Institutions: The Case of Enterprise Partners. Enterprise Partners.
57 Vlaicu, R. (7 November 2024). "Can AI Technologies Help Expand Credit Access?" IDB.



Regional applications

NG **Crop2Cash:** uses satellite data and ML for farmer credit assessment, in addition to its data-driven digital advisory services

KE **Apollo Agriculture:** uses satellite imagery data of farms and AI to rate the creditworthiness of farmers

NG KE **Nithio:** uses AI and blended finance to provide a sustainable, risk-informed approach to finance aggregated receivables for the off-grid solar sector

ET **Kifiya:** provides credit scoring and insights for financial institutions, using alternative data and ML models to extend credit to underserved populations

REGIONAL

Jumo: uses AI and ML to build accurate credit scores and targeted financial products for people without a formal financial identity, collateral or credit record

M-KOPA: provides affordable smartphones and digital financial services through a daily repayment model and uses AI to improve customer repayments and follow-on products.

GLOBAL

Tala: uses AI and ML to provide personalized financial services, offering instant credit, money transfers, and bill payments through an app that bridges digital and cash ecosystems for underserved customers

Case study 4: Qena Decision, Kifiya Technologies – Ethiopia

Established in 2012, Kifiya develops digital infrastructure to support credit, insurance and payment services, enabling banks and financial institutions to offer unsecured credit to MSMEs and consumers. Its digital marketplace bridges the gap between MSMEs, larger businesses and consumers, providing access to markets and opportunities to scale their operations. Kifiya also offers digital agriculture solutions to connect smallholder farmers, including market linkages (inputs and outputs) and financial services (credit), with a view to support rural livelihoods.

AI solution

Kifiya developed Qena Decision, an AI-powered digital financial solution that provides credit scoring, credit limits and insights to support informed decision-making for financial institutions and businesses. This solution enables financial institutions to create credit profiles for individuals and businesses without credit histories and to extend credit to underserved populations by analysing alternative data sources. The platform undertakes several AI tasks, including generative AI data synthesis, data transformation,[58] data validation, credit portfolio management, early warning systems, pattern mining and pattern matching, all of which are essential for generating insights and forecasting the likelihood of repayment. Kifiya employs three ML and deep learning approaches for credit scoring and lending: a predictive model to forecast the likelihood of repayment, a prescriptive model to recommend optimal loan terms and a descriptive model to analyse past data and identity trends.

The AI models use more than 30 submodels orchestrated by its grand meta-model and integrates more than 20 data sources, such as core system data from banks for financial transactions, geographic and living area data to understand regional financial behaviours, digital footprints to assess an individual's financial behaviour (including online activity and social media usage), utility data, agricultural datasets (like vegetation index data, weather data, soil fertility index data, commodity data, animal price data), Telebirr transactions (Ethio Telecom's mobile money system) and market intelligence data sourced by data collectors. In addition, the platform uses innovative models like the Referral Person Model, whereby an individual's creditworthiness is assessed based on networked relationships, and SME Enterprise Resource Planning (ERP) service models that allow businesses and employees to access financing through Kifiya's infrastructure (via B2B2C).

Kifiya rigorously adheres to the principles of Mechanism Design for Social Good (MD4SG), an interdisciplinary field that creates systems that promote positive, fair and transparent societal outcomes. Qena Decision builds on this approach, focussing on reducing AI bias to ensure fairness and inclusion. Its systems are deliberately designed to prevent existing social inequalities from being reinforced. By using diverse data sources, the platform minimises the risk of skewed outcomes that could disadvantage vulnerable groups such as women, rural populations and low-income individuals. An additional feature of Qena Decision is the Rejection Inference Engine, which analyses the reasons behind rejections and often generates valuable insights into potential biases, both algorithmic and data driven. This strengthens the ability of the platform to identify and address biases, ensuring decisions remain as fair and transparent as possible.

Solution profile:

Year launched: 2022

Business model: hybrid (B2B/B2B2C)

Cost model: revenue sharing, licensing

Funding: grants

Target users: banks, MFIs, MSMEs, micro-entrepreneurs

Delivery channel: mobile app, web app

Technology:

Data: transactional and credit data, loan performance data, KYC, SMS data, business profile, other data (alternative data like utility payments, social media, etc.)

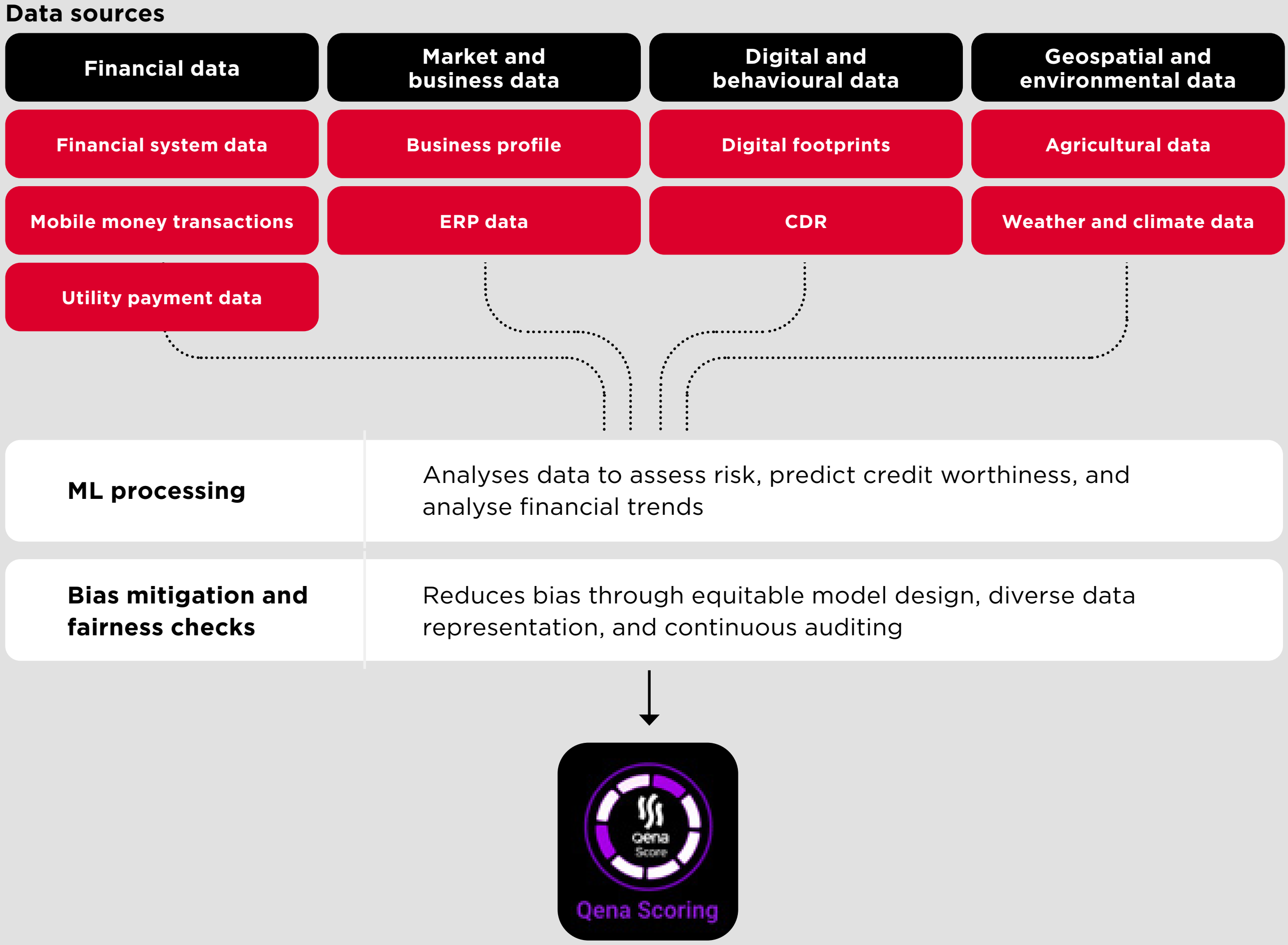
Team: in-house (software engineers, data scientists, AI experts, fintech experts with finance backgrounds)

Type of AI: predictive AI

58 Data transformation refers to processing and converting data from one format or structure to another, often to make it usable for ML models or analytics. This can include cleaning, aggregating, normalising or encoding data to ensure it is ready for modelling.

Figure 8

Qena Decision: data flow for credit scoring



Source: author's analysis

Progress and impact

Kifiya secured funding from the Mastercard Foundation to develop Qena, which allowed the company to collaborate with several financial institutions and expand its offering. Qena currently serves more than 800,000 users and has partnered with six local banks. The platform supports these institutions in rapidly expanding financial services through its infrastructure-as-a-service (IaaS) model. For example, Qena has partnered with the Cooperative Bank of Oromia to launch innovative products like Michu, a digital lending solution powered by its AI infrastructure. The first version of this solution disbursed more than 1.4 billion Ethiopian birr (USD 10.9 million) in uncollateralised working capital loans, benefitting more than 100,000 MSMEs, and has disbursed more than 16 billion Ethiopian birr to date.[59] These efforts have created economic opportunities and jobs, particularly for women, youth and persons with disabilities.

To scale its AI models and expand its products, Qena aims to secure a blend of development and commercial finance. This includes revolving credit funds (funds that are continuously replenished as they are used) to serve as guarantees for vulnerable groups like MSMEs and women. This funding strategy aims to de-risk investments, enabling testing, fine-tuning and scaling. By partnering with more MFIs and MSMEs, Kifiya can collect additional data to make the model powering the Qena platform more accurate and reliable, expand its market reach and promote financial inclusion while mitigating risks for partners. With broader adoption among major banks and lenders, Qena has the potential to significantly impact Ethiopia's unbanked and underbanked population, promoting entrepreneurship and economic growth.

