THE UNITED REPUBLIC OF

TANZANIA

Artificial Intelligence Readiness Assessment Report

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Table of Contents

Acronyms and Abbreviations

AfCFTA	African Continental Free Trade Area
AfDB	African Development Bank
AI	Artificial Intelligence
AI4D	Artificial Intelligence for Development
AMCS	Applied Mathematics & Computational Science (NM-AIST)
AML	Anti-Money Laundering
ARIFA	African Research Institute for Artificial Intelligence
AU	African Union
BADEA	Arab Bank for Economic Development in Africa
BAKITA	Baraza la Kiswahili la Taifa (National Kiswahili Council)
BASATA	Baraza la Sanaa la Taifa (National Arts Council)
BIG-Z	Boosting Inclusive Growth for Zanzibar
BoT	Bank of Tanzania
CBE	College of Business Education
CIVE	College of Informatics and Virtual Education (UDOM)
CNN	Convolutional Neural Network
CoCSE	Computational and Communication Sciences and Engineering
CoICT	College of Information and Communication Technologies (UDSM)
COSTECH	Tanzania Commission for Science and Technology
CSE	Computer Science and Engineering (UDSM)
CSO	Civil Society Organisation
DAO	Decentralised Autonomous Organisation
DIH	Digital Innovation Hub
DIT	Dar es Salaam Institute of Technology
dLab	Tanzania Data Lab - dLab
DPIA	Data Protection Impact Assessment
DTBi	Dar Teknohama Business Incubator
DTP	Digital Tanzania Project

EAC	East African Community
EASTRIP	East Africa Skills for Transformation and Regional Integration Project
eGA	e-Government Authority
eGAZ	Zanzibar e-Government Agency
EHR	Electronic Health Record
EMoS	Embedded & Mobile Systems (NM-AIST)
FYDP	National Five-Year Development Plan
GDP	Gross Domestic Product
GEPG	Government Electronic Payment Gateway
GERD	Gross Expenditure on Research and Development
GovESB	Government Enterprise Service Bus
HEI	Higher Education Institution
ICANN	Internet Corporation for Assigned Names and Numbers
ICSE	Information and Communication Sciences and Engineering
ICT	Information and Communication Technology
ICTC	ICT Commission
IEEE	Institute of Electrical and Electronics Engineers
IIT-M	Indian Institute of Technology - Madras
IMS	Institute of Marine Sciences
IoT	Internet of Things
ISNS	Information Systems & Network Security (NM-AIST)
ISP	Internet Service Provider
ITU	International Telecommunication Union
IVR	Interactive Voice Response
KCMUCo	Kilimanjaro Christian Medical University College
Kencorpus	Kenya Language Corpus
KFIT III	Korea Funds-in-Trust III (project)
KYC	Know Your Customer

L1	First Language
L2	Second Language
LGA	Local Government Authority
M2M	Machine-to-Machine
MAKISATU	Mashindano ya Kitaifa ya Sayansi, Teknologia na Ubunifu (National Competition on Science, Technology and Innovation)
MDA	Ministries, Departments, and Agencies
MeTL Group	Mohammed Enterprises Tanzania Limited Group
MoCIT	Ministry of Communication and Information Technology
MKUZA II	Zanzibar Strategy for Growth and Reduction of Poverty
ML	Machine Learning
MNO	Mobile Network Operator
MobC	Mobile Computing (NM-AIST)
MOICT	Ministry of Infrastructure, Communication and Transport (Zanzibar)
MP	Member of Parliament
MSc DSAI	Masters of Science in Data Science and Artificial Intelligence
MUHAS	Muhimbili University of Health and Allied Sciences
MUST	Mbeya University of Science & Technology
NACTE	National Council for Technical Education
NBC	National Bank of Commerce
NBS	National Bureau of Statistics
NCSS	National Cybersecurity Strategy
NDES	National Digital Education Strategy
NFAST	National Fund for the Advancement of Science and Technology
NICTBB	National ICT Broadband Backbone
NIDA	National Identification Authority
NIDC	National Internet Data Centre
NLP	Natural Language Processing
NM-AIST	Nelson Mandela African Institution of Science and Technology

NMB	National Microfinance Bank
NRCC	National Research Clearance Committee
OECD	Organisation for Economic Co-operation and Development
PDPA	Personal Data Protection Act
PDPC	Personal Data Protection Commission
PMU	Procurement Management Unit
PPP	Public-Private Partnership
PPRA	Public Procurement Regulatory Authority
RAG	Retrieval-Augmented Generation
RDI	Research, Development, and Innovation
RGoZ	Revolutionary Government of Zanzibar
SADC	Southern African Development Community
SEBEP	Skills Enhancement for the Blue Economy Project
SGCI	Science Granting Councils Initiative
SIDO	Small Industries Development Organisation
SRH	Sexual and Reproductive Health
STEM	Science, Technology, Engineering, and Mathematics
STI	Science, Technology, and Innovation
SUA	Sokoine University of Agriculture
SUZA	State University of Zanzibar
TAEC	Tanzania Atomic Energy Commission
TBL	Tanzania Breweries Limited
TCRA	Tanzania Communications Regulatory Authority
TEMDO	Tanzania Engineering and Manufacturing Design Organisation
TIRDO	Tanzania Industrial Research and Development Organisation
TRA	Tanzania Revenue Authority
TTCL	Tanzania Telecommunications Corporation Limited
UCSAF	Universal Communications Service Access Fund

UDOM	University of Dodoma
UDSM	University of Dar es Salaam
UNCDF	United Nations Capital Development Fund
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
VC	Venture Capital
WHO	World Health Organisation
WiDS	Women in Data Science
YEESI Labs	Youth Empowerment through Establishment of Social Innovation Labs
ZADEP	Zanzibar Development Plan
ZICTIA	Zanzibar ICT Infrastructure Agency
ZPPDA	Zanzibar Public Procurement and Disposal of Public Assets Authority
ZRB	Zanzibar Revenue Board

Foreword

We have officially entered the Age of Artificial Intelligence. The world is now set to change at a pace not seen in decades, even centuries. AI-based tools and applications make our lives easier, smoother, and richer. They help us move efficiently, get informed, get credit, get a job, and get our taxes done.

But in its current form, AI reproduces and amplifies many of the social challenges we face. It is not acceptable that around half of the world's population still lacks adequate internet access. Upstream, the AI industry is highly concentrated, with just two countries – the United States and China – and a dozen companies accounting for a major share of the sector. This can lead only to greater inequality of outcomes – including gender disparities – downstream. Non-diverse AI teams, unrepresentative datasets, and opaque and biased algorithms can cause harm, particularly to those who are already vulnerable, whether companies or individuals, children and young people, women, or entire democracies.

That is why UNESCO drafted the Recommendation on the Ethics of Artificial Intelligence, which was adopted in 2021 by 193 countries to make sure AI delivers fair, sustainable, and inclusive outcomes. The Recommendation is based on the protection and promotion of human rights, human dignity, and environmental sustainability, and these values are then translated into principles such as accountability, transparency, and privacy. The Recommendation also sets out concrete policy actions that governments can draw on to steer technological developments in a responsible direction, premised on the belief that light-touch regulation, which has until now remained the norm, is insufficient. We need capable governments that are well equipped, in terms of competencies, institutions and laws, to frame responsible AI development and protect the rule of law online, and public and private developers who are accountable for putting human rights and fundamental freedoms – not profits or geopolitical considerations – first.

The Readiness Assessment Methodology (RAM) is a diagnostic tool intended to assist Member States in upholding their commitment to the Recommendation by helping them understand how prepared they are to implement AI ethically and responsibly for all their citizens. By highlighting any institutional, regulatory or data gaps and obstacles, it enables UNESCO to tailor support for governments to fill those gaps to ensure an ethical AI ecosystem aligned with the Recommendation.

The RAM questionnaire forms the basis for the first section of this readiness assessment report, providing a comprehensive but detailed overview of laws, institutions, and the cultural, social, and human capital landscape shaping AI. This is then complemented in the second section by a summary of concerns and priorities raised during a national multistakeholder consultation that was conducted in 2023. Finally, the third section presents a roadmap and recommendations for building capacities across national institutions, laws and policies, and human capital, to achieve a responsible AI ecosystem aligned with the UNESCO Recommendation.

This report on Tanzania's AI readiness reveals a nation actively engaging with the complexities and opportunities of artificial intelligence, demonstrating a commitment to harnessing its potential for national development. We commend the Government of The United Republic of Tanzania for undertaking this comprehensive assessment and for its dedication to fostering an AI ecosystem that is both innovative and ethically sound.

The success of the extensive stakeholder engagement process, involving over 240 participants from diverse sectors and regions, is particularly noteworthy. These consultations have cultivated a nuanced, multidimensional approach to AI readiness, prioritizing national values, cultural contextualization, and inclusive development.

The report highlights Tanzania's significant strengths and proactive steps in the legal and regulatory dimension. The development of a draft National AI Strategy and Guidelines by the Ministry of Communication and Information Technology, explicitly shaped by the UNESCO Recommendation on the Ethics of AI and the African Union Continental Strategy on AI, is a commendable initiative. Furthermore, the enactment of the Personal Data Protection Act of 2022 and the subsequent operationalization of the Personal Data Protection Commission represent critical milestones in establishing robust data governance frameworks essential for trustworthy AI. Sector-specific policy development is also progressing, with the Ministry of Health having launched an AI Policy Framework for the health sector in 2022, and the Ministry of Education, Science and Technology drafting guidelines for AI in education. The overarching Tanzania Digital Economy Strategic Framework 2024-2034 further solidifies the nation's vision for technological advancement. However, the RAM also reveals the need to finalize the national AI strategy with clear implementation pathways, and to ensure that existing legislative frameworks, such as procurement laws and the Access to Information Act (currently limited to the mainland), are adapted to address the unique challenges posed by AI systems.

In the social and cultural sphere, the RAM underscores a strong emphasis from stakeholders on culturally contextualized AI frameworks and linguistic inclusivity, particularly through advancements in Natural Language Processing for Kiswahili. Initiatives like the Database Kiswahili project, Mozilla Common Voice, and The Lacuna Fund are vital in this regard. Despite these positive steps, the assessment points to a significant digital divide, with disparities in internet access between urban and rural areas, and a notable gender gap in both mobile internet access (17% for women versus 35% for men) and STEM enrollment at the tertiary level (4.4% for females versus 21.6% for males). Addressing this divide and enhancing digital literacy, with 60% of Tanzanians currently lacking basic digital skills, are critical. While foundational environmental policies exist, specific guidance for assessing the environmental impact of AI technologies is yet to be developed.

The scientific, educational, technical, and infrastructural dimensions present a mixed yet promising picture. Tanzania boasts a blooming AI research ecosystem within its universities and an emerging community of startups applying AI to local challenges. The nation's digital infrastructure is growing, with mobile broadband population coverage reaching 83% by September 2023, and a commendable top-tier ranking in the Global Cybersecurity Index 2024 within Africa. However, gross domestic expenditure on R&D remains low at approximately 0.5% of GDP, and significant infrastructure gaps persist, particularly in rural power sustainability, nationwide connectivity, and the availability of advanced computing capabilities such as data centers and GPUs. While universities are expanding AI-related degree programs, critical skills gaps in AI persist across the workforce.

The national multistakeholder consultations, a cornerstone of this assessment, brought forth a clear consensus: AI development must be rooted in ethical principles, serve human flourishing, and be adapted to Tanzania's unique cultural and developmental context. Participants voiced strong support for public-private collaboration, inclusive development to ensure AI's benefits are widely shared, and sustainable approaches that consider environmental impacts. The enthusiasm for AI's potential in sectors like healthcare, agriculture, and education was palpable, alongside a pragmatic understanding of implementation challenges.

To navigate this landscape, the report proposes a comprehensive suite of recommendations. Key among these are: finalizing and adopting the national AI strategy with robust ethical guidelines and a clear implementation roadmap; developing specific regulations for AI ethics, accountability, and transparency in alignment with global standards; and establishing a National AI Council with multi-stakeholder representation to guide and coordinate AI initiatives. Furthermore, integrating AI literacy into educational curricula at all levels, implementing targeted programs to increase women's participation in AI, and strategically investing in AI computing infrastructure and data centers are crucial for building a resilient and equitable AI future.

Overall, this report presents a fundamentally optimistic vision that we at UNESCO share: that ethical governance and responsible regulation of AI is entirely consistent with innovation and economic growth and is essential for ensuring a technological ecosystem that benefits the public good. With the RAM data and this report, The United Republic of Tanzania has a clear roadmap for how to get there.

It was a pleasure working with the Government of The United Republic of Tanzania to conduct this exercise. We are grateful for their engagement with the RAM and I am sure that by following the path laid out in this report, the United Republic of Tanzania will be able to reap the benefits of AI while making sure that AI technologies deliver fair, sustainable, and inclusive outcomes.

Lidia Brito
Assistant Director-General ad interim for Social and Human Sciences, UNESCO

Executive Summary

In November 2021, 193 Member States of UNESCO adopted the Recommendation on the Ethics of Artificial Intelligence. This global standard aims to leverage the positive impact of AI while addressing its inherent risks.

Countries around the world are now in the process of implementing the Recommendation, with UNESCO supporting them through various capacity-building efforts. In this context, UNESCO is partnering with the Patrick J. McGovern Foundation on the Harnessing the Power of AI to Promote Equal Opportunities in the Digital World initiative to translate the Recommendation into national institutional and regulatory frameworks and build a national consensus on the shared vision for AI.

As a result of this shared effort, the Readiness Assessment Methodology (RAM) has been created by UNESCO. The RAM is a macro-level instrument that will help countries understand where they stand on the scale of preparedness to implement AI ethically and responsibly for all their citizens, highlighting what institutional and regulatory changes will be needed. Furthermore, the output of the RAM will also help UNESCO tailor the policy reform and institutional capacity efforts to the needs of different countries. This will ensure that the country has human capacity, policies and regulations to address the challenges brought by AI, such as reinforcing traditional biases and ensuring that people and their interests are always at the centre of AI development.