59 See: Qena.

Ecosystem constraints

Despite the platform's innovative use of diverse data sources, Kifiya still faces challenges in terms of data availability and quality, which undermines the ability of the Qena platform to scale. Sources like social media activity, utility data and Telebirr transactions are often incomplete, unstandardised or unavailable, particularly in rural areas. These data limitations, coupled with weak governance frameworks and poor know-your-customer (KYC) systems, hinder the accuracy of credit scoring, slow decision-making processes and make platforms less efficient.

Limited server capacity and the lack of advanced chips slow data processing and model integration. Mobile compatibility is another barrier, as many smartphones lack the processing power or memory for Qena's app and data tasks. The absence of SMS integration further restricts reach, limiting accessibility for users without high-performance devices. SMS integration would enable the delivery of instant alerts and updates to users without high-performance devices, allowing them to access key features even without an internet connection, and enabling the platform to reach a larger, more diverse audience.

Kifiya also faces a talent shortage in AI and fintech, requiring extensive on-the-job training due to limited multidisciplinary expertise. Brain drain further reduces the local talent pool as professionals seek opportunities abroad. To address this, Kifiya has partnered with Addis Ababa University for lab and talent access and with 10 Academy for talent, although support from local tech hubs remains limited. Collaboration with international experts helps upskill the workforce but comes with high operational costs.

These challenges limit Kifiya's ability to conduct R&D, stifling innovation and the development of advanced solutions. Weak collaboration between academia and industry further slows the translation of research into scalable AI applications. Kifiya also struggles to engage government offices and public sector entities in partnerships, with limited understanding of the benefits of AI for financial inclusion hindering public-private collaboration.

While Kifiya benefits from support by development partners like the Mastercard Foundation, its reliance on donor funding and philanthropic capital makes securing private capital challenging. These funds are often limited and not suitable for scaling solutions that target high-risk customers. Qena's focus is on securing both development and commercial funds to expand AI models and products, alongside revolving funds. Qena also seeks more funding to support national AI infrastructure initiatives like IaaS and PaaS cloud systems to overcome technological and resource challenges.

USE CASE SPOTLIGHT

Education: adaptive and personalised learning

The problem: Education is a major challenge in Sub-Saharan Africa, where gaps in access and quality persist. Many students lack foundational skills, and dropout rates are particularly high in rural and low-income areas. This is due to a combination of factors, including teacher shortages, overcrowded classrooms and outdated learning materials. These issues are particularly acute in Ethiopia, where only 5% of students pass national grade 12 exams.[60] High pupil-to-teacher ratios, low-quality teaching and difficulties in teacher recruitment and retention are key contributing factors. Limited data on student outcomes hampers effective intervention while cross-sectoral challenges, such as inadequate school infrastructure, lack of health and sanitation facilities and poor nutrition, significantly affect educational delivery.[61]

Use case description: Adaptive learning tailors education to the individual needs of students by using AI to automate the delivery and assessment of content. It assigns personalised content based on test results, creates development plans for struggling students and adapts learning materials for diverse needs. This approach helps address teacher shortages, improves teaching quality, supports teacher training and detects learning difficulties, enabling educators to create customised lesson plans. When gamified, adaptive learning becomes more engaging, using game mechanics like rewards and challenges to motivate students, thereby reducing dropout rates and improving retention. It also allows students to learn at their own pace, offering a more inclusive learning experience, especially for those who have missed schooling.

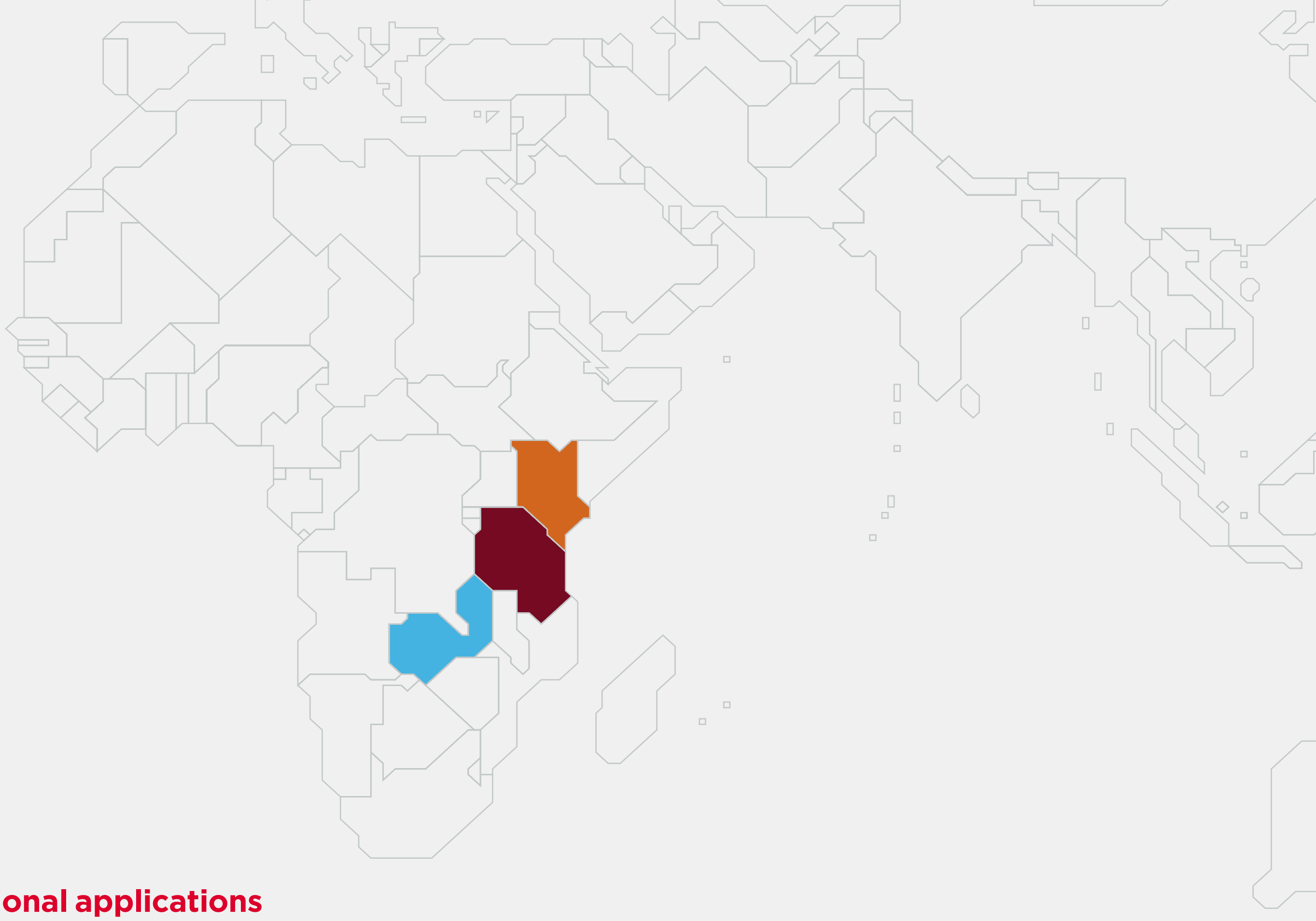
Key considerations

Data availability, digitalisation and needs assessment: Effective adaptive learning requires digitalised, locally relevant, curriculum-aligned education content in local languages to ensure inclusivity and improve student engagement. Accurate, up-to-date data on student progress is also essential for tailoring learning materials and providing timely support. Granular needs assessments are crucial to identify the specific challenges students face and ensure that learning materials address those needs.

Low device penetration and digital literacy: In rural areas, limited access to smartphones, unreliable internet connectivity and low digital literacy among teachers and students can impede the adoption and use of AI-driven edtech solutions. Successful deployment requires accessible solutions, such as low-tech alternatives like SMS or USSD, along with user-friendly interfaces that cater to varying digital skill levels, improving engagement and accessibility for all students.

Teacher training and engagement: Fostering acceptance of AI-driven tools among teachers can be challenging due to limited awareness of the benefits and a perceived risk of substitution. Concerns about AI replacing traditional teaching roles may cause resistance. To overcome this, comprehensive training is needed to build digital skills and demonstrate how AI can enhance teaching. Engaging teachers through professional development programmes helps ensure they are equipped to integrate adaptive learning solutions effectively, promoting long-term success and adoption.

60 Birr Metrics. (9 September 2024). "Only 5% of Ethiopian Students Pass Grade 12 Exams".
61 Molla, T. and Tiruneh, D.T. (23 November 2023). "Ethiopia's education system is in crisis – now's the time to fix it". The Conversation.



Regional applications

KE

Eneza Education: combines SMS-based learning with AI-powered solutions to enhance educational content creation and personalize learning experiences

M-Shule: mobile learning platform using AI combined with text messaging to deliver tailored tutoring and education in areas with low smartphone and internet penetration

TZ

Mtabe: uses AI and SMS technology to deliver learning content to students who cannot afford textbooks, smartphones or do not have internet access.

ZM

Riimagin: leverage AI to create engaging, accessible, and culturally relevant learning experiences, providing content in multiple formats.

REGIONAL

Kwame for Science: bilingual AI teaching assistant that uses curated knowledge and past exam questions to answer students' science queries

Solve Education!: uses AI for its learning platform, Edbot.ai, which adapts content to students' needs, offering accessible, interactive and engaging experiences for students in low-resource communities.

Case study: Knowledge Platform (several applications) – Kenya and Pakistan

Knowledge Platform is an edtech provider operating in Kenya and Pakistan, formed in 2024 through the merger of Eneza Education (Kenya) and Knowledge Platform (Pakistan), making it the first African-Asian edtech venture.[62] Eneza Education focussed on delivering learning support via SMS to underserved students in low-connectivity areas across multiple African countries, leveraging basic mobile phones and strong commercial partnerships. Meanwhile, Knowledge Platform specialised in learning management systems and game-based learning, developing offline solutions for schools in Pakistan.

AI solutions

By merging, Eneza Education and Knowledge Platform are integrating two complementary approaches to edtech, combining SMS-based learning with AI-powered solutions. This synergy aims to create more accessible, engaging and personalised learning experiences across diverse contexts.

In Pakistan, Knowledge Platform has leveraged AI across multiple workstreams to accelerate content creation and personalise learning experiences. AI is used to accelerate the generation of educational materials in various formats and to develop learning bots, which create interactive, gamified learning experiences to improve student engagement. The platform is also implementing adaptive learning, with AI providing customised recommendations on study materials based on students' progress, preferred formats and curriculum requirements.

In Kenya, Eneza Education has integrated AI in its system to enhance its flagship "Ask a Teacher" services. Initially reliant on live educator responses, the tool now harnesses AI trained on a proprietary dataset of more than 4 million student questions for more efficient and accurate support. The AI system can answer 80% of frequently asked questions, allowing teachers to focus on more complex ones, making the service more efficient and cost-effective.

Both organisations use local educational content aligned with the national curriculum. AI breaks down the content into structured modules and lessons, making it more digestible and adaptable to students' needs. Knowledge Platform has also used student engagement data, including peak study times and frequently revisited topics, to refine AI recommendations and create more engaging learning pathways.

Solution profile:

Year launched: 2024 (Eneza Education-Knowledge Platform merger)

Business model: B2B2C (schools, teachers, students)

Cost model: freemium (basic access for students), paid services for institutions and enhanced features

Funding: commercial investment, grants, partnerships with telecoms operators

Target users: schools, teachers, students

Delivery channel: mobile app, SMS/USSD, web platform

Technology:

Data sources: student engagement data (e.g. lesson completion rates, interaction logs), teacher input, curriculum-aligned content

Team: AI engineers, teachers and curriculum developers, edtech specialists

Type of AI: adaptive learning AI, AI-powered chatbots for tutoring and Q&A, recommendation systems for personalised learning pathways

62 Knowledge Platform. (n.d.). "Knowledge Platform and Eneza Education Merge to Form First African Asian Edtech Venture". Press release.

Progress and impact

Knowledge Platform's content team now generates 400 interactive games per month, providing students with diverse learning tools. Building on Eneza Education's expertise, they are working on integrating learning bots in the SMS learning platform to improve accessibility for students with lower access to mobile internet. They are also developing a "nudge bot" that will guide students through lessons, providing personalised learning experiences to improve retention.

The platform's AI recommendation system currently guides students to the most relevant content based on their progress and learning gaps. The next phase involves developing structured, topic-based learning pathways that will guide students through specific subjects, like mastering mathematical concepts. Although this feature is still being refined, the learning bots and AI-powered games are laying the foundation for a dynamic, personalised learning system.

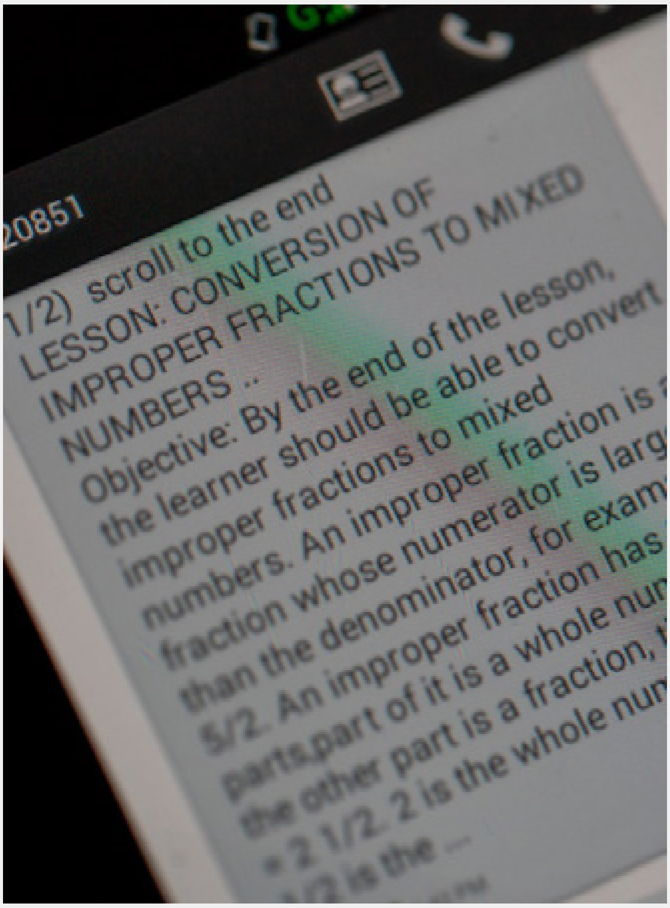
The team is working on expanding these innovations across the entire Knowledge Platform network. In Kenya, the focus is on deploying AI-driven features to enhance SMS-based learning with adaptive and personalised learning. Eneza Education's strong commercial partnerships, particularly with Safaricom in Kenya, but also with Orange in Côte d'Ivoire, have been key to its success and an important factor in its potential for expansion into other countries. For instance, during the COVID-19 pandemic, Safaricom sponsored Eneza's platform, making it free for nine months across Kenya, demonstrating the strength of their collaboration.

Looking ahead, Eneza is expanding its use of AI to integrate game-based learning bots and advanced recommendation systems in the SMS learning platform. These innovations will ensure that even students with limited internet access can enjoy engaging learning experiences. The long-term strategy is to create a fully personalised learning environment that adapts to each student's unique needs, setting the stage for more scalable, impactful educational outcomes across Kenya, Pakistan and beyond.

Lessons for Ethiopia

Eneza Education sees strong potential for adapting its AI-powered SMS-based learning model in Ethiopia, particularly with Safaricom's expansion into the country. However, for AI-driven edtech to be effective and scalable, it must align with the national curriculum, incorporate local languages, and complement offline learning rather than replace it. AI should be viewed as an enabling tool, especially given Ethiopia's broader education sector challenges, such as insufficient government spending on textbooks and ongoing school reconstruction efforts. While digital learning tools cannot replace traditional resources, SMS-based and AI-enabled solutions could help bridge gaps in under-resourced areas, providing additional support for students and teachers.

Partnerships with telecom operators and government initiatives will be crucial for increasing reach and ensuring financial sustainability. Although the rural-urban education divide remains a challenge, AI-powered learning solutions have the potential to expand access to educational content, support teachers, and complement broader efforts to rebuild the education system. Safaricom's presence, combined with Eneza's experience with mobile-based learning, provides a strong foundation for future adaptation and scale.



USE CASE SPOTLIGHT

Government services: smart targeting for social and humanitarian assistance

The problem: Many countries in Sub-Saharan Africa have launched social protection programmes to help vulnerable populations access critical assistance, whether regular support or one-off needs during a crisis. Yet, governments often lack comprehensive social registries to accurately identify and prioritise vulnerable populations, necessitating costly and time-consuming processes to assess and enrol eligible beneficiaries. Ethiopia's Productive Safety Net Programme (PSNP) is one of the largest welfare schemes in Africa, providing assistance to around 8 million vulnerable people.[63] With more than 90% of the population facing recurring challenges – including droughts, floods, locust infestations and conflict – there is a continuous need to enhance and scale social protection mechanisms. The recent conflict in Tigray displaced millions, highlighting the urgent need for adaptive, data-driven approaches to effectively reach those in need.[64]

Use case description: Smart targeting offers a promising solution when social registries are incomplete or outdated. This involves using ML to analyse data sources, such as mobile phone usage and survey data, to identify and prioritise vulnerable populations more accurately and efficiently. ML helps reduce exclusion errors, ensuring that those in need receive assistance while also offering a faster, lower-cost alternative to traditional methods. Smart targeting can be applied across various interventions, including cash transfers, food assistance and targeted subsidies, helping governments optimise resource allocation and improve the effectiveness of social and humanitarian programmes.

Key considerations

Data availability and quality: The availability and quality of these data sources can be challenging, especially in rural and conflict-affected areas. Low mobile penetration, limited data-sharing from telecoms companies and outdated or incomplete government data can hinder the accurate identification of vulnerable populations. Ensuring compliance with data privacy – through anonymisation, encryption and consent mechanisms – is critical.

Bias and inclusivity: ML models may inadvertently exclude vulnerable groups if the data used to train them is not sufficiently representative. Overreliance on mobile phone data risks leaving out individuals who do not have access to or use mobile devices, such as women, older persons and people in remote or low-income areas – groups that are often the most vulnerable and in greater need of assistance during crises.

System scalability and flexibility and stakeholder engagement: A smart targeting system must be scalable to process large volumes of data quickly, particularly during emergencies like droughts, floods or conflict. Flexibility is essential to adapt to different regional infrastructure and rapidly shifting needs, such as the influx of displaced populations. Effective coordination with multiple stakeholders is also crucial to ensure access to data and enable rapid updates to targeting systems, facilitating a quick, efficient response across different crises and regions.