The implementation of the RAM consists of three stages:

1. **Diagnosis of the National AI landscape,**
2. **Developing a National AI Multi-Stakeholder Roadmap and**
3. **Main Policy Recommendations for a National AI Strategy.**

Tanzania stands at a pivotal moment in its digital evolution, poised to harness the transformative power of Artificial Intelligence (AI) for national development and to emerge as a leading research, development, and innovation (RDI) hub in the region. This assessment reveals a nation making significant strides in AI readiness, underpinned by a thoughtful, human-centred approach prioritising national values, cultural contextualisation, inclusive development, and ethical implementation. Tanzania's commitment to leveraging AI for societal benefit is evident in its proactive policy development, growing digital infrastructure, and a burgeoning ecosystem of innovators and researchers. This summary highlights the key opportunities and recommendations that will propel Tanzania towards its vision of a digitally empowered future, driven by responsible and impactful AI.

A Nation Primed for AI-Driven Growth:

Tanzania has laid a strong foundation for AI advancement. The enactment of the Personal Data Protection Act (PDPA) of 2022 and the development of crucial sectoral frameworks, such as the AI Policy Framework for the health sector (2022) and the forthcoming Guidelines for AI in Education, demonstrate a proactive stance on governance. The Tanzania Digital Economy Strategic Framework 2024-2034 further articulates a clear vision for technological progress, emphasising digital infrastructure, skills development, innovation, and inclusion.

Key strengths underpinning Tanzania's AI potential include:

- **A Stable and Supportive Environment:** A stable political climate fosters digital innovation and supports the implementation of progressive policies.
- **Legislative and Policy Advancements:** Recent laws like the PDPA provide a crucial framework for data governance, essential for ethical AI. Sector-specific policies highlight a nuanced understanding of AI's application, including the AI Policy Framework for the Health Sector and the Ministry of Education, Science and Technology's draft guidelines for AI in education.
- **Growing Digital Infrastructure:** The National ICT Broadband Backbone (NICTBB) is a significant asset, and efforts are ongoing to expand connectivity, including 3G, 4G, and emerging 5G networks.
- **Digital Transformation in Governance:** Initiatives like the Government Electronic Payment Gateway (GEPG) showcase a commitment to leveraging technology for the public good and efficiency.

- **A Blooming Research and Innovation Ecosystem:** Universities like the University of Dar es Salaam (UDSM), Nelson Mandela African Institution of Science and Technology (NM-AIST), Sokoine University of Agriculture (SUA), and the University of Dodoma (UDOM) are actively engaged in applied AI research across vital sectors such as healthcare, agriculture, and education. This academic thrust is powerfully complemented by research bodies like the AfriAI Lab, a partnership between UDOM and NM-AIST fostering responsible AI research and capacity development. Furthermore, a vibrant startup community is unlocking and applying AI to solve local challenges, with numerous companies operating in financial services, healthcare, agriculture, and education. Community-led initiatives like the Tanzania AI Community, boasting over 700 members, are also crucial in building a collaborative AI learning and innovation environment.
- **Rich Linguistic and Cultural Assets:** Tanzania's linguistic diversity, particularly the widespread use of Kiswahili, presents a unique opportunity for developing inclusive AI and Natural Language Processing (NLP) tools. Initiatives to create Kiswahili datasets are underway, supported by the Database Kiswahili project, The Mozilla Common Voice, and The Lacuna Fund.
- **Strong Stakeholder Engagement:** Consultations with over 240 participants across Dar es Salaam, Zanzibar, and Dodoma revealed a sophisticated, values-based approach to AI, emphasising cultural contextualisation, ethical implementation, and public-private collaboration.

Unlocking Tanzania's Potential as a Regional RDI Hub: Tanzania is uniquely positioned to become a centre of excellence for AI research, development, and innovation in East Africa and beyond. The nation's focus on applied AI to solve pressing socio-economic challenges and its strategic initiatives, growing talent pool, and dynamic startup scene create a fertile ground for RDI leadership.

Opportunities for RDI Eminence:

1. **Leveraging Local Context for Global Impact:** Tanzania's commitment to culturally contextualised AI that honours local traditions and values can lead to developing unique, ethical, and highly relevant AI solutions. This approach, particularly in areas like Kiswahili NLP, can attract international collaboration and position Tanzania as a leader in inclusive AI.
2. **Pioneering Sector-Specific AI Solutions:** With established research in AI for health (e.g., diagnostics, patient monitoring via platforms like Dawa Mkononi and Muhimbili radiology), agriculture (e.g., crop disease surveillance, smart farming via platforms like AgriMfumo and AgroScan), and education (e.g., platforms like Twiga, Tusome, and SomaApp), Tanzania can deepen its expertise and export innovative solutions tailored to the needs of developing economies. The AI Policy Framework for the Health Sector (2022) provides a foundational model for such sectoral advancements.
3. **Cultivating a Vibrant Innovation Ecosystem:** The burgeoning network of innovation hubs (e.g., Buni Hub, Sahara Ventures, DTBi) and the ambitious Silicon Zanzibar initiative provide crucial support for startups and tech talent. Strategic investment in these hubs, coupled with improved access to funding for the strong startup community, can accelerate the translation of research into market-ready AI applications.
4. **Building a Skilled AI Workforce:** Tanzania is actively developing its AI talent through university programs (UDSM, NM-AIST, MUST, IIT-M Zanzibar Campus offering specialised AI and Data Science degrees) and various skills initiatives. Institutions like AfriAI Lab also play a vital role in capacity building. Tanzania can produce a globally competitive AI workforce by strengthening STEM education from foundational levels, modernising curricula in collaboration with industry (the "Triple Helix" model), and promoting lifelong learning.
5. **Fostering Ethical AI Leadership:** Tanzania's early adoption of data protection laws and its focus on ethical AI implementation can establish it as a model for responsible AI governance in the region. By developing and implementing clear ethical guidelines aligned with international standards like the UNESCO Recommendation on the Ethics of AI, Tanzania can build trust and attract ethical AI investment.
6. **Championing Data-Driven Development:** Ongoing efforts to improve data sharing and accessibility, such as development of Jamii Exchange Platform to enhance integration and data sharing among public and private Information System Development of National Data Governance standards by MoCIT, presence of COSTECH's National Data Sharing Framework and the National Bureau of Statistics' work, are vital. Strengthening data infrastructure and statistical capacity will fuel AI development and evidence-based policymaking.

Key Recommendations for Accelerating AI-Driven RDI: To fully realise its potential as a regional RDI hub, Tanzania should prioritise the following strategic actions, drawn from the comprehensive assessment and stakeholder insights:

I. Strengthen Regulation and Governance for Innovation:

1. **Finalise and Adopt a National AI Strategy:** This strategy should be anchored in ethical guidelines, prioritise human-centred design, and promote cultural and linguistic diversity, creating "safe spaces" for AI development. It must be an inclusive document reflecting Tanzania's unique socio-technical aspirations and explicitly recognising AI as a socio-technical system.
2. **Develop Specific AI Regulations:** Building on the PDPA 2022, establish clear rules for AI ethics, accountability, and transparency, including requirements for algorithmic impact assessments and human oversight. The UNESCO Ethical Impact Assessment tool should be deployed. These regulations must incorporate Tanzanian cultural values and priorities.
3. **Establish a Clear AI Liability Regime:** Develop a legal framework to address harms caused by AI systems, clarifying responsibility and providing compensation mechanisms, while fostering innovation. This should address unique AI challenges like foreseeability and causation in complex algorithms.
4. **Implement Sectoral AI Guidelines:** Develop tailored guidelines for priority sectors like agriculture, education (building on existing draft guidelines), tourism, and financial services, modelling on the existing AI Policy Framework for the health sector. These should be developed collaboratively with domain experts, AI specialists, ethicists, and affected communities.
5. **Create Robust Data Sharing Frameworks:** Facilitate secure and privacy-preserving data sharing between public and private entities, establishing standards for data quality and interoperability to fuel AI development, both nationally and internationally, with partner governments. An assessment of current data protection frameworks against AI challenges is needed.

II. Build a Cohesive and Empowered Institutional Framework:

1. **Establish a National AI Council:** Create a multi-stakeholder body (government, academia, private sector, civil society) to oversee national AI initiatives, coordinate activities, advise on policy, and manage international engagement. This council will serve as a forum for addressing emerging ethical, social, and legal issues and ensure diverse perspectives are represented.
2. **Launch a National AI Research Centre:** This centre will drive locally relevant research, develop solutions leveraging Tanzania's unique assets (linguistic diversity, cultural heritage), foster collaboration (including with international networks), and serve as a training ground for AI talent, supported by institutions like AfriAI Lab.
3. **Develop AI Testing and Certification Facilities:** Establish facilities to ensure AI systems meet quality, safety, and ethical standards, building trust in AI technologies, particularly in sensitive sectors, potentially with international expert assistance (e.g., UNESCO).
4. **Expand Regional AI Innovation Hubs:** Democratize access to AI resources by establishing and strengthening innovation hubs nationwide, leveraging existing resources like universities, technical schools, and hubs such as the Tanzania AI Community. These hubs should address diverse local needs and connect to national and international networks.
5. **Form an Independent AI Ethics Review Board:** Create a board to assess high-risk AI applications, provide ethical guidance, and address emerging challenges, complementing regulatory efforts, potentially with international expert support.

III. Invest in Human Capital and Public Engagement:

1. **Integrate AI Literacy into All Education Levels:** Embed age-appropriate AI education, covering technical and ethical aspects, from primary to tertiary levels, to prepare citizens for an AI-enabled society and cultivate critical thinking.
2. **Develop Specialised AI Degree Programs and Certifications:** Universities and technical institutions should offer AI programs (like those at UDSM, MUST, IIT-M Zanzibar) designed with industry collaboration to meet market needs, advance scientific discovery, and promote ethical awareness and critical thinking.
3. **Launch Public Awareness Programs on AI:** Educate citizens about AI's benefits, risks, and existing national initiatives through culturally appropriate campaigns to build understanding and empower critical engagement.
4. **Implement Targeted Programs for Women in AI:** Introduce scholarships, mentorship, and women-focused AI clubs (as suggested in stakeholder consultations) to address gender disparities and ensure diverse perspectives in AI development.
5. **Build Advanced Infrastructure Capacity:** Invest in high - performance computing, data centres (like the

planned BADEA-funded AI and Robotics Data Centre and WINGU Africa's facility), and enhanced connectivity (5G, fibre), focusing on sustainability and renewable energy solutions.

A Human-Centred Future for AI in Tanzania:

Tanzania is not merely adopting AI; it is shaping its technological future with a profound understanding that innovation must serve human flourishing. The nation's approach, characterised by a commitment to cultural preservation, ethical considerations, and inclusive participation, offers a compelling model. By strategically implementing the recommendations outlined, Tanzania can concretise its aspirations for leading in responsible AI, attract investment, nurture talent, and drive sustainable development.

The journey ahead requires sustained commitment and collaboration. However, with its existing strengths, including a dynamic startup ecosystem and dedicated research institutions like AfriAI Lab, a clear vision, and the collective wisdom of its stakeholders, Tanzania is well-equipped to transform these opportunities into tangible realities. By continuing on this human-centred path, Tanzania can forge an AI ecosystem that not only addresses its unique challenges and aspirations but also contributes significantly to the advancement of ethical and impactful AI regionally and globally, securing its place as a vibrant hub for research, development, and innovation for generations to come.

Diagnosis of the National AI Landscape

At the moment of the preparation of this Report, Tanzania was at the inception stage of the development of its national approach to AI governance, with several important initiatives underway. The Ministry of Communication and Information Technology is the lead national institution for the development of a draft National AI Strategy and Guidelines, aimed to provide overarching guidance for the implementation of AI across various sectors. This effort demonstrates Tanzania's commitment to proactively shaping its AI landscape rather than merely reacting to technological developments.

Sector-specific policy development is also progressing, with the Ministry of Education, Science and Technology embarked at the moment of this assessment in the drafting of guidelines for AI implementation in education, and the Ministry of Health having developed an AI Policy Framework for the health sector in 2022. These specialised frameworks reflect an understanding that AI applications require contextual adaptation to different domains.

The Tanzania Digital Economy Strategic Framework 2024-2034 represents a significant step forward in positioning the country for technological advancement. This comprehensive framework articulates a vision to "transform Tanzanians through cutting-edge, supportive, and affordable digital technologies, solutions and skills in all areas of socio-economic activities."

It establishes six strategic pillars:

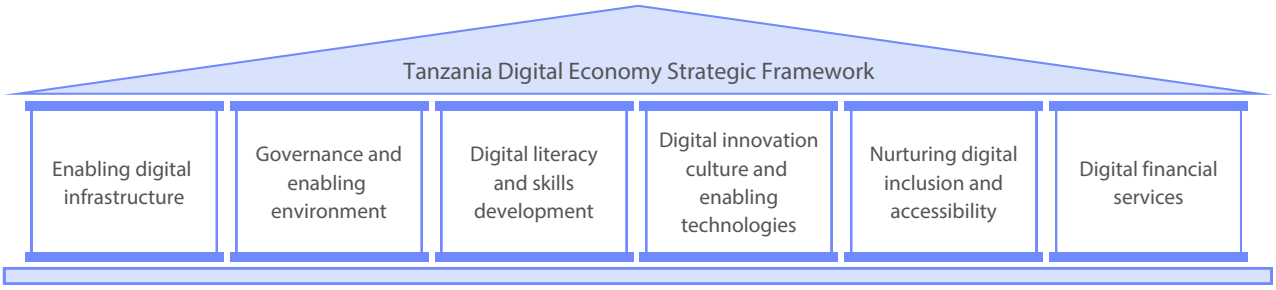

Figure 1. Strategic Pillars of the Tanzania Digital Economy Strategic Framework

According to national stakeholder consultations, AI companies in Tanzania primarily operate in the financial services, healthcare, agriculture, and education sectors. Organisations like Muhimbili National Hospital have implemented IoT solutions for patient monitoring, while universities including The Nelson Mandela African Institution of Science and Technology (NM-AIST) and The Sokoine University of Agriculture (SUA) are researching AI applications for agriculture.