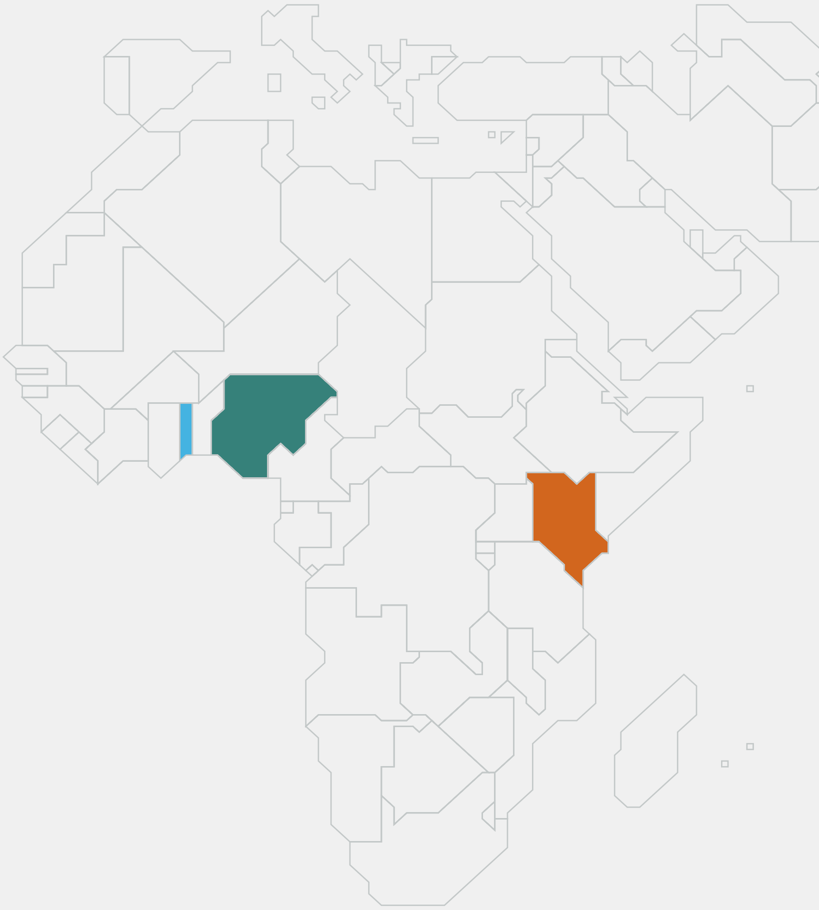
63 Taylor, L. (28 March 2024). "As starvation looms, Ethiopia's social safety programme faces a funding gap". The New Humanitarian.
64 See: The World Bank in Ethiopia.

Regional applications

NG **Google.org/Google Floods:** uses AI to predict severe flooding and send cash before disasters, enhancing forecasting, localised warnings, and resource allocation during emergencies.

KE **Ushahidi:** developed a crisis-mapping platform that aggregates crowdsourced data, enabling real-time identification of vulnerable communities and improving the distribution of humanitarian aid.

TG **GiveDirectly:** used ML to target cash transfers during COVID-19, combining satellite imagery and mobile phone data to prioritise the poorest villages and individuals.



Case study: MobileAid, GiveDirectly – Togo

GiveDirectly is a nonprofit organisation that allows donors to send money directly to the world's poorest households, to accelerate the end of extreme poverty globally. Since its launch in 2009, GiveDirectly has delivered more than $800 million in cash to more than 1.6 million people living in poverty. The organisation currently operates in Bangladesh, DRC, Kenya, Liberia, Malawi, Morocco, Mozambique, Rwanda, Uganda and the United States. Over the past few years, Give Directly has used AI/ML technology to improve its programmes delivering cash aid to people living in poverty, following a responsible AI framework.[65]

AI project

GiveDirectly, in collaboration with the Center for Effective Global Action (CEGA) and Innovations for Poverty Action (IPA), implemented an innovative targeting solution to deliver cash in Togo during the COVID-19 pandemic. This new approach, called "MobileAid", was implemented to support the government's Novissi programme – Togo's flagship emergency social assistance programme established during the pandemic. Initially, the programme determined eligibility using the voter registry and self-declared informal employment in Greater Lomé, prioritising informal workers although not necessarily the poorest households. MobileAid combines ML targeting, recipient self-enrolment and mobile money payments.[66]

The ML-enabled targeting consisted of two main stages. First, to prioritise the poorest villages and neighbourhoods, researchers mapped poverty using high-resolution satellite imagery from Digital Globe to generate micro-estimates of wealth for small geographic areas (2.4 km by 2.4 km grid cells).[67] The ML algorithm identified patterns indicative of poverty, such as poor terrain and lack of infrastructure, while distinguishing wealthier areas marked by features like metal roofs and better roads. These insights enabled them to identify the 100 poorest cantons in Togo, which were prioritised for support. Second, to prioritise the poorest individuals in the poorest villages, they analysed phone usage patterns, such as call frequency, mobile money transactions and airtime expenditures, in collaboration with Mobile Network Operators (MNOs). These estimates were based on ML models trained using survey data linked to phone usage, ensuring the predictions aligned with actual poverty indicators.

Once identified, Give Directly and the Government of Togo deployed a self-enrolment tool that eligible individuals could access through their mobile phone via the short code *855# and key in their ID information. On the backend, the self-enrolment tool matched applicants' IDs and phone numbers against the poverty scores determined by the ML algorithm. This platform integrated with mobile money providers (MMPs), enabling eligible beneficiaries to be paid instantly, automatically and remotely.

Project profile:

Year implemented: 2020

Business model: G2C

Cost model: government and donor funded

Funding: grants

Target users: government, NGOs and humanitarian agencies

Delivery channel: mobile device (USSD)

Technology:

Data: geospatial data (Digital Globe), population census data, mobile phone metadata (calls, SMS, mobile data, mobile money transactions from Togocel and Moov), phone survey (from individuals from the 100 of the poorest cantons in Togo)

Team: in-house domain and tech experts, technical partners (CEGA and the University of California, Berkeley), and M&E partners (IPA)

Type of AI: predictive AI

65 Lummis, V., Luk, S. and Ramprasad, S. (8 July 2024). "GiveDirectly's approach to responsible AI/ML". GiveDirectly.
66 Marchenko, A. and Chia, H.S. (13 April 2021). "How MobileAid & Machine Learning-based Targeting can Complement Existing Social Protection Programs". CEGA. Medium.com.
67 Chi, G., Fang, H., Chatterjee, S. and Blumenstock, J. E. (2021). Micro-Estimates of Wealth for all Low- and Middle-Income Countries. In submission.

Figure 9

MobileAid: Data-driven poverty modelling for social assistance

Priotising the poorest cantons

Training data

Survey data: consumption data and geocoordinates

+

Geospatial data

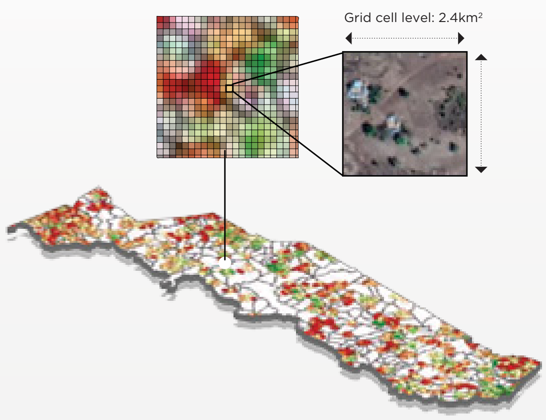
Satellite data (high-resolution imagery, night lights)

Connectivity data (cell towers, devices)

Demographic data (population, urban/rural)

Geographical data (road density, elevation)

These data sources were matched to train a supervised ML algorithm to find patterns of poverty and identify a model to predict consumption.



The result was a high-resolution map with the estimated average daily consumption per capita at the grid cell level (2.4km²) across Togo

Priotising the poorest individuals

Training data

Phone survey data

+

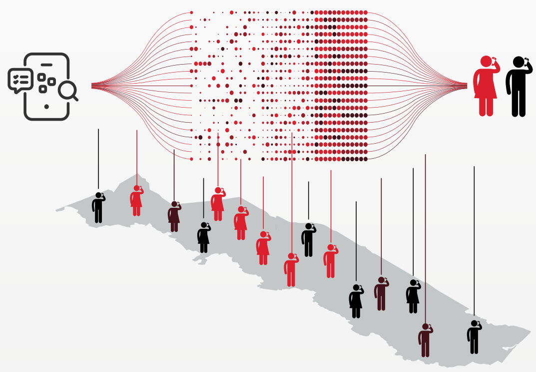
Call details records

Calls and SMS: volume, intensity, timing, social network characteristics, patterns of mobility and locations, international transaction features

Mobile data usage: mobile data transactions, days on which data is consumed

Mobile money transactions: amount, duration, direction

These data sources were matched to train a supervised ML algorithm to find patterns of poverty in CDR data and identify a model to predict consumption.



The result was a model allowing to estimate average daily consumption for each of Togo's 5.83 million mobile phone subscribers.

Source: World Bank (adapted)

Key findings and implications

The evaluation of MobileAid for the Novissi programme demonstrated its potential to improve social assistance targeting compared to alternative and traditional methods. The approach was tested against alternative targeting methods that could have been used by the Government of Togo at the time. Compared to geographical targeting, which allocated cash assistance to individuals in the poorest cantons, often excluded eligible recipients. The ML model reduced errors of exclusion by 4% to 21%, demonstrating greater precision in identifying those in need. When benchmarked against a hypothetical social registry (a common targeting method that does not exist in Togo), the ML approach increased exclusion errors by 9% to 35%. However, this comparison assumes the use of an ideal proxy means test, which likely makes the hypothetical registry appear more accurate than what would be achievable with a real-world registry. A simpler method of targeting based solely on mobile phone expenditure, which relies on the assumption that lower phone spending correlates with poverty, was also assessed but introduced significantly higher errors than the ML-based solution.[68,69]

The use of ML for targeting assistance was also assessed for fairness across different demographic groups, specifically whether it unfairly excluded vulnerable populations, such as women or individuals from specific ethnic or religious backgrounds. The findings indicated that the ML method did not disproportionately exclude any demographic group compared to their actual poverty rates. While demographic parity – where the proportion of targeted individuals matches the proportion of poor within each group – was not fully achieved, ML-based targeting maintained equity across various groups, including age, religion and household type.[70]

Overall, there is evidence that ML-based targeting provides a rapid and scalable tool for identifying poor households, particularly in crisis settings or where traditional data sources are incomplete. While the ML-based targeting approach offers advantages over traditional methods, it should be used as a complement rather than a replacement. Combining this innovative method with established practices like proxy means that tests or community-based targeting offers an opportunity to enhance social assistance efforts. By combining the precision and scalability of ML with the local insights and community engagement of traditional methods, these approaches can ensure wider coverage, legitimacy and acceptance of social protection programmes.[71]

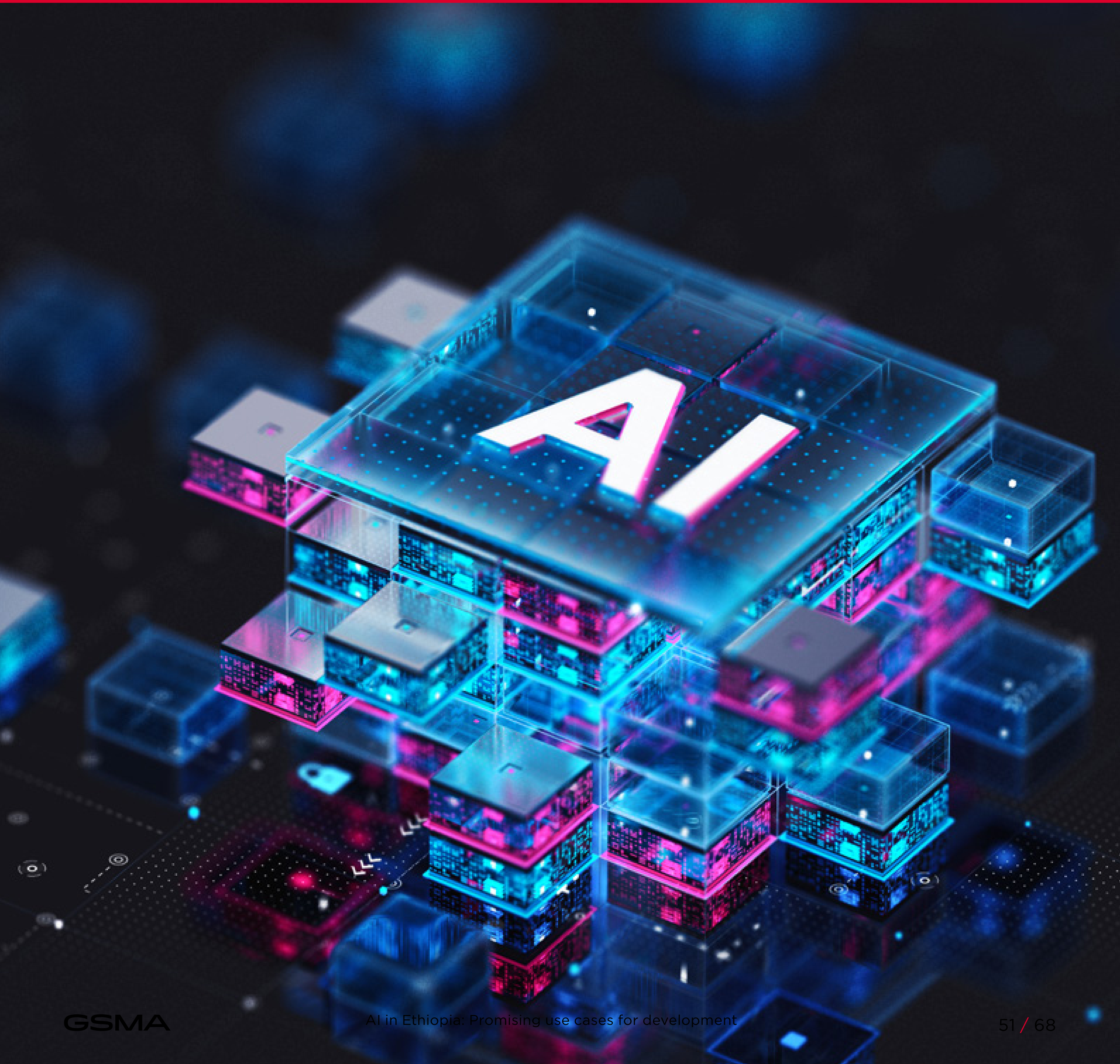
Lessons for Ethiopia

MobileAid was successful in Togo and could be adapted in Ethiopia to improve the targeting and rapid delivery of humanitarian aid during crises. By leveraging mobile data to identify those most in need, such as during conflicts or natural disasters, Ethiopia could benefit from ML models that detect financial strain and prioritise affected areas. However, successful implementation will require strong partnerships between the government, telecoms providers and grassroots organisations. In Togo, GiveDirectly's mobile-based cash transfer programme succeeded largely due to pre-existing partnerships with MNOs Togocel and Moov. These partnerships facilitated access to essential data, such as anonymised call detail records (CDRs), which were used to identify vulnerable populations. The MNOs also provided free API access, created mobile money accounts for beneficiaries and ensured that USSD platforms could support the long transaction sessions required for Novissi.[72]

In addition, Ethiopia's recent Data Proclamation Act introduces stricter data regulations than many other data protection laws, explicitly covering both content and metadata of communications data. Compliance will require coordinated efforts between these stakeholders, with government buy-in playing a critical role in determining the timeline for implementation. In Togo, this process took approximately nine months, and the timeframe in Ethiopia will largely depend on the level of government engagement.

68 Marchenko, A. (27 July 2021). "Machine Learning and Mobile Data Improves Aid Delivery in Togo". CEGA. Medium.com.
69 Aiken, E. et al. (July 2021). "Machine Learning and Mobile Phone Data Can Improve the Targeting of Humanitarian Assistance". National Bureau of Economic Research.
70 Marchenko, A. (27 July 2021). "Machine Learning and Mobile Data Improves Aid Delivery in Togo". CEGA. Medium.com.
71 Marchenko, A. and Chia, H.S. (13 April 2021). "How MobileAid & Machine Learning-based Targeting can Complement Existing Social Protection Programs". CEGA. Medium.com.
72 Lawson, C. et al. (September 2023). Novissi Togo: Harnessing Artificial Intelligence to Deliver Shock-Responsive Social Protection. Discussion Paper No. 2306. République Togolaise and The World Bank.

4. Key takeaways and considerations for AI deployment in Ethiopia



Ethiopia presents unique opportunities and challenges for AI deployment, with sectoral innovations demonstrating the potential for AI to drive economic and social transformation. However, the adoption of AI remains constrained by foundational barriers, digital inclusion challenges and sector-specific complexities. Based on the analysis of AI use cases across sectors, and the state of Ethiopia's AI ecosystem, six overarching and interrelated takeaways emerge.

Key takeaway: Limited access to sector-specific and locally relevant data constrains AI deployment, underscoring the need for strong data-sharing partnerships

Across all use cases, challenges related to data availability, accessibility and quality limit the successful deployment of AI-enabled solutions at scale. Local language data, which is critical for ensuring accessibility and inclusivity, remains one of the most significant gaps. While Amharic has a small digital footprint, other Ethiopian languages are severely underrepresented, restricting the development of NLP applications that could drive digital inclusion. In this context, efforts from organisations like iCog are critical to bridge gaps and enhance digital inclusion across various sectors.

In agriculture, healthcare and education, extremely limited and domain-specific data tailored to local contexts further hinders AI adoption. Advisory services in these sectors require high-quality, locally relevant data, yet much of it is non-digitalised, inaccessible or fragmented across institutions. In healthcare, while some datasets exist, they are scattered across different levels of government, not standardised and the quality varies significantly between regions and hospitals. In agriculture – as well as other sectors such as energy and climate – data collection technologies, such as IoT devices or remote-sensing devices require significant upfront investments and ongoing maintenance, further limiting data accessibility.

Beyond data scarcity, data-sharing barriers pose additional challenges. Use cases like alternative credit scoring and smart targeting rely on third-party data from MNOs and digital service providers, yet private sector entities have limited incentives to share data. CDRs from MNOs, for example, could enhance NLP training data and improve AI-driven targeting of underserved populations, but regulatory and commercial constraints limit data sharing.

However, regional examples show that strong partnerships can help overcome these barriers. In Togo, GiveDirectly's smart targeting model successfully leveraged existing partnerships with MNOs, allowing access to anonymised mobile data to identify and reach vulnerable populations more effectively. Similarly, recent initiatives in the region highlight the potential of data-sharing collaborations led by telecoms to enhance digital inclusion. One such example is Orange's new partnership to integrate African languages in open-source AI models.

Spotlight:

Orange to integrate African regional languages in open-source AI models for digital inclusion

Mobile operator Orange, in partnership with OpenAI and Meta, is spearheading an initiative to integrate African regional languages in open-source AI models. This collaboration aims to enhance digital inclusion and foster AI innovation across the African continent. The focus is on fine-tuning existing AI models, including OpenAI's Whisper for speech recognition and Meta's Llama for text processing, to better understand languages such as Wolof and Pulaar, which are spoken by millions in West Africa but are not currently supported by most generative AI systems.