Key challenges to developing AI regulations and policies in Tanzania include:

- Limited specialised expertise in AI governance and ethics
- Infrastructure constraints, particularly in rural areas
- Funding limitations for AI research and implementation
- The need for stronger coordination among government agencies
- Balancing innovation with appropriate regulatory safeguards
- The digital divide that could limit inclusive AI development

In the following sections, Tanzania's national AI landscape will be discussed across various dimensions, including: legal and regulatory, social and cultural, scientific and educational, economic, and technical and infrastructural.

Legal and Regulatory

In this section, the legal and regulatory dimensions will be discussed. The regulatory framework within which Artificial Intelligence is situated is crucial to ensuring the ethical deployment of AI systems. The legal and regulatory framework should include effective mechanisms for safeguarding and upholding citizens' rights, as well as monitoring, mitigating and compensating for any unforeseen adverse outcomes resulting from the deployment and use of AI systems. Examples of the legal framework include regulations concerning Artificial Intelligence, data protection and privacy, data sharing and accessibility and freedom of information, among others.

AI Policy and Regulation

Table 1: Key Tanzanian Digital/ ICT Policies and Strategies Relevant to AI

Policy/Strategy	Status (as of May, 2025)	Key Provisions/Pillars Relevant to AI
Tanzania Development Vision 2050 [1]	Draft	Sets broad socio-economic goals where ICT/Digitalisation is recognised as a key enabler.
National Five-Year Development Plan (FYDP III 2021-26) [2]	Active	Emphasise competitiveness, industrialisation, and service provision; adoption of digital technologies is seen as crucial for realisation.
Digital Economy Strategic Framework (2024-2034) [3]	Active (Launched July 2024)	Pillars: Infrastructure, Governance, Literacy/Skills, Innovation/Emerging Tech (incl. AI), Inclusion, Digital Finance. Aims for a digitally empowered economy, promotes the startup ecosystem, and Tanzania Tech Stack.
National ICT Policy (2023/2024 Version) [4]	Active/ Draft/ Approve draft	Cornerstone for the digital economy. Focus on infrastructure (NICTBB), e-services, local content, security, human capital, innovation, legal/regulatory framework. May include AI provisions.
e-Government Strategy (2022-2027) [5]	Active	Pillars: Connected Gov, Collaboration, e-Services, Research/Innovation, Cybersecurity, Human Capital, Policy/Legal. Aims to leverage ICT for public service delivery, potentially via AI.

1. https://www.planning.go.tz/uploads/documents/en-1734088094-DRAFT%20TANZANIA%20DEVELOPMENT%20VISION%202050_.pdf
2. https://www.mof.go.tz/uploads/documents/en-1636177646-The%20Third%20National%20Five%20Years%20Development%20Plan%20202126%20Final.pdf
3. https://ictc.go.tz/storage/44/01J5TJNDHDVTA3AHVQN9CR6BV7.pdf
4. https://www.mawasiliano.go.tz/uploads/documents/sw-1693455522-DOCUMENT%20TO%20UPLOAD%20DRAFT%20AUGUST%20NICTP.pdf
5. https://www.utumishi.go.tz/uploads/documents/sw-1688121445-Tanzania%20e-Government%20Strategy%202022.pdf

Policy/Strategy	Status (as of early 2025)	Key Provisions/Pillars Relevant to AI
Personal Data Protection Act (PDPA) 2022 [6]	Active (Operational since May 2023)	Establishes principles for data processing, data subject rights, PDPC, and rules for cross-border transfers. Foundational for AI data governance.
Cybercrimes Act 2015 [7]	Active (Under Review 2024)	Addresses computer-related offences, jurisdiction, search/seizure, and service provider liability. Relevant to AI threats/data misuse. Review may incorporate AI.
Policy Framework for AI in the Health Sector (2022) [8]	Active	Provides a structured approach for AI integration in healthcare, outlining processes, technologies, stakeholder roles, and ethical considerations.
National Digital Education Strategy (2024/25 - 2029/30) [9]	Active	Aims to integrate ICT, including AI, into education.
National Guidelines For Artificial Intelligence In Education [10]	Published Jan, 2025	A deeper look at implementing AI in Tanzanian Education.
National AI Strategy	In Preparation (2024/25)	Planned an overarching strategy to guide AI development and governance.

6. https://www.mawasiliano.go.tz/uploads/documents/sw-1691159153-GN%20NO.%20449C%20OF%202023.pdf
7. https://www.parliament.go.tz/polis/uploads/bills/acts/1452061463-ActNo-14-2015-Book-11-20.pdf
8. https://www.moh.go.tz/storage/app/uploads/public/65c/61f/590/65c61f59087ac486047849.pdf
9. https://www.moe.go.tz/sites/default/files/DIGITAL%20NATIONAL%20STRATEGY%202025_0.pdf
10. https://www.moe.go.tz/sites/default/files/NATIONAL%20GUIDELINES%20FOR%20ARTIFICIAL%20INTELIGENCE%20N%20EDUCATION.pdf

Tanzania is developing its national AI strategy under the lead of the Ministry of Information, Communication, and Technology, with a clear focus on aligning with major global and regional frameworks. The national AI strategy aims to foster ethical, inclusive, and innovative AI development to support socio-economic goals, such as improving healthcare, agriculture, finance, education, and governance. The strategy incorporates global, regional, and national frameworks, which provide both guidance and practical tools for AI governance.

During the 8th Annual Tanzania ICT Conference in 2023, the Ministry highlighted the adoption of international governance AI frameworks models for regulating emerging technologies. The AI Strategy draft explored risk-based approaches to governing AI applications in sensitive sectors, such as fintech and public services. The strategy is explicitly shaped by the UNESCO Recommendation on the Ethics of Artificial Intelligence, which emphasises human rights, transparency, fairness, privacy, and societal inclusion.

Furthermore, Tanzania's strategy is informed by the African Union (AU) Continental Strategy on AI, adopted in 2024, which promotes African-led innovation, ethical AI use, and regional collaboration. The governments have expressed strong support for the AU's vision and are integrating its priorities, such as data sovereignty and local ecosystem development, into the national strategy. Tanzania aims to adapt these frameworks to its local context, given resource constraints. The ongoing strategy development process is characterised by broad stakeholder engagement, capacity building, and a balanced approach to regulation and innovation, positioning Tanzania to harness AI for sustainable development responsibly.

The Tanzania Digital Economy Strategic Framework 2024-2034 provides overarching direction for the use of digital technologies, including AI. Although the Five-Year Development Plan (FYDP) III mentions emerging technologies such as AI and blockchain, it lacks detailed implementation plans to support the development of these technologies. Tanzania Vision 2050,[11] which aspires to transform the country into a technology-driven, high-productivity economy, the Vision emphasizes the urgent need to develop and apply emerging technologies to accelerate digital economic growth. It specifically calls for building national capabilities to leverage AI, blockchain, and other frontier technologies as key drivers of long-term development. Sector-specific approaches are further along with the Ministry of Health having developed an AI Policy Framework for the health sector in 2022, and the Ministry of Education, Science and Technology drafting guidelines for AI in education. These domain-specific frameworks address unique sectoral needs but would benefit from alignment with a comprehensive national AI strategy.

Stakeholder consultations emphasised the need for "culturally contextualised AI frameworks that honour Tanzania traditions and cultural values" and called for coordinated policy implementation between mainland Tanzania and Zanzibar through information and data sharing. Participants also advocated for "safe spaces" to foster innovation while maintaining ethical guardrails—suggesting a nuanced approach that balances enabling innovation with appropriate governance.

Data Protection and Privacy Laws

The cornerstone of data governance in Tanzania is the Personal Data Protection Act (PDPA), Act No. 11 of 2022. Enacted by Parliament in November 2022 and brought into force on May 1, 2023 , the PDPA aims to establish a minimum legal threshold for the collection and processing of personal data, thereby strengthening privacy rights.

- **Scope and Definitions:** The Act applies throughout Mainland Tanzania and Zanzibar, with the crucial caveat that its application in Zanzibar is limited to Union matters. It defines "personal data" broadly, encompassing information relating to an identified or identifiable natural person, including identifiers (name, ID number, location data, online identifiers) and characteristics specific to physical, physiological, genetic, mental, economic, cultural, or social identity. Key actors are defined as "data collectors" (those determining the purpose and means of processing, akin to controllers) and "data processors" (those processing data on behalf of the collector). The Act also specifically addresses "sensitive personal data" (covering aspects like race, ethnicity, religion, health, biometrics, criminal records) and generally prohibits its processing, subject to specific exceptions outlined in the law.

11. https://www.planning.go.tz/uploads/documents/en-1734088094-DRAFT%20TANZANIA%20DEVELOPMENT%20VISION%202050_.pdf

- **Core Principles:** Section 5 of the PDPA enshrines key data protection principles. Personal data must be processed lawfully, fairly, and transparently, ensuring its security and respecting the data subject's privacy. Data must be collected for explicit, specified, and legitimate purposes and not further processed incompatibly. Processing must be adequate, relevant, and limited to what is necessary (data minimization). Data must be accurate, kept up-to-date, and corrected or deleted promptly if inaccurate. Data should not be kept in an identifiable form for longer than necessary (storage limitation). Furthermore, data must not be transferred outside Tanzania contrary to the Act's provisions. Implicitly, these principles also encompass integrity, confidentiality (through security requirements), and accountability (through the responsibilities placed on collectors and processors).

- **The Personal Data Protection Commission (PDPC):** Part 2 of the Act establishes the PDPC as an independent regulatory authority. The PDPC is responsible for overseeing the implementation of the PDPA, registering data collectors and processors, receiving and investigating complaints regarding alleged violations, educating the public, conducting research on data processing technologies, and fostering cooperation with international data protection authorities. The Commission became operational in May 2023 and maintains a website providing information and resources. A significant early task is managing the mandatory registration of all public and private institutions processing or controlling personal data, with a deadline set by the President for December 31, 2024.

- **Key Provisions:** The PDPA outlines several critical requirements:
  - Registration: Data collectors and processors must register with the PDPC.

  - Collection and Processing: Rules govern the lawful collection of data (including source and accuracy confirmation), its use strictly for intended purposes, limitations on disclosure (requiring consent or legal basis), mandatory security measures, storage limitations, and procedures for data correction.

  - Cross-Border Transfers: Part 5 regulates the transfer of personal data outside Tanzania, distinguishing between transfers to countries with adequate protection and those without, requiring specific safeguards or derogations for the latter.

  - Data Subject Rights: Part 6 grants individuals significant rights, including the right to be informed about processing, the right to access their data, the right to correct inaccuracies, the right to object to processing (particularly for direct marketing), rights related to automated decision-making, the right to compensation for damages caused by violations, and the right to request modification, blocking, deletion, or destruction of their data.

  - Enforcement: Part 7 details procedures for lodging complaints with the PDPC (in English or Swahili, orally or in writing), investigation powers of the Commission (including summoning individuals and accessing premises), and mechanisms for enforcement notices and administrative fines. Appeals against PDPC decisions are possible.

  - Offenses and Penalties: The Act defines offenses such as unlawful disclosure, unlawful destruction/alteration of data, and offenses committed by corporate bodies, specifying significant fines (up to TZS 20 million) and potential imprisonment (up to 10 years for certain offenses).

  - Supporting Regulations and Guidance: The PDPA is supplemented by the Personal Data Protection (Personal Data Collection and Processing) Regulations, 2023, which provide more detailed rules, particularly regarding consent mechanisms. The PDPC has also begun issuing practical guidance, publishing templates in March 2025 for data breach notifications, Data Protection Impact Assessments (DPIAs), privacy notices, cookie policies, and data sharing agreements.

Zanzibar: Policy and Institutional Landscape

The Revolutionary Government of Zanzibar (RGoZ) has developed its own set of policies and institutions to guide digital transformation, often aligning with its unique development priorities like the Blue Economy.

Zanzibar ICT Policy (2013): This policy acknowledged the catalytic role of ICT in achieving Zanzibar's development goals, including Vision 2020 and the Zanzibar Strategy for Growth and Reduction of Poverty (MKUZA II). It aimed to improve government service delivery and efficiency through ICT adoption, noting initiatives like the deployment of a fiber optic backbone and the transition to digital broadcasting. The policy document is publicly available.

Zanzibar e-Government Policy/Strategy (2015, 2023-2027): An e-Government policy was outlined in 2015, envisioning an integrated ICT system across all Ministries, Departments, and Agencies (MDAs) to enhance service delivery and transparency. It identified key areas needing attention, including developing an institutional framework, building human ICT capacity, expanding infrastructure, establishing data centers, setting standards and security protocols, and ensuring adequate funding. More recently, the Zanzibar Digital Government Strategy for 2023-2027 was launched, aiming to transform Zanzibar into a strong digital economy. This strategy includes objectives related to securing digital systems, driving ICT solutions, and crucially, developing training for digital governance. Its launch involved collaboration with international partners like Mastercard.

Zanzibar Development Plan (ZADEP) 2021-2026: As the first five-year plan implementing the Zanzibar Development Vision 2050, ZADEP focuses on the theme "Blue Economy for Inclusive Growth and Sustainable Development". It explicitly recognizes ICT as a crucial initiative alongside investments in energy, health, education, and infrastructure, essential for achieving its development aspirations.

Blue Economy Strategy: This strategy prioritizes ocean-based economic activities such as tourism, fisheries, maritime transport, and potential oil and gas development. It serves as a key guiding framework for initiatives like the AfDB-funded SEBEP project, which focuses on developing skills relevant to these sectors.