The initiative will roll out in the first half of 2025, with the primary goal of enabling customers to communicate with Orange in their local language, especially for customer support and service interactions. These custom AI models will be offered with a free licence for non-commercial use, including applications in public health, education and other community services. In the long term, Orange plans to expand this project to cover all 18 countries in its African operations, with a vision to include all African languages in future AI models. This will help bridge the digital divide and make AI more accessible to populations, including those who are not literate and unable to benefit from current AI technologies.[73,74,75]

Orange is also committed to responsible AI, ensuring its innovations align with regulations and its Data and AI Charter.[76] Through a "Responsible AI by Design" approach, the company prioritises security, transparency, and environmental sustainability, embedding human oversight at every stage. In 2024, Orange adopted the GSMA Responsible AI Maturity Roadmap, strengthening its ethical AI practices and engagement with the broader AI ecosystem.[77] With an independent ethics council and 800 AI ethics experts, Orange fosters trust and inclusivity, ensuring AI serves social and economic progress while minimising environmental impact. [78]

73 Orange (26 November 2024). "Orange intègre les langues régionales africaines dans les modèles d'IA open-source afin de favoriser l'inclusion numérique". Newsroom Orange Group.
74 Browne, R. (26 November 2024). "Orange partners with OpenAI, Meta to develop custom African-language AI models". CNBC.
75 Ranjan, A. (27 November 2024). "Orange, OpenAI, and Meta Partner to Bring AI to Africa's Regional Languages". TechAfrica News.
76 See: Orange
77 See: GSMA Responsible AI Maturity Roadmap
78 Moenza, M. (2 January 2025). "Empowering ethical AI: trust, transparency and sustainability in action". Orange Business.

Key takeaway: Mobile technology has the potential to play a critical role in data generation and processing

Mobile technology plays a dual role in AI data generation and processing, offering both actively generated data where users directly input information, and passively generated data, which is automatically collected as users interact with mobile and digital services. Recognising these distinctions is crucial for leveraging mobile for AI solutions in Ethiopia.

Mobile phones are increasingly being used as tools for individuals to contribute and generate AI-relevant data, reducing reliance on traditional data collection methods. In agriculture, smallholder farmers can capture and upload images of crops for AI-powered disease detection, while in healthcare, mobile-based diagnostic tools enable patients or frontline workers to collect medical images or conduct voice-based assessments. These data points can then be processed locally on edge devices or in the cloud. Although mobile penetration in Ethiopia is relatively low, the liberalisation of the telecoms sector is expected to drive smartphone adoption and increase the availability of mobile-generated data. However, to ensure inclusivity in data collection, it is important that mobile-generated data is not limited to smartphones but also accommodates feature phones through SMS/USSD-based interactions and offline functionality.

In addition, mobile networks generate vast amounts of passively collected data, which can offer valuable insights for use cases like alternative credit scoring and smart targeting. Key examples include CDRs that can reveal mobility patterns and, when combined with other datasets, serve as proxies for economic activity and social behaviour, as well airtime purchases, mobile money transactions and digital footprints (such as app usage and geolocation data). However, the sensitive nature of mobile data raises privacy concerns, and reliance on mobile-generated data risks reinforce exclusion biases, as individuals without consistent mobile access – particularly rural residents, lower-income communities and women – may be systematically left out of AI-driven services. Where mobile adoption lags, on-the-ground data collection mechanisms can help fill gaps and ensure that digitally excluded populations are not left out of AI-driven services.

Key takeaway: AI deployment in Ethiopia must account for varying levels of digital inclusion in rural areas and among marginalised groups

While AI has the potential to enhance service delivery across multiple sectors, its impact can be uneven due to differences in infrastructure, connectivity and digital literacy. Rural populations, which account for the largest share of the total population, face considerable barriers to accessing and benefitting from these innovations.[79] Similarly, the gender gap in Ethiopia is one of the largest in Sub-Saharan Africa, compared to countries like Kenya, Nigeria or Uganda.[80] Limited access to mobile phones, internet services and digital skills among rural communities and women exacerbates exclusion from AI-driven services.

These disparities shape how AI solutions can be deployed across different use cases. In healthcare, AI-powered diagnostics have been introduced in hospitals with access to trained medical professionals and digital infrastructure. However, many rural health facilities lack the necessary equipment, connectivity and skilled personnel to integrate AI in their workflows, limiting their expansion to regions where healthcare access is already limited. Similarly, in agriculture, the adoption of advisory services powered by generative AI can be limited due to reliance on feature phones and low literacy and digital skills. For example, Farmer.Chat currently operates on WhatsApp, which limits its access to farmers with smartphones.

79 77% of the population live in rural areas, compared to 55% for Sub-Saharan Africa (average). World Bank Data.
80 GSMA. (2024). The Mobile Gender Gap Report 2024.

To ensure equitable AI deployment, strategies must differentiate between urban and rural contexts, tailoring solutions to fit different levels of connectivity and technological adoption. Leveraging legacy technologies, such as SMS, USSD and IVR-based AI services, can help bridge this gap and expand reach beyond high-connectivity zones. SMS-based adaptive learning, similar to Eneza Education's model in Kenya, has strong potential for schools and students in rural areas and limited resources. Similarly, innovations in edge AI are making it possible for ML models to run directly on lower-end mobile devices, allowing local processing of data and mitigating infrastructure challenges in low-resource environments. Solutions must prioritise user-friendliness and accessibility to accommodate different foundational and digital skills and improve engagement. This includes the use of voice-based AI tools to increase accessibility, given lower than average literacy levels in Ethiopia (approximately 51% in 2021),[81] particularly among women and rural communities.

Key takeaway: Strengthening the capacity of intermediaries is as critical as upskilling end users

While there is a need to upscale end users with literacy and digital skills, which are often key barriers to the adoption of AI and digital services, upskilling and raising awareness of intermediaries is equally important. In several of the use cases, AI adoption depends on the level of awareness, acceptance and skills of intermediaries rather than end users, such as extension agents, teachers and healthcare professionals, who act as the primary link between solution providers and end users.

In agriculture, AI-powered advisory services are designed to benefit smallholder farmers, yet their adoption relies on extension agents who act as facilitators, given the digital literacy challenges among rural populations. Similarly, in education, AI-driven learning tools are not simply accessed by students but require teachers to integrate them in classrooms, ensuring AI complements rather than disrupts traditional teaching methods. In healthcare, AI-powered diagnostics are not directly used by patients but instead require medical professionals in hospitals and clinics to interpret results and facilitate treatment.

This high level of intermediation means that capacity-building efforts must extend beyond end users to include these key actors, who are often the gatekeepers of AI adoption. Without their engagement, even well-designed AI solutions may not scale, as intermediaries shape how AI is introduced, explained and used within communities. While investments in AI technology and digital infrastructure are necessary, they must be accompanied by targeted training and awareness efforts to ensure intermediaries understand the value of AI, can communicate its benefits effectively and have the technical know-how to integrate it in their work. Without this, AI risks being underused, misapplied or failing to gain traction altogether.

81 UNESCO. (December 2021). "Ethiopia". GAL Country Profiles.

Key takeaway: AI deployment in Ethiopia is heavily dependent on public sector buy-in and strategic partnerships

In Ethiopia, the government plays a central role in shaping the AI ecosystem beyond policy and regulation. Unlike more established AI markets in countries like Kenya or Nigeria, where private-sector innovation is the primary force behind AI adoption, Ethiopia's AI landscape is still in early stages and less diverse. Public institutions have a strong influence on the economy, which in turn shapes the tech and AI ecosystem. Given this context, buy-in and support from government institutions are essential for AI to develop and scale.

Some government agencies have embraced AI and actively supported private sector innovators. For example, Digital Green has collaborated with the Ministry of Agriculture and the Agricultural Transformation Institute (ATI) to integrate locally relevant data in its advisory services. However, institutional support varies across sectors and use cases. The EAII has championed AI deployment across multiple domains, but more efforts are needed to secure support from key government actors. This highlights the importance of ongoing engagement with public institutions to ensure that AI adoption aligns with national priorities.

One sector where government involvement is particularly evident is telecommunications. As the main operator, Ethio Telecom, is state-owned,[82] partnerships require government buy-in. AI applications that rely on telecoms data, such as smart targeting for social protection or alternative credit scoring, likely depend on approvals and strategic alignment with both Ethio Telecom and overseeing government agencies. For third-party players, demonstrating the value of their solutions to both the telecoms sector and policymakers is key to unlocking these partnerships.

To successfully deploy AI in Ethiopia, solution providers must go beyond regulatory compliance and actively engage with public institutions to co-develop solutions that align with the country's broader digital transformation goals. Demonstrating the value of AI use cases – through pilots, impact assessments and alignment with government priorities – is essential for gaining trust and investment. Moreover, understanding how different government agencies operate, identifying synergies across ministries and proactively building partnerships at multiple levels, will be key to unlocking funding, data access and implementation pathways.

82 However, the government is planning to sell 45% of Ethio Telecom.

Key takeaway: AI for development in Ethiopia relies on grant funding, underscoring the need to diversify financing models

AI-enabled solutions in Ethiopia are heavily reliant on donor funding, government subsidies and institutional grants to develop and scale. These funding sources have been critical for early-stage research, pilot projects and deployment, but they are often short-term and insufficient for long-term sustainability and scaling. In sectors like agriculture, education and healthcare, AI applications primarily target low-income populations, making the business model challenging. Making services free of charge for end users is often essential to drive adoption, further entrenching reliance on grant funding.

As a result, AI innovation risks stagnation and a limited impact in key development sectors. While these are challenges across Sub-Saharan Africa, they are particularly acute in Ethiopia due to the country's unique structural constraints. Compared to the "Big Four" (Nigeria, Kenya, South Africa and Egypt), Ethiopia's startup ecosystem remains nascent, with limited private capital inflows. High investor risk aversion, weak exit opportunities, foreign exchange barriers and a historically dominant public sector undermine ecosystem growth.