Silicon Zanzibar Initiative: A significant public-private partnership aimed at attracting technology companies and skilled workers to Zanzibar, transforming it into a Pan-African tech hub. Led by government ministries (Investment & Economic Development, Tourism) and private partners (Wasoko, Fumba Town/CPS), it seeks to create employment and training opportunities for local youth in the digital sector. Organizations like UNDP and UNCDF are involved in assessing skills needs and designing relevant training programs to support this initiative.

Tanzania Ranks in Tier 1 (role-modelling) of the Global Cybersecurity Index 2024,[12] ranking in the top 5 in Africa.

Data Sharing and Accessibility

The country has implemented several data sharing initiatives, including a national data sharing framework for science, technology, and innovation developed by COSTECH, and electronic data sharing and exchange guidelines provided by the e-Government Authority (eGA). These frameworks classify data by security levels (Top Secret, Secret, Confidential, Restricted, and Unclassified) to guide appropriate sharing protocols.

Tanzania ranks 81st in the Open Data Inventory 2022 with an overall score of 54,[13,14] reflecting moderate progress in making government data accessible and usable. While the country has not yet signed the international Open Data Charter, several initiatives have been implemented to improve data sharing and accessibility. Notably, the Tanzania Commission for Science and Technology (COSTECH)[15] has developed a National Data Sharing Framework for Science, Technology, and Innovation (STI), aiming to centralize and standardize STI data sharing among stakeholders, and the e-Government Authority (eGA)[16] has issued electronic data sharing and exchange guidelines that classify data by security levels to guide sharing protocols. Despite the efforts still there are missing gaps in data quality, quantity and other sectors such as economic opportunities. There are also deficiencies in sex-disaggregated data in civil registration and adherence to international standards, which can limit the effectiveness of AI applications that require precise and high-quality datasets.[17] The ongoing efforts by COSTECH to establish a one-stop center for STI data, and continued investment in data infrastructure and standardization, will be essential for creating an environment where data can effectively fuel AI development and innovation in Tanzania.[18]

12. https://www.itu.int/dms_pub/itu-d/opb/hdb/d-hdb-gci.01-2024-pdf-e.pdf
13. Global Cybersecurity Index-ITU
14. itu.int/dms_pub/itu-d/opb/str/D-STR-GCI.01-2021-PDF-E.pdf
15. COSTECH
16. e-GA | Guidelines and Standards
17. data2x.org/wp-content/uploads/2019/11/Tanzania-Country-Profile-2019.10.23.pdf
18. National Data sharing Framework for Science, Technology and Innovation

Tanzania has a National Bureau of Statistics (NBS) which acts as a central body responsible for collecting and disseminating publicly available data, organizing the national statistical system and providing a diverse range of datasets on households, individuals, and facilities to facilitate evidence-based planning and decision making, and monitoring and evaluation of National and International Development Programmes such as National Vision, 2025, National Five-Year Development Plans, and the UN Sustainable Development Goals.[19]

The Ministry is working on consolidating public information through efforts such as the Jamii Xchange, Jamii Namba, and the eKYC. This will further enhance data sharing, interoperability, and accessibility.

Procurement Laws and Policies

The acquisition of AI systems, software, or AI-powered services by public entities is governed by public procurement legislation. In Mainland Tanzania, this is primarily the Public Procurement Act, 2023 , while Zanzibar operates under the Public Procurement and Disposal of Public Assets Act, No. 11 of 2016. Regulatory oversight is provided by the Public Procurement Regulatory Authority (PPRA) on the Mainland (implied) and the Zanzibar Public Procurement and Disposal of Public Assets Authority (ZPPDA). Both laws are founded on core principles of value for money, fairness, competition, transparency, non-discrimination, and accountability. However, standard procurement processes may struggle to adequately address the unique complexities of AI systems. Challenges include:

- Evaluating technical aspects like algorithmic bias, model transparency, and robustness.
- Defining data ownership and usage rights for training and operational data.
- Establishing appropriate testing, validation, and ongoing performance monitoring requirements.
- Incorporating ethical considerations and impact assessments into the procurement lifecycle.
- Managing risks associated with vendor lock-in and the long-term maintenance and updating of AI models.

The Mainland's 2023 Act includes provisions promoting local content, such as preference for local goods and firms, capacity building mandates for local entities, and encouragement of joint ventures or subcontracting. Applying these preferences effectively in the nascent Tanzanian AI market, which may rely heavily on international solutions initially, could prove challenging but also offers an opportunity to stimulate local AI development.

Public procurement represents a potentially powerful, yet currently underutilized, lever for shaping responsible AI deployment. By embedding specific requirements—such as mandatory bias audits, transparency documentation, ethical compliance certifications, and robust security standards—into tender specifications and evaluation criteria, the government, as a major AI consumer, can significantly influence market practices. This could drive adherence to responsible AI principles even before comprehensive AI-specific legislation is fully enacted. Achieving this, however, requires updating procurement guidelines and regulations (issued by PPRA and ZPPDA) and building specialized capacity within procuring entities' Procurement Management Units (PMUs) to understand and evaluate AI technologies effectively. The procurement process includes pre-qualification procedures to identify suitable vendors before inviting tenders, but no special approval processes for AI systems or certified AI vendors are not in place yet.

Freedom of Information Acts/ Access to Knowledge Acts

Transparency in the government's use of AI is partially addressed by the Access to Information Act, 2016 (Act No. 6 of 2016). This Act grants the public the right to access information held by public authorities and, under certain conditions, private bodies utilizing public funds or possessing information of significant public interest. Its stated objectives include promoting transparency and accountability of information holders. In the context of AI, this law could theoretically enable citizens, journalists, or researchers to request information about how government agencies are using AI systems, the types of algorithms employed, the data used for

19. *National Bureau of Statistics - Tanzania*

training (subject to privacy constraints), and the outcomes of AI-driven decisions. This supports democratic oversight and accountability.

However, practical application faces hurdles. Defining what constitutes accessible "information" regarding a complex AI model or algorithm can be technically and legally challenging. Requests might be denied based on existing exemptions within the Act, such as those related to national security, commercial sensitivity, personal privacy, or deliberative processes. Furthermore, the technical capacity of public information officers to adequately explain complex AI systems to requesters may be limited.

Crucially, the Access to Information Act 2016 explicitly states its application is limited to Mainland Tanzania. This creates a potential disparity in transparency rights regarding the use of AI by public bodies in Zanzibar for non-Union matters, unless Zanzibar has enacted equivalent access to information legislation. This highlights the recurring need to address the dual jurisdictional structure when considering governance frameworks.

Due Process and Accountability

Fundamental rights related to due process and accountability are enshrined in the Constitution of the United Republic of Tanzania, which serves as the supreme law. These constitutional guarantees underpin the legal framework for AI governance.

The PDPA 2022 reinforces accountability in the context of data processing through its provisions on data subject rights (access, correction, objection, automated decision rights), mandatory registration, security obligations, and mechanisms for complaints, investigations, and compensation for damages.

However, establishing clear lines of accountability for harms caused by autonomous or opaque AI systems remains a significant challenge globally and in Tanzania. Determining legal liability – whether it falls upon the AI developer, the entity deploying the system, the user, or another party – requires specific rules that may not be adequately covered by existing tort or contract law. The acknowledged regulatory gaps in Tanzania include the need for clear rules on liability for AI decisions. The recommended principles for future AI regulation – Transparency, Accountability, Ethical Considerations, and Risk Minimization – directly address this need, emphasizing that mechanisms must be in place to assign responsibility for AI outcomes.

Online Safety and Integrity of Speech

The security of AI systems and the data they process is critical. The Cybercrimes Act, 2015 (Act No. 14 of 2015) provides the primary legal framework for addressing offenses related to computer systems and data. It criminalizes actions such as:

- Illegal access (hacking)
- Illegal interception of data/communications
- Data interference (unlawful destruction, alteration, deletion)
- Data espionage (unauthorized obtaining of protected data)
- Use of illegal devices (e.g., malware)
- Computer-related forgery and fraud
- Distribution of child pornography
- Online publication of racist or xenophobic insults

This Act is directly relevant to protecting AI systems from malicious attacks (e.g., unauthorized access, data poisoning, model tampering) and prosecuting the misuse of AI for criminal activities like fraud. The Act grants specific powers to law enforcement officers (defined to include police, intelligence services, prosecutors, and other authorized personnel) for investigation, search, and seizure.

Recognizing the growing threat landscape, Tanzania developed a National Cybersecurity Strategy (NCSS) in 2018.

Government efforts also focus on strengthening cybersecurity measures across public and private sectors and raising public awareness about online safety practices, such as through campaigns like 'Sita Peliki' (I Don't Click/Send). Cybersecurity is explicitly identified as a top concern amidst rapid digitalization. AI introduces new cybersecurity challenges, including adversarial attacks designed to fool models (evasion) or corrupt their training data (poisoning), requiring specialized security protocols and ongoing vigilance.

Public Sector Capacity

A significant impediment to the effective adoption and governance of AI in Tanzania is the recognized limitation in relevant skills and capabilities within the workforce and among key stakeholders. This challenge is explicitly noted in sector-specific analyses, such as the health sector, where skills for AI development and application are deemed limited. Compounding this is a reported general lack of awareness regarding AI's potential benefits and risks across various stakeholder groups.

This skills deficit exists despite broader government efforts to promote digital literacy and ICT competencies as integral components of the national digital transformation agenda. Bridging this gap between ambition and current capacity is critical for ensuring that Tanzania can not only deploy AI technologies but also develop, manage, and regulate them effectively and ethically.

The Tanzania Digital Economy Strategic Framework 2024-2034 acknowledges the importance of building digital capacity within the public sector. Initiatives include the establishment of ICT Management Units in all Ministries, Departments, and Agencies (MDAs), Regional Secretariats, and Local Government Authorities (LGAs). The Framework notes that "ICT units in each government department are crucial for modernizing government functions, improving service delivery, enhancing data security and management, and promoting efficiency and innovation."

Addressing the capacity deficit is a recurring theme in policy documents and strategic recommendations:

- **Sector-Specific Training:** The Policy Framework for AI in the Health Sector explicitly includes capacity development as a strategic component, calling for training programs and updated curricula to enhance the technical and operational understanding of AI among healthcare professionals. The National Digital Education Strategy (2024-2030) similarly incorporates "Human Resource and Capacity Building" as one of its core pillars.
- **Innovation Ecosystem Support:** Government bodies like COSTECH are involved in capacity building for researchers and innovators. Examples include providing training workshops on intellectual property, business model development, and competitive research proposal writing, particularly targeting participants in national innovation competitions like MAKISATU.
- **National Skills Development:** The draft National ICT Policy 2023 emphasizes nurturing an innovation culture supported by reskilling and upskilling programs to equip the workforce with digital competencies required for the digital economy, framing this as a collective endeavor for public and private sectors.
- **International Collaboration:** UNESCO's AI Readiness Assessment highlights capacity building and digital skills development as key areas requiring investment and strategic planning.
- **Institutional Development:** The government has supported the establishment of innovation centers and a digital technology institute aimed specifically at grooming young innovators and equipping them with relevant skills.

The consistent identification of capacity building as essential across multiple strategies and stakeholder recommendations underscores that policymakers view it as a critical bottleneck. There is a clear understanding that technological deployment alone is insufficient; developing human capital with the necessary digital and AI-specific skills is fundamental for sustainable adoption, local innovation, effective governance, and reducing reliance on external expertise.

Social and Cultural

Diversity, Inclusion and Equality

The digital landscape in Tanzania has seen continuous growth, however substantial gaps remain, such as access and active participation across gender and socioeconomic position.In 2023, Tanzania had 33 million internet subscriptions, with internet penetration reaching 31.6% of the population.[20]

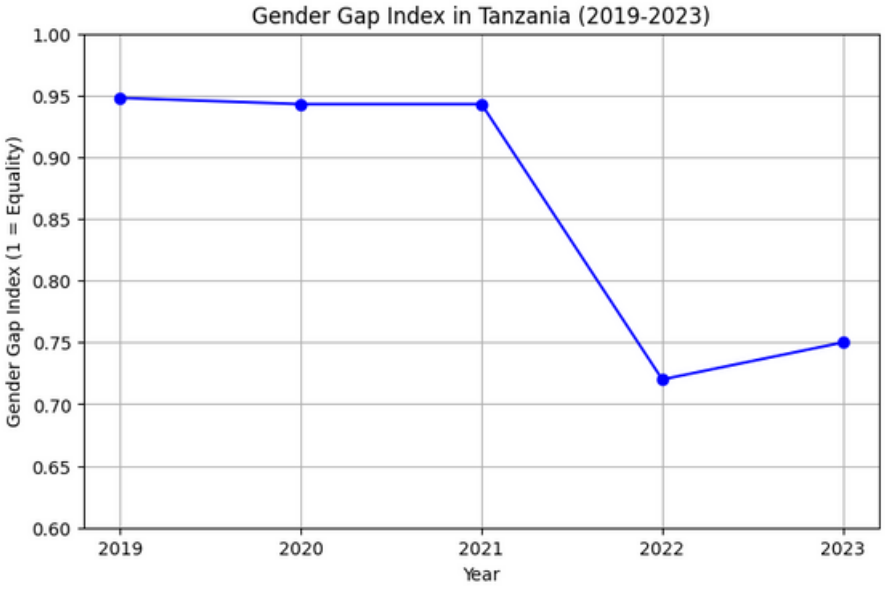

Figure 2. Gender Gap Index in Tanzania

Mobile connectivity is widespread, yet urban areas benefit disproportionately from digital infrastructure, and rural communities remain underserved. The government aims to reach 80% internet subscription coverage by 2025, but bridging the urban-rural divide remains a challenge. TCRA emphasises infrastructure upgrades in underserved areas, including plans to auction 3.5 GHz spectrum to boost connectivity.[21]

On the other hand, According to ITU, only 17% of women have mobile internet access compared to 35% of men, and also women's participation in STEM fields remains low, with just 4.4% of female students enrolled in STEM-related tertiary programs versus 21.6% for males.

Access and Basic Skills: Mobile phone ownership shows a gap, with 86% of men owning a mobile compared to 77% of women, based on 2019 data.[22] The disparity widens significantly concerning mobile internet access, utilized by only 17% of women compared to 35% of men. Financial autonomy often limits women's ability to purchase data bundles even if they own a phone. Broader statistics indicate that 60% of Tanzanians lack basic digital skills, with the situation being more acute in rural areas where 80% lack access to digital technologies. This fundamental lack of access and basic literacy forms a significant barrier to entry into more advanced tech training and participation in the digital economy.

Affordability: The cost of accessing digital technology is a major barrier for many Tanzanians. Internet-enabled devices, particularly smartphones, are expensive relative to average incomes, with monthly wages for some workers as low as TZS 100,000. While mobile data plans might be competitively priced compared to regional neighbors, they remain unaffordable for a large segment of the population when considered as a proportion of income. Sector-specific taxes and levies on mobile services and devices further exacerbate these affordability challenges, disproportionately impacting lower-income groups. Studies suggest that reducing these taxes could significantly boost mobile penetration and contribute to GDP growth.

20. *Digital 2023: Tanzania — DataReportal – Global Digital Insights*
21. *TCRA Communication statistics report*
22. *https://www.unesco.org/en/articles/adolescent-girls-and-young-women-tanzania-expand-digital-literacy-and-skills*

Skills and Literacy: Low levels of digital literacy and a lack of awareness regarding the potential benefits of the internet and digital tools represent another critical barrier to adoption and meaningful use.[23] Tanzania scored relatively low on the Digital Skills Gap Index, and surveys indicate a strong desire among citizens, particularly youth, for better digital skills training. Integrating digital skills into the national education curriculum and enhancing teacher training are seen as essential steps.[24] Initiatives like TCRA's "Ni Rahisi" campaign aim to promote digital literacy among the general public.[25]

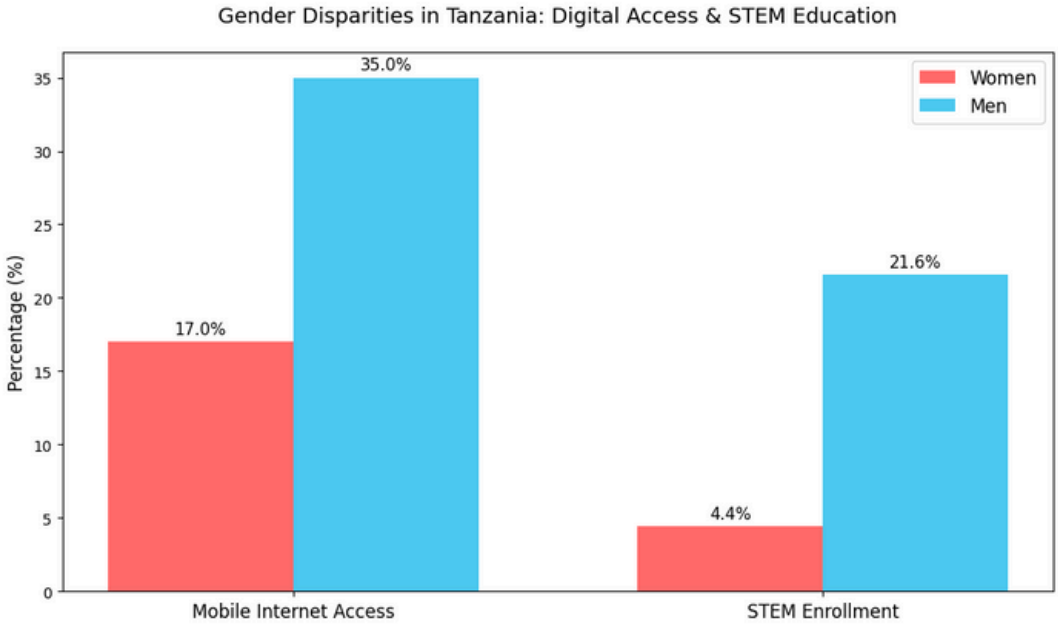

Figure 3. Gender Disparities in Tanzania

Employment and Economic Participation: The culmination of these access and skills gaps is starkly evident in the labor market. Women hold 25% of technology-related jobs in Tanzania. Statistics from the Tanzania ICT Commission showed 170 registered female ICT professionals compared to 1,011 males.[26] More broadly, women are disproportionately represented in the informal sector (65% of women vs. 20% in formal employment), often due to barriers like gender discrimination in hiring (cited by 29% of women), balancing family responsibilities (26%), and lack of access to credit (18%). While education improves formal job prospects (72% of formally employed women have degrees), many lack post-secondary education.[27]

Policy interventions, such as the Science, Technology, and Innovation Policy of 2018 and targeted scholarships, have improved female enrollment and performance, but more effort is needed to close the gap and ensure equal opportunities for marginalized groups. According to a 2022 published article titled "Why are Women Under-represented in STEM in Higher Education in Tanzania?" by Rose Matete, gender disparities persist in STEM fields at the tertiary level. The AI RAM stakeholder(s) consultation(s) emphasized the importance of gender inclusion strategies, including women-focused AI clubs, competitions, and community outreach. There was also strong emphasis on natural language processing advancements for Kiswahili to ensure technological inclusivity.

Inclusion and equality in the digital and AI ecosystem are further shaped by cultural factors and the impact of AI on Tanzania's cultural and creative industries. AI is beginning to transform the creative sector with collaboration between the National Arts Council (BASATA) and the African Research Institute for Artificial Intelligence (ARIFA).[28] This partnership marks a significant step toward integrating AI into Tanzania's creative landscape, with the potential to enhance productivity, expand creative possibilities, and increase the global reach of Tanzanian art, music, and content. Furthermore there are other initiatives, Database Kiswahili project, The Mozilla Common Voice and The Lacuna Fund, working to develop resources for Kiswahili language processing, which is essential for making AI systems accessible to Tanzania's primary language speakers.

23. https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-for-development/wp-content/uploads/2023/01/gsma_ciu_Tanzania_digitalisation_2501_23.pdf
24. https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-for-development/blog/tanzanias-digitalisation-journey-how-to-foster-digital-adoption/
25. http://tmc.co.tz/report-launch-the-state-of-internet-governance-and-analysis-on-emerging-digital-threats-in-tanzania-2024/
26. https://english.news.cn/africa/20230308/6df7c2da60524e78acd8ddf56e5e0996/c.html
27. https://www.aa.com.tr/en/africa/girl-coders-aim-to-bridge-tech-gender-gap-in-tanzania/2021605
28. AI set to transform Tanzania's artistic industry | IFACCA - International Federation of Arts Councils and Culture Agencies

- **Database kiswahili project:** [29] An initiative with the goal to build open-access datasets for Kiswahili. It is supported by non-profit organisations such as "Knowledge4all Foundation" which aims to address the chronic underrepresentation of African languages in digital and AI ecosystems. By collecting, curating, and sharing large-scale Kiswahili datasets-including text and speech-the project empowers developers and researchers to create language technologies such as speech recognition, translation, and conversational AI tools tailored for Kiswahili speakers. Apart from increasing local innovation and capacity-building in Tanzania and throughout East Africa, its open-source strategy promotes access to premium language materials. However, there is ongoing challenges include the need for more diverse data sources and continuous community engagement to ensure the datasets reflect the full richness of Kiswahili phrases and usage contexts
- **The lacuna Fund:** [30] A language dataset with a pivotal role in bridging data gaps for underserved languages by providing funding and support for the creation of labeled datasets, including those for African languages like Kiswahili. The Lacuna Fund enables local researchers and institutions to address linguistic diversity in AI development by providing funds for projects that build high -quality dataset with its focus on open data ensures that the resources produced are freely available, reducing barriers for innovators and supporting the development of inclusive AI applications. Despite these advances, the scale and sustainability of dataset creation remain ongoing challenges, as many languages still lack sufficient annotated data to support robust AI models.
- **The Mozilla Common Voice project:** [31] A global, community-driven initiative that collects and releases open-source voice datasets in over 180 languages, with a strong emphasis on African languages such as Kiswahili. Common Voice has amassed thousands of hours of audio data by mobilizing volunteers to donate and validate voice recordings, making it one of the largest free resources for training speech recognition systems. Its impact is evident in real-world applications-such as voice-enabled agricultural apps in Tanzania-that improve access to information and services for Kiswahili speakers.[32] The project's open licensing (CC0) and commitment to inclusivity help address the exclusion of African languages from mainstream AI tools, promoting linguistic diversity and digital equity. Nonetheless, gaps persist, especially in achieving balanced gender representation, capturing dialectal variation, and scaling up data collection to meet the needs of advanced AI systems.

Public Engagement and Trust

According to the 2022 Inclusive Internet Index,[33] Tanzania is ranked 87th globally and 13th out of 26 Sub-Saharan African countries evaluated. The country performs relatively well in the region when it comes to Affordability and Readiness, placing in the top third among its Sub-Saharan African peers in these categories. However, Tanzania falls into the bottom third for Availability, indicating it lags behind many neighboring countries in this area. The main barriers to broader internet inclusion in Tanzania are insufficient network coverage and limited digital infrastructure.

Regarding trust in government websites and apps, a 2023 publication titled "Assessing the factors influencing intention to use e-government in Tanzania: the perspective of trust, participation and transparency"[34] indicated that the more citizens perceive that there is transparency in the actions of governmental officials, the more they are likely to trust the services that are offered through the e-government channels.

Tanzania's media landscape is at a nascent stage of AI adoption, characterized by growing awareness and willingness to engage with AI tools, yet hampered by significant challenges that temper its full integration into journalism. While 73% of journalists find AI acceptable in their work and a remarkable 95% express willingness to participate in AI training, a considerable skills gap persists, with 60% of journalists having received no formal AI or digital tools training. This is compounded by limited access to AI tools, concerns about cost, and a lack of knowledge regarding available AI solutions, with 64% citing an AI skills gap and 51% a lack of knowledge on AI tools as major barriers. Furthermore, the absence of formal AI policies in most newsrooms (63.7% report no guidelines) creates ethical uncertainty and inconsistent application, despite 53% of newsroom leadership expressing readiness to adopt AI. While digital journalists show a higher propensity for AI experimentation, a digital divide exists with traditional media, and concerns about AI's role in misinformation (40% believe it

29. *Database Kiswahili project*
30. *Language - Lacuna Fund*
31. *https://huggingface.co/datasets/mozilla-foundation/common_voice_12_0*
32. *How an App Transformed Farming for Rural Tanzanian Women*
33. *https://impact.economist.com/projects/inclusive-internet-index/2022/country/Tanzania*
34. *https://www.emerald.com/insight/content/doi/10.1108/jebde-08-2023-0017/full/html*

significantly contributes) and potential job losses (32% fear this) underscore the urgent need for structured AI literacy programs, development of context-specific ethical guidelines, and multi-stakeholder collaboration to foster responsible and effective AI adoption in Tanzanian journalism.[35]

The stakeholder consultations revealed that cultural contextualization is essential for building public trust in AI systems. Which means designing, developing, and deploying AI systems that are deeply attuned to the values, beliefs, languages, social norms, and lived experiences of the communities. Cultural contextualization involves embedding Tanzania's unique cultural heritage, values, philosophies, and social priorities directly into the technology.

Participants emphasized the following:
i. Integrating local languages such as Kiswahili and indigenous knowledge systems into AI datasets and interfaces, making the technology accessible and relatable to a broader segment of the population.
ii. Aligning AI ethics and governance frameworks with Tanzanian values-such as the philosophy of Ubuntu, which emphasizes community, interconnectedness, and mutual care-ensuring AI systems promote collective well-being, fairness, and inclusivity.
iii. They also proposed engaging local stakeholders, including communities, policymakers, and cultural experts, in the design and oversight of AI solutions, thus fostering transparency, community consent, and shared ownership of technological change.

Environmental and Sustainability Policies

Tanzania has a legal and policy framework to guide its environment and promote sustainable development. The Environmental Management Act (EMA) of 2004, along with its supporting regulations and guidelines, requires that any project or intervention with potential environmental impact across sectors such as construction, infrastructure, and industry must undergo a thorough Environmental Impact Assessment (EIA) before approval or implementation.[36] This process is overseen by the National Environment Management Council (NEMC) and involves detailed procedures, including project screening, scoping, public consultation, and the issuance of EIA certificates, which are mandatory for obtaining other permits or licenses.[37]

However the current policies do not directly address the AI emerging in the environment. Stakeholder consultation indicated the need to develop specific guidance within its EIA framework for development, deployment, and use of AI technologies. Such guidance should ensure that environmental assessments for AI projects consider not only traditional ecological impacts but also issues like energy consumption, electronic waste, data center seating, and the broader ethical implications of AI deployment. The participants also recommended incorporating the UNESCO Ethical Impact Assessment framework into its EIA process for AI-related procurements. This would provide a structured approach to evaluating not just environmental, but also social and ethical risks associated with AI, ensuring alignment with global best practices and the country's sustainability goals.

Health and Social Well-being

The Ministry of Health has developed an AI Policy Framework for the health sector (2022), which represents an important step in guiding the ethical application of AI in healthcare. This framework would provide guidelines for implementing technologies such as electronic medical records (EMR) systems, telemedicine, electronic health records (EHRs), AI-assisted diagnostics, and telehealth.

According to stakeholder consultations, healthcare applications for AI are considered priority areas with specific use cases identified including diagnostic support systems, with platforms like Dawa Mkononi and Muhimbili radiology demonstrating existing implementations.

35. *https://tmc.co.tz/report-launch-the-state-of-artificial-intelligence-for-media-development-ai4md/*
36. *The Environment Management Act*
37. *THE ENVIRONMENTAL IMPACT ASSESSMENT AND AUDIT REGULATIONS, 2005*

Culture

Tanzania's cultural and creative landscape includes music, dance , storytelling, film, fashion and the performing arts. This diversity plays a significant role in both national pride and economic development.