The lack of support structures in this nascent ecosystem compound these challenges. iCog's growth, for instance, is hindered by the absence of long-term funding, VC and AI-specific accelerators that could provide essential technical and business development support. Similarly, while Kifiya benefits from development partner funding, these resources are often limited and not well suited for scaling solutions targeting high-risk customers. Regulatory barriers also present additional constraints. AI-driven credit scoring models, for example, require extensive approval processes, which can be slow and deter private investment.

There is potential for AI initiatives to achieve long-term sustainability by diversifying funding models and aligning incentives. Digital Green is exploring new financing approaches, including revenue-sharing partnerships with telecoms and private sector players. They are testing models to zero-rate services like Farmer.Chat for rural users and offering AI-driven advisory tools through an SaaS model. These strategies highlight how partnerships with telecoms and agribusinesses can provide a pathway to financial sustainability. Similarly, in Kenya, Eneza Education ensured its long-term viability by aligning its SMS-based education services with Safaricom's commercial model, integrating AI-powered solutions in the telecom's revenue streams. Ethiopia's AI ecosystem could benefit from similar models, ensuring that AI solutions transition from donor dependency to self-sustaining, scalable enterprises.

5. Conclusion and recommendations

Ethiopia's AI ecosystem presents both significant opportunities for growth and persistent challenges that must be addressed to enable sustainable, scalable and inclusive adoption of AI. While AI solutions are emerging across key sectors – including agriculture, healthcare, education and financial services – their impact remains limited by structural constraints such as data availability, computing infrastructure, financing gaps and digital inclusion barriers. The ecosystem is still in early stages of development, with public institutions playing a dominant role and private sector engagement gradually expanding. To unlock the full potential of AI for economic and social transformation, targeted interventions are needed to improve foundational AI enablers, strengthen collaborative partnerships and promote sustainable funding models.

There are several actions that the public and private sector, development partners and multilateral organisations can take to support long-term AI growth in Ethiopia, address key ecosystem gaps and prioritise interventions. By implementing these strategies, Ethiopia can build a more resilient and dynamic AI ecosystem, ensuring that AI solutions effectively address local development challenges while fostering innovation, investment and financial inclusion.

Table 6:

Recommendations to accelerate AI deployment and adoption in Ethiopia

Strengthen the local data ecosystem

- **Expand efforts to collect, digitalise and improve data availability:** Addressing affordability barriers for data collection tools is essential to improving data availability across sectors. Investments in digitalising sector-specific datasets – especially for agriculture, healthcare and education – can accelerate AI adoption. Additionally, community-driven and voice-based data collection initiatives can expand Ethiopia's local language datasets, enhancing NLP applications and AI accessibility for non-English and non-Amharic speakers.
- **Empower local actors to accelerate the development of datasets:** Working with local organisations such as civil society organisations (CSOs) and community groups can significantly accelerate the development of culturally sensitive local datasets. These organisations already possess a deep understanding of the local context, including linguistic nuances, social dynamics and cultural norms, which is essential for ensuring that datasets accurately represent the communities they aim to serve. Their existing networks and relationships can also facilitate data collection and validation processes, improving both the quality and reliability of the data. Moreover, partnering with trusted local actors fosters community buy-in and ethical data practices, mitigating risks related to data privacy, consent and misuse. By leveraging their contextual knowledge and established presence, organisations can help ensure that datasets are not only comprehensive and representative, but also aligned with the values and needs of local populations.
- **Encourage responsible data-sharing frameworks:** AI models need diverse and regularly updated datasets, but private sector players (e.g. MNOs and financial institutions) often hesitate to share data due to commercial interests and regulatory uncertainty. Ethiopia should develop clear data-sharing agreements and incentives, such as data monetisation models and regulatory sandboxes, to encourage participation from private data holders while maintaining privacy and security safeguards.

Relevant stakeholders: *Ethiopian Ministry of Innovation and Technology, EAII, domain experts, MNOs, development organisations (Tony Blair Institute for Global Change, FCDO, World Bank).*

Expand computing infrastructure and hardware access

- **Invest in high-performance computing (HPC) and data centres:** Ethiopia must prioritise AI-specific infrastructure investments, including HPC facilities and local cloud computing capabilities. Given Ethiopia's abundant hydropower resources, leveraging renewable energy for AI computing could reduce operating costs and improve sustainability. Additionally, establishing AI-focussed computing hubs will enable universities, startups and government agencies to develop AI solutions without relying on foreign cloud providers.
- **Reduce import barriers for AI hardware:** High import taxes on AI-related equipment (e.g. GPUs, servers, IoT sensors) increase costs and limit access for startups and research institutions. Policymakers should review tariff structures to lower costs and improve affordability. Additionally, creating public-private funding mechanisms to subsidise hardware costs for AI startups can help boost innovation.
- **Improve cloud computing access:** Foreign exchange restrictions make it difficult for Ethiopian developers and startups to pay for cloud services (AWS, Azure, Google Cloud). Addressing financial barriers and negotiating regional cloud hosting agreements can improve access to affordable AI infrastructure.

Relevant stakeholders: *government (Ethiopian Ministry of Innovation and Technology, EAII), regulators (Ethiopian Communications Authority), cloud service providers (AWS, Microsoft Azure), IT infrastructure companies, donor organisations (FCDO, Tony Blair Institute for Global Change)*

Promote mobile access and edge computing

- **Promote affordable mobile technology and digital literacy:** To maximise the potential of mobile-enabled AI applications, efforts should focus on enhancing mobile accessibility for underserved groups, especially women and rural populations. Policies aimed at reducing the cost of mobile devices,[83] improving network connectivity and increasing mobile internet access will be critical. Alongside this, digital literacy programmes should be scaled to ensure that marginalised populations have the skills to use these technologies effectively, particularly for accessing essential services like healthcare or financial services.
- **Enhance inclusive data collection through mobile-enabled tools:** As mobile phones generate valuable data for AI-driven services like smart targeting and alternative credit scoring, it is crucial to ensure that data collection mechanisms include diverse groups. Targeted efforts should be made to ensure that mobile-generated data reflects a broad range of demographic groups, especially marginalised communities. This could involve integrating mobile data with on-the-ground collection strategies to ensure that AI models account for the needs of all populations, thereby minimising risks of bias in service delivery.
- **Leverage mobile-enabled edge computing to expand AI applications:** Capitalising on mobile devices for both data generation and processing through edge computing can bridge infrastructure gaps in Ethiopia. Encouraging innovation around AI-powered applications that process data locally on mobile phones, such as crop health analysis or real-time medical diagnostics, will allow services to be provided even in low-connectivity areas. Stakeholders should invest in building AI models that can operate effectively on lower-end devices, ensuring accessibility for a larger population, including those in rural areas.

Relevant stakeholders: *MNOs and industry organisations (GSMA, ITU), solution providers, government*

83 The GSMA Handset Affordability Coalition, for example, aims to identify strategies to enhance handset affordability in LMICs.

Invest in AI talent and collaborative innovation

- **Focus on talent development and retention:** It is important for Ethiopia to not only develop AI talent but also retain it. This includes strengthening university curricula to provide more practical, hands-on AI training, fostering industry-academia collaborations to give students real-world experience and expanding mentorship and internship opportunities with local companies. Additionally, improving working conditions, offering competitive salaries and creating clear career growth pathways can help reduce brain drain. By nurturing and retaining a skilled AI workforce, Ethiopia will be better positioned to drive local innovation, accelerate the adoption of AI use cases and develop solutions that address the country's unique challenges. Government bodies could provide scholarships for AI education and seek partnerships with development partners and global universities, contingent upon students returning to Ethiopia to contribute their expertise to the country.
- **Establish AI innovation hubs and collaborative research centres:** To accelerate AI adoption and bridge the gap between research and real-world applications, Ethiopia could establish dedicated AI innovation hubs that bring together public, private and academic stakeholders. These hubs would serve as testing grounds for AI-driven solutions in priority sectors like agriculture, healthcare and financial inclusion, ensuring that innovations are developed in response to local challenges. By facilitating data sharing and collaborative research, these centres would strengthen connections between universities, startups and established companies, fostering a more vibrant AI ecosystem. Locating these AI hubs within existing technology hubs can further accelerate growth by tapping into established infrastructure, talent pools and entrepreneurial networks, creating environments where AI innovations can be rapidly tested, refined and scaled.

***Relevant stakeholders:** Government bodies (Ministry of Technology and Innovation, Ministry of Education), development partners (FCDO, IDRC), CSOs and capacity building organisations*

Address barriers to digital inclusion at all levels

- **Develop user-centric digital literacy and capacity-building programmes:** Given the literacy and digital skills challenges in Ethiopia, especially among women and rural populations, there is a strong need for capacity-building initiatives that focus on improving basic literacy and digital skills. These programmes should prioritise practical, accessible training in mobile phone use and AI services, tailored to low-literacy users. Voice-based interfaces, interactive IVR systems and simple user experiences should be incorporated in AI solutions to make them more accessible to non-literate or low-literate populations.
- **Increase awareness and engagement at all levels:** Raising awareness is essential for the adoption of AI-enabled services. In sectors like financial services, healthcare and agriculture, it is important that both decision-makers and frontline workers understand the value of AI solutions. For example, government officials need to appreciate the benefits and limitations of AI to ensure smooth implementation in public initiatives. Similarly, in agriculture, extension agents play a key role in helping smallholder farmers adopt AI services by building trust and communicating the benefits effectively. Without sufficient awareness and engagement from both key stakeholders and intermediaries, even AI solutions with high potential may struggle to gain traction and have a meaningful impact.