Tanzania does not have a national AI policy or specific regulations addressing the use of AI for the preservation of cultural heritage or minority and indigenous languages, but existing policy frameworks such as the Personal Data Protection Act (2022) and the Cybercrimes Act (2015), guide digital technologies in the cultural sphere. The policy emphasises the importance of safeguarding heritage and promoting linguistic diversity.

Despite challenges, including limited digital infrastructure, data scarcity-especially for local languages and cultural content-and a lack of sector-specific AI regulations or policies, the AI adoption in the cultural and creative industries show its promising growth momentum through ongoing efforts to build AI literacy within these sectors, such as the Basata initiative, which invites leaders from major music associations to participate in AI training programs. [38]

The stakeholder consultations revealed a strong interest in cultural heritage preservation through AI, with traditional storytelling preservation (through platforms like ONA Story) identified as a potential application. Participants emphasised that AI development must be adapted to Tanzania's cultural context, suggesting that cultural preservation is an essential consideration.

Tanzania's Linguistic Tapestry: Challenges and Opportunities for AI/NLP

Tanzania stands out as one of Africa's most linguistically diverse nations, home to a vast array of languages reflecting its multitude of ethnic groups. Estimates suggest over 120 distinct languages are spoken, with Ethnologue listing 127 total languages, including 119 living indigenous tongues and two recently extinct ones. This diversity spans prominent African language families: Niger-Congo (primarily Bantu), Nilo-Saharan, Afro-Asiatic (Cushitic and Semitic), alongside the unique click languages of the Hadza and Sandawe (tentatively Khoisan or isolates), and Indo-European languages spoken by minority communities. The vitality of these languages varies significantly, ranging from institutional and vigorous languages to many considered endangered or dying.

The official language policy adds another layer of complexity. Swahili (Kiswahili) holds the national language status, used widely as a lingua franca by approximately 90-95% of the population (as L1 or L2), and serves as the medium of government administration and primary/adult education. English functions as a de facto official language, primarily used in secondary and higher education, international trade, diplomacy, and the higher courts. While Swahili fosters national unity, this policy landscape puts pressure on the vitality of the numerous indigenous languages, which remain the primary mode of communication within many communities, especially in rural areas. The abrupt switch to English medium instruction at higher education levels also creates challenges for students whose primary language of education was Swahili. Furthermore, a notable portion of the population, potentially up to 15%, may not be fluent in either Swahili or English, facing significant communication barriers.

This linguistic complexity poses significant challenges for AI's development and equitable application, particularly in Natural Language Processing (NLP) technologies. Despite being spoken by over 100 million people in East Africa, Swahili is considered a low-resource language in the NLP domain. Key challenges include the scarcity of large-scale, high-quality, annotated datasets required for training robust AI models, the inherent morphological complexity of Swahili (e.g., agglutination, complex verb forms), which complicates processing, limited funding for NLP research, and gaps in local technical expertise. Nonetheless, efforts are underway to develop Swahili NLP resources, including research at UDSM, the development of corpora like Kencorpus, exploration of techniques like Retrieval-Augmented Generation (RAG) and transfer learning, and the creation of basic datasets for stop-words and slang. However, current AI tools like writing assistants still struggle with Swahili's nuances.

38. *BASATA | TAFCA HOLDS ANNUAL MEETING TO DISCUSS STRATEGIC PLANS*

The situation for Tanzania's other ~120 minority languages is far more precarious. These languages are largely absent from the digital sphere and lack the foundational resources needed for NLP development. AI, however, holds potential for documenting, revitalising, and supporting education in these languages. UNESCO actively promotes multilingualism and mother-tongue-based education, recognising its benefits for learning outcomes. Initiatives like the UNESCO-supported project engaging the Hadzabe community aim specifically at the intergenerational transmission of knowledge, skills, culture, data, and language. Yet, the dominant focus of AI development remains on high-resource languages, creating a risk that the digital divide will further marginalise speakers of minority languages.

Tanzania's extraordinary linguistic diversity is a significant cultural asset but presents a formidable challenge for equitable AI development. The current focus on developing NLP resources for Swahili, while necessary, already faces substantial hurdles due to data scarcity and technical complexity. This leaves the vast majority of Tanzania's indigenous languages – over 100 of them – largely invisible and unserved by emerging AI language technologies. Given the resource-intensive nature of NLP development and the existing policy emphasis on Swahili and English, there is a high probability that AI advancements will bypass these linguistic communities entirely. This risks deepening the digital divide along linguistic lines and potentially accelerating the decline of endangered languages, running counter to national and international goals of cultural preservation. Avoiding this outcome requires a deliberate national strategy that includes targeted investment, innovative approaches (such as transfer learning and community-driven data creation), and dedicated initiatives specifically aimed at documenting and digitally empowering Tanzania's ultra-low-resource languages, potentially leveraging partnerships like the UNESCO Hadzabe project.

Table 2: Tanzanian Linguistic Diversity

Category	Details
Estimated Languages	>120 (living indigenous: 119)
Major Language Families	Niger-Congo (Bantu), Nilo-Saharan, Afro-Asiatic, Khoisan/Isolates (Hadza, Sandawe)
Language Status	1 Institutional (Swahili), ~75 Stable/Vigorous, ~43 Endangered/Dying, 2 Extinct (based on Ethnologue)
Official/National	Swahili (National, Primary Ed.), English (Official - de facto, Higher Ed.)
Major Indigenous (Examples)	Sukuma (~16%), Chaga (<2%), Haya (<2%), Gogo (<2%), Makonde (<1%), Nyamwezi (<2%), Ha (<1%), Maasai (<5%)
Known Swahili NLP Efforts	UDSM Research (RAG, writing tools), Kencorpus, Stopword/Slang datasets, Transfer Learning experiments
Known Minority Language Efforts	UNESCO Hadzabe Project (Knowledge/Language Transmission)
Known Minority Language Efforts Key NLP Challenges	Data scarcity (esp. annotated), Funding limitations, Technical expertise gaps, Morphological complexity (Swahili), Policy focus on Swahili/English

Scientific and Educational

Research and Innovation

While Tanzania is not an OECD member,[39] the country is included as a selected non-member economy in OECD comparative datasets. The national data indicate that gross domestic expenditure on R&D has historically been low but is gradually increasing. In 2005, Tanzania committed to spending at least 1% of its GDP on R&D, which was in line with African Union targets, but the actual expenditure rate was around 0.3% of GDP at that time. By 2014, this figure had risen to approximately 0.52% of GDP, demonstrating progress but still falling short of the national and continental targets. The trend suggests incremental growth, with ongoing efforts to improve monitoring and investment in R&D as part of Tanzania's National Development Vision 2025.

R&D Expenditure

Tanzania's Gross Expenditure on Research and Development (GERD) as a share of GDP is estimated at 0.5%. However, the Digital Economy Strategic Framework 2024-2034 implicitly recognises the importance of investment in research and development through its strategic focus on digital transformation.

Research Output

Tanzania is home to a blooming AI research ecosystem, with institutions such as the University of Dodoma (UDOM), Nelson Mandela African Institutions of Science and Technology (NM-AIST), University of Dar-es-salaam(UDSM), Sokoine University of Agriculture (SUA), and AfriAI Lab supporting applied AI research in topics such as Healthcare, Education, and Agriculture.

While Tanzania's overall contribution to African research output is modest (around 2%),[40] there is a growing body of research related to AI, ML, and Data science. Publications indexed in databases like Google Scholar and Scopus exist. The documented research projects demonstrate a strong focus on applied AI, aiming to address specific developmental challenges within Tanzania. Examples include:

- Health: AI for diagnostics (cardiomyopathy, TB, pneumonia, malaria), mental healthcare support systems, EHR analysis.
- Agriculture & Environment: AI for crop disease surveillance, fish farming, poultry health, soil analysis, and farmer information chatbots.
- Education: AI for dropout prevention, STEM content generation, and university services chatbot.
- Governance & Public Sector: AI is used for transparency in tendering processes, as well as smart infrastructure monitoring (speed detection).
- Finance/Economy: AI for health assistant (Dr. Elsa), FinTech (Face Rec for loans), Tourism (sentiment analysis).

This concentration of AI research and educational programs within a few key public universities (UDSM, UDOM, NM-AIST, SUA) suggests these institutions are the current hubs of national expertise. Strengthening these centres and fostering greater collaboration among them, as well as with specialised institutions like KCMUCo and SUZA/IMS, will be crucial for building a cohesive and robust national AI research ecosystem. The strong emphasis on applying AI to solve immediate sectoral problems is vital for demonstrating relevance and achieving development impact.

However, the apparent scarcity of fundamental AI research (e.g., development of novel algorithms or theoretical frameworks) noted in the reviewed projects might pose a long-term challenge to developing truly indigenous innovation capacity and staying at the forefront of AI advancements. A balanced portfolio supporting both applied and fundamental research may be necessary for sustained progress. A scoping review on The use of artificial intelligence-based innovations in the health sector in Tanzania[41] in march 2023 indicated 18 publications related to AI applications in the health sector in Tanzania, rising interest in the adoption of these emerging technologies in health services, and technical, organisational, data and individual-related challenges hinder AI-driven innovations.

39. https://www.oecd.org/sti/inno/Frascati-2015-Glossary.pdf
40. https://scienceforafrica.foundation/media-center/high-level-stakeholder-engagement-workshop-research-management-held-tanzania
41. https://www.sciencedirect.com/science/article/abs/pii/S2211883723000060

Ethical AI Research

The stakeholder consultations indicated a sophisticated understanding of the importance of ethical AI implementation, with consistent focus on ensuring AI development adheres to ethical principles and preserves human values. This suggests growing attention to AI ethics, though formal research infrastructure may be still developing.

Ensuring that AI research and deployment are conducted ethically is paramount. In Tanzania, the governance framework for AI ethics is evolving, with responsibilities distributed across national bodies and individual institutions.

The Tanzania Commission for Science and Technology (COSTECH) serves as the primary national body overseeing research ethics on the Mainland.[42] Its mandate includes registration and clearance for all research activities across various institutions, including universities and NGOs. The National Research Clearance Committee (NRCC), operating under COSTECH, reviews research proposals for ethical appropriateness, scientific merit, and safety. COSTECH's guidelines explicitly aim to safeguard the dignity, rights, and well-being of study subjects (including humans, flora, and fauna) and reduce systemic risks associated with research. Foreign researchers are required to affiliate with local institutions and involve local collaborators, potentially including capacity building components. However, these general research ethics guidelines, established before the widespread proliferation of AI, may not adequately address the unique ethical challenges posed by AI, such as algorithmic bias, lack of transparency, and complex data privacy issues.

Recognizing this gap, some universities are taking initiative. KCMUCo approved a comprehensive institutional **AI Policy and Procedures** in 2024,[43] addressing ethical use, privacy, data protection, bias, fairness, transparency, disclosure requirements, and academic integrity within the context of health education and research. UDSM is also actively developing **Guidelines for the Use of Artificial Intelligence in Research, Academics, and Administration** (planned for 2024-2025). Despite these positive steps, a 2024 study indicated that many Tanzanian Higher Education Institutions (HEIs) lacked specific AI policies, often relying on broader ICT or anti-plagiarism policies that may be insufficient.[44]

The **Policy Framework for AI in the Tanzanian Health Sector (2022)**[45] explicitly incorporates ethical considerations, mandating that AI solutions meet standards of safety, efficacy, and equity, align with established medical ethics, and that new guidelines be created to address emerging AI-specific ethical issues.

Research highlights significant ethical concerns prevalent in the Tanzanian context.[46] These include the potential for **algorithmic bias and lack of fairness**, particularly given existing societal inequalities; issues of **transparency and explainability** in AI decision-making; risks to **data privacy and security** when handling sensitive information; challenges to **academic integrity** due to AI-assisted plagiarism or cheating; potential **data misuse**; and the risk of **reduced human interaction** in educational or service settings.[47] Studies also point to low awareness among students regarding ethical AI use and copyright laws, and a need for targeted ethics training for IT professionals developing AI systems. Affordability and accessibility constraints can also create ethical dilemmas by disproportionately excluding certain groups from AI benefits.

Tanzania can draw upon established international frameworks, such as the UNESCO's Recommendation on the Ethics of Artificial Intelligence (2021), which provides globally endorsed values (e.g., human rights and human dignity, living in peaceful just, and interconnected societies, ensuring diversity and inclusiveness, and environment and ecosystem flourishing) and principles (e.g., proportionality and do no harm, safety and security, fairness and non-discrimination, transparency and explainability, responsibility and accountability, right to privacy and data protection, human oversight and determination, sustainability, awareness and literacy) and policy action areas. The **World Health Organization (WHO)**[48] also offers specific guidance on ethics and governance for AI in health. The **AU Continental AI Strategy**[49] further emphasizes ethical governance aligned with African values and human rights. In Zanzibar's stakeholder's consultation, while specific AI ethics guidelines were not identified, the national Data Protection Act was deem to apply, and initiatives like the UNDP's AI tourism project have incorporated ethical practices like responsible web scraping.

42. *https://costech.or.tz/Files/Documents/1684598463.pdf*
43. *https://kcmuco.ac.tz/wp-content/uploads/2025/01/KCMUCo-AI-Policy-Procedures-and-Guidelines.pdf*
44. *https://orcid.org/0000-0002-7551-0107*
45. *https://www.moh.go.tz/storage/app/uploads/public/65c/61f/590/65c61f59087ac486047849.pdf*
46. *https://www.researchgate.net/publication/384195604_Evaluating_the_Ethical_Practices_in_Developing_AI_and_Ml_Systems_in_Tanzania*
47. *https://pubs.ufs.ac.za/index.php/ijer/article/view/1721*
48. *Artificial Intelligence for Health*
49. https://au.int/en/documents/20240809/continental-artificial-intelligence-strategy

The current landscape suggests that ethical frameworks for AI in Tanzania are largely developing reactively as adoption increases, rather than proactively shaping the trajectory of AI deployment. While institutional and sectoral initiatives are commendable, the absence of a comprehensive, cross-cutting national AI ethics framework, coupled with low public and student awareness, creates significant governance gaps and potential risks. Furthermore, even where general research ethics structures like COSTECH's NRCC exist, their capacity to effectively evaluate AI-specific ethical challenges (like subtle biases in algorithms or the implications of opaque models) may be limited without explicit updates to guidelines and targeted capacity building for both reviewers and researchers. A proactive, nationally coordinated approach to AI ethics, incorporating education and drawing from international best practices, is urgently needed.