***Relevant stakeholders:** Government agencies (EAII), civil society and non-governmental organisations, solution providers, donor organisations, MNOs and industry organisations (GSMA, ITU)*

Encourage public-private sector collaboration

- **Foster public-private partnerships to support AI fundamentals:** A robust AI ecosystem requires collaboration between public and private sector actors to address foundational gaps in infrastructure, data accessibility and talent development. Given the central role of the public sector in Ethiopia, AI champions within the government should demonstrate the value proposition of AI solutions to secure government buy-in. This will enable the government to act as a catalyst by setting clear data governance frameworks, facilitating investment and incentivising AI-driven innovation through funding mechanisms, tax incentives and demand for AI solutions in key sectors such as education, healthcare and financial services.
- **Align incentives and identify mutual benefits:** Developing AI solutions with local impact requires complex, multistakeholder collaborations. It is crucial for those building AI solutions to identify the right partners, as no single entity can tackle all aspects alone. Successful collaborations depend on understanding the needs, motivations and strengths of potential partners, from data holders and technical partners to domain experts, financial backers and government bodies. By aligning incentives, these partnerships can create win-win scenarios where all stakeholders benefit.
- **Support local innovators with flexible policy:** Effective AI deployment requires strong coordination among public institutions to align policies, share data and ensure interoperability across sectors. Establishing a formalised framework to document best practices and streamline collaboration would help reduce duplication, enhance efficiency and support responsible adoption of AI. Additionally, regulatory sandboxes can provide businesses and researchers with a controlled environment to safely test AI applications, refine solutions and navigate regulatory requirements before full-scale deployment.

Relevant stakeholders: *Government (Ministry of Innovation and Technology, EAII, regulatory authorities), solution providers and private sector (MNOs, startups), donor organisations*

Explore innovative financing mechanisms to de-risk investments

- **Promote blended finance and provide flexibility in funding structures:** Given Ethiopia's nascent private investment ecosystem, public sector involvement, donor funding and catalytic capital will be crucial in de-risking AI investments and encouraging private sector participation. Blended finance models, which combine early-loss patient capital with commercial investment, can help AI startups build foundational capabilities and test solutions before scaling. Aligning grant-funding mechanisms with commercial investor metrics can streamline financing and ease the transition across funding stages. To promote inclusion, dedicated funding rounds for women founders and underrepresented entrepreneurs will help ensure equitable access to capital.
- **Encourage sustainable revenue models to reduce reliance on grants:** To ensure long-term viability, startups must develop revenue models that align with commercial interests while maintaining their impact. Exploring subscription-based pricing, SaaS models or pay-per-use structures can provide predictable income streams. Strategic partnerships with corporate clients, telecoms providers and industry stakeholders – such as Digital Green's or Eneza Education's revenue-sharing approach – demonstrate how AI services can be integrated in existing business ecosystems. Encouraging private-sector investment in AI through tax incentives, co-financing schemes and procurement commitments can further strengthen financial sustainability while fostering innovation.
- **Provide technical assistance and go-to-market support:** Beyond financial support, Ethiopian AI startups and innovators need technical assistance and commercialisation strategies to scale their solutions. Many startups face challenges in accessing expertise on AI technologies, data management and ML capabilities, as well as navigating regulatory requirements and ethical AI considerations. Supporting existing initiatives, such as iceaddis and iCog Labs, and offering structured technical support through mentorship programmes, accelerator initiatives and partnerships with research institutions can help bridge these gaps. Go-to-market support is equally critical, assisting startups to refine their products, conduct market research and identify viable business models to ensure their solutions are both impactful and financially sustainable. By integrating technical capacity building with market readiness strategies, AI startups can transition from pilot projects to scalable, long-term solutions.

Relevant stakeholders: *Government (Ministry of Innovation and Technology, Ethiopian Investment Commission), DFIs and donor organisations (World Bank, International Finance Corporation, FCDO, European Commission), VC and impact investors, corporate and industry players, accelerators and innovation hubs (iceaddis)*

Annexes

Annex 1: Sectoral assessment of AI readiness and maturity levels in Ethiopia

	Alignment with national development priorities	Supply-side momentum	Scale of impact	AI readiness and maturity level
Digital inclusion (NLP)	**High** AI-powered language technology is central to Ethiopia's digital inclusion strategy, supported by the National AI Policy and Digital Ethiopia 2025.	**Moderate** Growing initiatives like the Ethiopian Languages Research Center, Masakhane, iCog and Lesan AI, although still in early stages.	**High** NLP solutions could significantly expand access to digital services, education and governance for millions, particularly in underserved rural communities.	**Emerging**
Agriculture	**High** The sector is a cornerstone of Ethiopia's economy and food security, central to government policies such as Digital Ethiopia 2025, the Homegrown Economic Reform and the National AI Policy.	**High** Active AI solutions and pilots (e.g. CoffeeNet, Digital Green, Kifiya) are driving innovation in precision agriculture, crop monitoring, yield prediction and supply side management.	**High** Agriculture is the largest employer and key driver of the economy. AI-driven solutions have the potential to enhance productivity and improve livelihoods for millions of smallholder farmers, supporting rural development.	**Advanced/ Potential to scale**
Healthcare	**High** Universal healthcare and improved service delivery are key priorities under the Health Sector Transformation Plan (HSTP) and National AI Policy.	**High** AI applications in diagnostics, telemedicine and healthcare accessibility are emerging, with leadership from the Ethiopian AI Institute, and private sector organisations (e.g. YeneHealth)	**High** AI-driven healthcare solutions can directly improve disease detection, telehealth access and maternal care for millions of people, and bridge the access gap for marginalised communities.	**Advanced/ Potential to scale**
Financial services	**High** The National Financial Inclusion Strategy (2021–2025) focuses on expanding digital financial services, particularly for rural populations and SMEs.	**Moderate** Some AI use cases exist in banking (e.g. chatbots, fraud detection), but innovation is limited to a few institutions.	**High** Ethiopia has relatively low financial inclusion, especially in rural areas. AI-driven credit scoring, mobile banking and fraud detection could unlock financial access for millions.	**Intermediate**
Education	**High** A national priority for economic development under the Ten-Year Development Plan and Digital Ethiopia 2025.	**Low** Limited adoption of AI-driven edtech and limited availability of digitised Ethiopian high school textbooks to act as a database for developing additional tutoring or self-paced learning tools.	**High** A large youth population, teacher shortages and unequal access. AI-driven personalised learning, digital textbooks and virtual training could significantly enhance educational outcomes.	**Emerging**

	Alignment with national development priorities	Supply-side momentum	Scale of impact	AI readiness and maturity level
Government services	**High** Ethiopia is digitalising government services via digital IDs, e-government platforms and public service automation.	**Moderate** Early-stage AI applications (e.g. chatbots, service automation) are being piloted by EAII.	**High** AI can improve public service delivery for the entire population, enhancing efficiency, transparency and access to government benefits.	**Intermediate**
Energy and infrastructure	**High** Energy access and infrastructure development are key policy goals, including telecoms market liberalisation and renewable energy expansion.	**Low** There is limited AI-driven innovation in Ethiopia, although relevant models exist in other African countries (e.g. AI-driven grid optimisation, energy demand prediction)	**Moderate** Ethiopia has one of the largest energy deficits in Africa. AI could optimise power distribution and efficiency, but foundational infrastructure challenges must be addressed first.	**Nascent**
Tourism	**High** A recognised strategic sector in Ethiopia's Ten-Year Development Plan, with strong potential for job creation and foreign exchange earnings.	**Low** AI adoption remains limited, with isolated applications in smart tourism technologies and infrastructure mapping.	**Moderate** The sector plays an increasingly important role in the economy. AI can enhance visitor management and marketing, but sector growth is constrained by security and infrastructure gaps.	**Nascent**
Manufacturing	**High** A priority for industrialisation, with investments in industrial parks, logistics and infrastructure development.	**Low** Ethiopia's manufacturing sector remains small (4.6% of GDP), with limited AI-driven automation and digitalisation efforts.	**Moderate** Strategic for long-term growth. AI could boost productivity, supply chain efficiency and quality control, but the sector is not yet a major employer.	**Nascent**
Climate action	**Moderate** Ethiopia has demonstrated commitment to climate action (e.g. Green Legacy initiative, 10-Year Development Plan) but relies heavily on international funding for implementation.	**Low** Some investment in renewable energy and climate-smart agriculture, but other AI applications in climate remain limited.	**High** High climate vulnerability and dependence on natural resources. AI could enhance climate modelling, biodiversity tracking and resource optimisation, but adoption remains low.	**Emerging**
Humanitarian/ social assistance	**Moderate** Ethiopia's social protection and disaster response programmes (e.g., PSNP, National Disaster Risk Management policy) are critical but not AI-focused.	**Low** Digital tools for humanitarian response exist, but AI adoption is minimal. There is growing recognition of AI's potential, but discussions on integration are still in an early stage.	**High** Recurring humanitarian crises, millions displaced. AI-driven disaster prediction, crisis response and aid distribution could improve efficiency.	**Emerging**

Annex 2: List of organisations consulted

- Addis Ababa Science and Technology University (AASTU)
- Arif Pay
- Chapa Financial
- Consultative Group on International Agricultural Research (CGIAR)
- Digital Green
- Ethio Telecom
- Ethiopia Federal Ministry of Health
- Ethiopian Agricultural Transformation Institute
- Ethiopian Artificial Intelligence Institute
- Ethiopian Federal Ministry of Education (MOE)
- Ethiopian Federal Ministry of Health (MOH)
- Ethiopian Federal Ministry of Innovation and Technology (MInT)
- Ethiopian Fintech Association
- Ethiopian Institute of Agricultural Research (EIAR)
- Gates Foundation
- GiveDirectly
- Guzo Technologies
- iCog Labs
- Jimma University Incubation Innovation Center
- Kifiya Technologies
- Knowledge Platform
- Last Mile Health
- Laurendeau & Associates
- Lesan AI
- Mastercard Foundation
- Mindplex
- Mtabe
- Opian Analytics
- Orbit Health
- Safaricom
- Tony Blair Institute for Global Change
- YeneHealth

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