AI Talent

According to stakeholder consultations, Tanzania faces critical skills gaps in AI, with participants identifying the need for both technical skills in programming, data engineering, and statistical analysis, and complementary soft skills in critical thinking, problem-solving, and AI ethics.

Skills Development Initiatives: Recognizing the need, various initiatives aim to bolster digital and AI skills:

- **Government Initiatives:** The World Bank-funded "Digital Tanzania Project" includes skills development components. MoCIT is actively training its staff in emerging technologies. The "National Digital Innovation Acceleration" program aims to establish regional incubation hubs through SIDO to impart skills to youth for entrepreneurship.
- **Development Partner & NGO Initiatives:** UNESCO's KFIT III [50] project focuses on enhancing ICT competencies for teachers and students.[51] Microsoft is running large-scale AI Skills Initiatives across Africa, offering free courses, certifications, and an AI Skills Navigator portal, aiming to reach millions. Google is investing significantly ($5.8M) in AI training and skills development in Sub-Saharan Africa, providing resources for educators and students, and partnering on platforms like "Twende Digital".[52] The AI4D Africa program supports capacity building through initiatives like the AfriAI Lab involving UDOM and NM-AIST. UNDP also supports local AI talent development. UDSM's dLab is particularly active, running AI Bootcamps for university students, offering MSc Data Science scholarships (Mahadia Tunga WiDS Fellowship), and running programs like Code Like a Girl, Smart Girls, and Data4Her to promote digital and data skills among girls and women entrepreneurs. Stanford's RAISE fellowship also involves Tanzanian participants. The FemAI Lab conducted 2 Training sessions for women, one targeted at Members of Parliament (MP) and the second for the citizens, covering topics such as “The role of MPs in inclusive AI legislations” and tools for women-led businesses

Despite the proliferation of university programs and skills initiatives, a potential mismatch persists between the supply of graduates and the specific, dynamic skills required by the AI industry and the broader digital economy. Ensuring curriculum agility, strong industry linkages, and continuous professional development opportunities are essential to bridge this gap. Moreover, while targeted initiatives aimed at improving gender equity in STEM and AI are vital, systemic challenges related to equitable access to quality foundational education and digital infrastructure, particularly in rural areas, must be addressed to ensure the diversity and inclusivity of Tanzania's future AI talent pool. Without tackling these underlying inequities, the benefits of AI advancements may not be broadly shared.

Innovation Output

Beyond formal research institutions, a nation's AI readiness is also reflected in its capacity to translate research and ideas into practical innovations and viable businesses. Tanzania's AI innovation ecosystem, while nascent, shows signs of dynamism, particularly in key urban centers.

The investment landscape for Tanzanian startups, including those leveraging AI, has shown significant dynamism in recent years. According to the Tanzania Startup Ecosystem Status Report 2024 by the Tanzania Startup Association (TSA), the number of active startups grew by 24% in 2024, reaching 1,041 ventures. This growth was accompanied by a surge in investment: Foreign Direct Investment (FDI) into these startups more than doubled to $53 million (a 112% increase from the previous year), while Domestic Direct Investment (DDI) also saw substantial

50. https://dailynews.co.tz/tanzania-gets-ict-e-learning-platform/
51. https://www.unesco.org/en/articles/unesco-republic-korea-and-tanzania-launch-third-phase-korea-funds-trust-project-enhance-ict-skills
52. https://www.unesco.org/en/articles/unesco-republic-korea-and-tanzania-launch-third-phase-korea-funds-trust-project-enhance-ict-skills

growth, rising by 85.5% to $43.4 million. The FinTech sector emerged as the dominant recipient of FDI, attracting $41.4 million, which accounted for 78.3% of the total FDI, with AgriTech also demonstrating a strong presence. A separate report from March 2025 indicated that Tanzania's broader tech ecosystem secured a record $100 million in venture capital funding from global investors in 2024, with prominent firms like Sequoia Capital and Partech Partners showing interest.

Startups and AI Applications: An emerging community of startups is exploring AI applications to address local challenges across various sectors. Examples documented include:

- *HealthTech:* Dr. Elsa (AI-powered health assistant for providers), AI for Malaria Diagnosis (using CNNs).
- *AgriTech:* Agrobot (chatbot providing farmer information), Maize Disease Detector, GreenFarmTech (data-driven precision farming).
- *FinTech:* NuruPay (digital financial services), Ramani (SME financing for distributors), AI for Face Recognition for Loans.
- *EduTech:* ChemCheem (AI-personalized learning platform for children), Ticha Kidevu[53] (student support).
- *Social Impact/Other:* e-Shangazi (SRH information chatbot), Parrot AI (AI-as-a-Service for businesses, linked to UDOM). Databases like Clutch list local AI development companies such as Krazimo, Neurotech Africa, Index Labs, Bongo Live, and others, primarily based in Dar es Salaam, offering services like AI development, consulting, and Big Data analytics.

Innovation Hubs and Support Structures: Innovation hubs are crucial catalysts, providing space, mentorship, training, and networking opportunities. Key hubs supporting the tech ecosystem include:

- *COSTECH's Buni Hub (Dar):* Focuses on innovation, tech entrepreneurship, skills gap bridging, and supporting other hubs.
- *Dar Teknohama Business Incubator (DTBi):* Supports tech startups.
- *Sahara Ventures (Dar):* Offers consulting, acceleration (Sahara Accelerator), and organizes the annual Sahara Sparks event, often focusing on tech, innovation, and skills, including AI. They published an early report mapping AI activities in Tanzania.
- *Specialized Hubs:* Ifakara Innovation Hub (Fablab/Makerspace), SmartLab (Dar, startup/university focus), Twende (Arusha, affordable local tech).
- *AI-Specific Hub:* Tanzania AI Community (Dar) aims to build the AI community and serve as a learning lab/incubator.
- *Government Planned Hubs:* The ICT Commission plans to fund SIDO to establish 6 regional digital innovation hubs (Mwanza, Arusha, Dar es Salaam, Tanga, Mbeya, Lindi) and 2 equipment hubs (Arusha, Dar) under the National Digital Innovation Acceleration program.
- *International Connections:* The Hubiquitous project supported African Digital Innovation Hubs (DIHs), including training events held in Arusha.

Silicon Zanzibar: This targeted government initiative aims to establish Zanzibar as a premier tech and innovation hub for Africa. It offers attractive incentives, including streamlined work visas for tech workers and 10-year corporate tax exemptions within the Free Economic Zone. The initiative leverages Zanzibar's strategic location and improving digital infrastructure (supported by ZICTIA). Wasoko, a major Kenyan B2B e-commerce unicorn, is the anchor tenant. Other startups like Ramani and Tushop have also established a presence. Partnerships, like with Pando DAO (a network of African tech founders), aim to attract talent and companies. The initiative seeks to diversify Zanzibar's economy beyond tourism and is hosting events like the Tech and AI International Expo in August 2025.

Funding Landscape: Access to funding remains a critical challenge for Tanzanian AI startups. While some seed funding exists through accelerators (e.g., e-Kilimo for Agrobot) and grants from COSTECH/NFAST or SGCI, scaling often requires larger investments. International Venture Capital (VC) interest in Tanzania's tech scene is reportedly growing. Development partners also provide support, such as AI4D seed grants and Google's accelerator program. However, the overall funding environment, especially for early-stage AI ventures requiring significant R&D, appears constrained compared to more mature African tech ecosystems.

53. https://www.thecitizen.co.tz/tanzania/news/national/artificial-intelligence-can-boost-learning-in-schools-2702518

The AI innovation ecosystem in Tanzania, therefore, is characterized by nascent but growing activity. Startups are actively applying AI to local problems, supported by an expanding network of innovation hubs, particularly concentrated in Dar es Salaam and Arusha. Silicon Zanzibar represents a focused governmental effort to create a distinct and attractive hub within the Isles. Despite this dynamism and increasing international VC interest , access to sufficient early-stage and growth capital appears to be a primary bottleneck hindering the scaling of local AI innovations. Bridging this funding gap, alongside strengthening talent pipelines and university-industry links, will be crucial for the ecosystem's maturation.

Education

The AI innovation ecosystem in Tanzania, therefore, is characterized by nascent but growing activity. Startups are actively applying AI to local problems, supported by an expanding network of innovation hubs, particularly concentrated in Dar es Salaam and Arusha. Silicon Zanzibar represents a focused governmental effort to create a distinct and attractive hub within the Isles. Despite this dynamism and increasing international VC interest, access to sufficient early-stage and growth capital appears to be a primary bottleneck hindering the scaling of local AI innovations. Bridging this funding gap, alongside strengthening talent pipelines and university-industry links, will be crucial for the ecosystem's maturation.

Education Strategy

The United Republic of Tanzania, through its Ministry of Education, Science and Technology (MOEST), has developed the "National Guidelines for Artificial Intelligence in Education," dated January 2025. These guidelines serve as a foundational document for the ethical, effective, secure, and responsible integration, development, and use of AI tools and applications across all levels of Tanzania's education sector. This includes pre-primary, primary, secondary, non-formal education, Technical and Vocational Education and Training (TVET), and Higher Education Institutions.

The guidelines are strategically aligned with key national policies and strategies, including the National Digital Education Strategy 2024/25 - 2029/30, the Tanzania National ICT Policy 2016, the Education and Training Policy of 2014 (revised 2023), and the National AI Strategy 2024. Internationally, they resonate with the Beijing Consensus on AI and Education (2019), the African Union's Continental AI Strategy (2024), and various UNESCO statements on AI in education and ethics.

Core Objectives and Principles: The main objective is to guide the effective, ethical, secure, and responsible development and use of AI in Tanzania's education sector.

Specific objectives aim to:

- Support institutions in developing ethical AI strategies to enhance teaching and learning quality.
- Ensure AI tools are accessible to all learners, including those with disabilities and from underserved communities.
- Establish clear protocols for data privacy, security, and ethical considerations.
- Foster research, innovation, and resilience within the education system.
- Align AI usage with national and international regulations and standards.

The guidelines are built upon four guiding principles:

1. **Ethical Use:** Ensuring transparency, fairness, accountability, and responsibility.
2. **Equity and Inclusivity:** Promoting equal access for all users.
3. **Data Privacy and Security:** Protecting personal data and maintaining security.
4. **Sustainability:** Ensuring long-term viability and scalability of AI initiatives.

Key Dimensions for AI Readiness in Education: The guidelines are structured around ten critical dimensions to enable successful AI integration:

1. **Policy Development and Advocacy:** Mandating the formulation of institutional policies aligned with national guidelines for ethical and responsible AI use across all education levels. This includes regular review and involvement of diverse stakeholders.
2. **Security, Privacy and Ethics:** Requiring AI tools to comply with data privacy laws, undergo bias audits, and for institutions to establish monitoring mechanisms and provide ongoing ethical training.
3. **Teaching and Learning:** Promoting accessible AI tools that align with the national curriculum, integrate AI literacy, and create inclusive learning environments.
4. **Assessment and Evaluation:** Advocating for AI-driven assessment tools that provide fair, unbiased, and continuous evaluations, with robust data protection and transparency.
5. **Capacity Building and Training:** Emphasizing continuous professional development programs on AI literacy and ethical use for educators, administrators, and learners at all levels.
6. **Curriculum and Content Development:** Calling for the incorporation of AI literacy and skills into curricula at all education levels to enhance employability and use AI to create engaging, personalized content.
7. **AI Infrastructure and Access:** Stressing the need for sufficient funding, development of centralized platforms, regular infrastructure assessment, and equitable distribution of AI tools, especially to underserved areas.
8. **Data Use and Management:** Requiring robust data protection policies, compliance with privacy laws, transparency in data handling, and promoting data literacy among stakeholders.
9. **Research and Innovation:** Encouraging and supporting research initiatives for developing contextual AI tools, providing funding, establishing ethical research guidelines, and fostering collaboration.
10. **Collaboration and Partnerships:** Promoting engagement with diverse stakeholders (educators, learners, parents, AI experts, policymakers, industry, local and international institutions) to share knowledge, resources, and ensure relevance.

Stakeholder Roles and Responsibilities: The document clearly outlines the roles of various stakeholders:

- **Ministry of Education, Science and Technology (MOEST):** Coordination, funding allocation, overarching policy development, capacity building for policymakers, and ensuring ethical alignment.
- **Ministry Responsible for Regional Administration and Local Government Authorities:** Coordination at the school level, funding support, and ensuring compliance.
- **Ministry Responsible for ICT:** Facilitating ICT access and providing technical assistance.
- **Regulatory and Compliance Institutions (TCU, NACTVET, SQA):** Ensuring compliance with laws and standards, conducting audits.
- **Research and Innovation Institutions:** Conducting research, developing AI tools, adhering to ethical guidelines, and collaborating.
- **Academic and Professional Development Institutions (e.g., TIE):** Integrating AI into programs, developing institutional policies, and providing training.
- **Institutions Responsible for Basic Education (Schools):** Integrating AI in teaching, fostering digital literacy, and training teachers.
- **The Tanzania Private Investors in Education:** Partnering with government for financing R&D and investing in AI initiatives.
- **The Mass Media:** Disseminating accurate information, promoting awareness, and fostering discourse on AI in education.

According to stakeholder consultations, participants identified several educational priorities for building Tanzania's AI-ready workforce:

- Strengthening STEM education from primary levels through higher education
- Curriculum modernization with more frequent updates to keep pace with technological change
- Technical skills development in programming, data engineering, and statistical analysis
- Development of complementary soft skills in critical thinking, problem-solving, and AI ethics

The consultations revealed sophisticated thinking about educational reform, suggesting a "Triple Helix" model integrating industry, academia, and government in curriculum development—moving beyond siloed approaches to skills development.

Educational Attainment

According to the Digital Economy Strategic Framework, by 2022, Tanzania was producing approximately 2,200 graduates from universities and degree-awarding technical colleges (certificate to degree level) and about 2,000 graduates from technical and vocational training colleges in ICT-related programs. However, this represents a very small fraction of the overall workforce, with approximately 1.3 million primary school pupils, 500,000 secondary school students, and 110,000 advanced-level secondary school students completing studies annually.

The amount of STEM graduates from Tanzania is still low, with average of 35% women and 65% men; however, less than 25% are in engineering. With low enrollment of female ICT students at universities. In the vocational training report from NACTE mentioned gender balance in diploma programs. Moreover, in AI related postgraduate programs women participation are of only 10% in the year 2021. These gender gaps in STEM/ICT/AI education reflect broader societal and institutional challenges.

UNESCO's 2024 Gender Report highlighted that in sub-Saharan Africa, for every 100 men proficient in spreadsheet skills, only 40 to 44 women possess the same capability.[54] This skills gap is reflected in educational pathways. Women and girls constitute only 10% of students earning degrees in computer science in Tanzania. While initiatives exist to promote STEM in schools, such as government efforts to provide ICT skills training, the reach is often limited compared to the need. Efforts by institutions like the Dar es Salaam Institute of Technology (DIT), supported by projects like the World Bank's East Africa Skills for Transformation and Regional Integration Project (EASTRIP), are working to increase female enrollment in STEM fields. DIT saw female enrollment rise from 14% in 2016/17 to 23% in 2022/23 through targeted outreach,[55] but the overall numbers remain low.

Table 3: Female and Male Representation

Category	Female Representation (%)	Male Representation (%)
STEM Graduates	35	65
ICT Graduates	25	75
Data Science/AI (MSc/PhD)	20	80
Vocational ICT Training	40	60
AI-Related PhDs	10	90

A report from Coursera has shown that Tanzania's performance in data science, AI, and STEM courses on Coursera reflects moderate growth with persistent challenges. According to Coursera's Global Skills Reports (2021–2023).[56] Tanzania ranks in the top 5 in Sub-Saharan Africa for STEM enrollment, with strong demand for Data Science and programming courses (especially Python). However, proficiency in AI and machine learning remains low (30th percentile globally), with fewer learners pursuing advanced specializations compared to foundational data analytics.

It has been observed that corporate upskilling (e.g., banks and telecoms) drives enrollment; however, gender gaps

54. https://www.unesco.org/en/articles/how-girls-shape-tech-their-own-terms-tanzania
55. https://www.worldbank.org/en/news/feature/2023/06/26/preparing-for-tomorrow-afe-developing-digital-skills-in-east-african-youth
56. Global Skills Report 2024 | Coursera

persist, with women comprising only 25% of AI/data science learners. This is caused by high dropout rates in AI courses due to math prerequisites, limited Swahili/localized content, and internet access barriers (only 36% of Tanzanians have broadband).

Tanzania ICT Commission[57] and other initiatives such as dLab Tanzania have been engaged as partnerships by subsidizing Coursera access for universities and using Coursera to train youth on data skills. Stakeholders recommend improving access to online courses. There should be Swahili-translated AI courses and mobile-friendly learning tools, and also the government must address infrastructure and affordability to fully leverage AI education for economic growth.

Moreover, stakeholders suggested early intervention is critical to change cultural norms, including mandatory STEM outreach programs for girls in secondary schools. Also, they emphasize reducing financial barriers to girls by expanding of gender-targeted scholarships.

Public Access to AI Education

Information on the availability of technical AI courses and AI ethics courses aimed at the general population.

Several key universities offer undergraduate and postgraduate programs relevant to AI and Data Science, including Computer Science, Data Science, Software Engineering, Cybersecurity, and related engineering disciplines.

There is an increasing emphasis on practical, hands-on skills, industry-relevant projects, and incorporating ethical considerations into the training. National strategies like the NDES and the University Guidelines mandate the integration of ICT and emerging technologies like AI into the curriculum.

The Digital Economy Strategic Framework acknowledges the need to "promote public awareness and basic skills on digital content" but does not provide specific details on public access to AI education.

Table 4. AI/Data Science Related Programs in Key Tanzanian Universities

University Name	College/ Department/ School	Program Level	Program Name (Explicit/Related)	Key AI/DS Topics Covered (Examples)	Status
Ardhi University	Computer Systems And Mathematics	BSc	Data Science and Artificial Intelligence		In Development
University of Dar es Salaam (UDSM)	CoICT / CSE	MSc	Data Science	Data mining, ML, Big Data, visualization, ethics	Active
University of Dar es Salaam (UDSM)	CoICT / CSE	PhD	Data Science (by Thesis)	Big data analytics, visualization, info processing/systems	Active
University of Dar es Salaam (UDSM)	CoICT / CSE	MSc / PhD	Computer Science	Often includes AI/ML specializations/electives	Active

57. TIC | Home

University Name	College/ Department/ School	Program Level	Program Name (Explicit/Related)	Key AI/DS Topics Covered (Examples)	Status
University of Dar es Salaam (UDSM)	CoICT / CSE / dLab	Short Course	Artificial Intelligence Fundamentals	AI concepts, design/development (details pending)	Planned
University of Dar es Salaam (UDSM)	dLab	Training	AI Bootcamp (for college students)	Employable data science skills, capstone project	Active
University of Dodoma (UDOM)	CIVE	BSc	Computer Science / Software Eng. / Cyber Security	Likely includes foundational AI/ML courses	Active
University of Dodoma (UDOM)	CIVE	MSc	Computer Engineering / Cyber Security	Likely includes advanced AI/ ML/ Security topics	Active
Nelson Mandela African Inst. of Sci. & Tech. (NM-AIST)	CoCSE	MSc / PhD	Info & Comm Systems Eng (ICSE)	Foundational ICT, potentially data/AI applications	Active
Nelson Mandela African Inst. of Sci. & Tech. (NM-AIST)	CoCSE	MSc / PhD	Applied Math & Comp Science (AMCS)	Computational science, mathematical foundations for AI/DS	Active
Nelson Mandela African Inst. of Sci. & Tech. (NM-AIST)	CoCSE	MSc	Mobile Computing (MobC) / Embedded & Mobile Systems (EMoS)	Mobile tech, potential for mobile AI/data apps	Active
Nelson Mandela African Inst. of Sci. & Tech. (NM-AIST)	CoCSE	MSc	Info Systems & Network Security (ISNS)	Cybersecurity, potential for AI in security analytics	Active
Nelson Mandela African Inst. of Sci. & Tech. (NM-AIST)		MSc	Data Science and Artificial Intelligence (MSc DSAI)	Cybersecurity, potential for AI in security analytics	In Development

University Name	College/ Department/ School	Program Level	Program Name (Explicit/Related)	Key AI/DS Topics Covered (Examples)	Status
Mbeya University of Science & Technology (MUST)	N/A	B.Eng	Data Science	Python, R, ML, Big Data, AI fundamentals, Regression, Data Mining, NLP	Active
IIT Madras Zanzibar Campus	School of Engineering & Science	BS	Data Science and Artificial Intelligence	Foundations (prob, stats, linear alg), professional courses, projects	Active
IIT Madras Zanzibar Campus	School of Engineering & Science	MTech	Data Science & AI	Math foundations, Prog/Data Structures, electives, labs, projects	Active
Kilimanjaro Christian Medical University College (KCMUCo)	N/A	Institutional Policy	AI Policy & Procedures	Focus on ethical AI use in health education/research	Active
Sokoine University of Agriculture (SUA)	N/A	Research/ Projects through the YEESI Lab[58]	N/A (Programs not specified)	AI applications in agriculture/ aquaculture	Active

In a direct move to foster AI talent, the government plans to extend the **Samia Scholarship program**[59] to fund students pursuing studies in data science disciplines, explicitly including artificial intelligence and machine learning. For the 2024/2025 fiscal year, the existing Samia Scholarship program allocated TZS 7.29 billion, supporting 646 first-year students, 674 continuing undergraduate students, and 80 master's degree students in various science fields. This strategic investment in human capital is critical for building the skilled workforce necessary for a thriving domestic AI ecosystem, reducing reliance on foreign expertise, and making Tanzania a more attractive location for AI companies seeking local talent.

58. https://www.yeesi.org/
59. https://thechanzo.com/2025/05/13/government-to-extend-samia-scholarship-to-fund-students-in-data-science-studies/

Economic

The Tanzania economy is characterized by steady growth of 6-7% annually which drops to 4.7% in 2024. The economy relies heavily on agriculture (25% of GDP, 65% of employment), mining, manufacturing, tourism, and an emerging digital sector. With a GDP per capita of $1,326 in 2023. Country faces challenges like infrastructure deficits, low human capital, high informality (~80% of jobs), and commodity export dependence, exposing it to global price volatility. Recent policies under the government, including the Tanzania Development Vision 2025 and the Third Five-Year Development Plan (2021-2026), prioritize industrialization, digitalization, and private sector growth, supported by investments in transport and energy. Inflation remains stable at 3-4%, but rural poverty approximates 26%, and income inequality persists. The digital economy, driven by 60% mobile money penetration and fintech, is a growth area, positioning Tanzania to leverage strategic trade agreements like the AfCFTA.

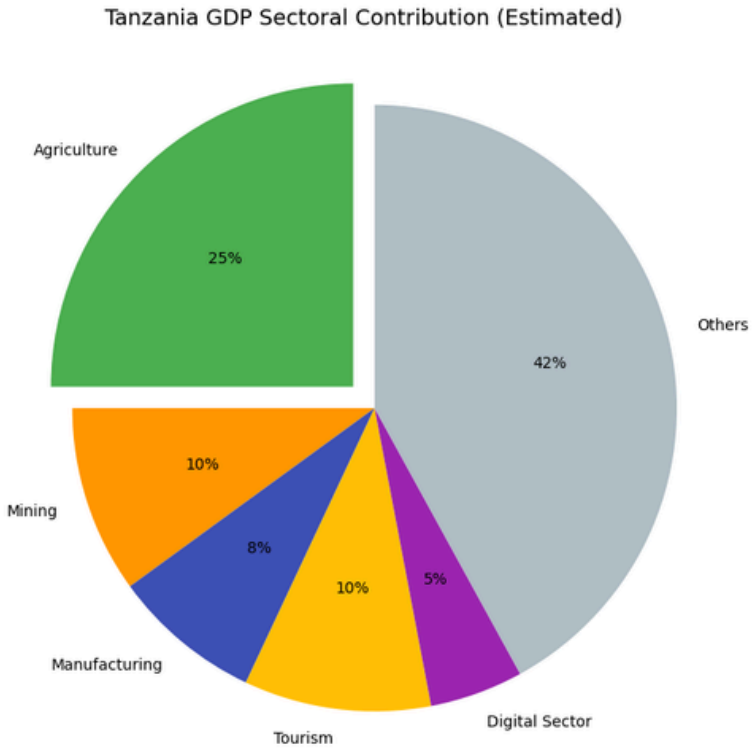

Figure 4. Tanzania GDP Sectoral Contribution

Tanzania is actively embracing artificial intelligence (AI) as part of its broader technological and economic development strategy, with initiatives that indirectly address the impact of AI on the labour market.

AI In the Private sector

The current state of AI adoption within Tanzania's broader private sector is generally characterized as "nascent" or in its "early stages". A 2019 study by Sahara Ventures documented these initial "early forays" and "pilot projects,"[60] indicating that the journey had commenced some years ago. A specific report focusing on AI in Tanzanian Health Supply Chains[61] suggested that the country has already invested in some of the necessary preconditions for AI integration and possesses the capability to enhance its AI readiness by scaling up existing systems.

60. https://publication.saharaventures.com/publication/Artificial-Intelligence-in-Tanzania-What-is-Happening
61. https://insupplyhealth.com/wp-content/uploads/2021/09/Implementing-AI-in-Tanzanian-Health-Supply-Chains_FinalReport_20210913.pdf

The AI maturity level in Tanzania's established private sector appears to be marked more by pockets of adoption and focused experimentation rather than by widespread, systemic integration across entire organizations or industries. This implies that while awareness of AI's potential is growing and some tangible benefits are being realized, particularly in pioneering sectors like finance and telecommunications, a significant "AI divide" likely exists. This divide separates the firms actively piloting and operationalizing AI from the broader majority of the private sector that may still be in earlier stages of awareness or exploration.

A November 2024 report by Tech and Media Convergency (TMC) in collaboration with the Tanzania AI Community[62] observed that while the private sector shows promise in localized AI innovation, particularly in health and FinTech, it remains "underfunded". This suggests that despite successes, a gap may exist between the potential of local AI innovation and the available capital to scale these ventures. This "underfunded" status, juxtaposed with the evident promise, points to a significant opportunity for investors. With the new Tanzania Venture Capital Fund[63] becoming operational and growing international investor interest , this gap may begin to close. Early-stage investors, both local and international, who can identify and nurture these promising but currently undercapitalized AI ventures could see substantial returns as the ecosystem matures and the government's pro-innovation policies gain full traction. This also highlights the ongoing need for more robust local angel networks and seed-stage VCs with expertise in technology.

Table 5. AI Adoption Snapshot in Tanzania's Established Private Sector by Key Industry

Sector	General Level of AI Adoption	Key AI Applications/Use Cases	Notable Established Company Examples/ Initiatives	Key Drivers	Major Hurdles
Financial Services	Emerging to Operational	Fraud detection, risk assessment, credit scoring, customer service (chatbots), personalized banking, operational efficiency, AML/KYC automation	CRDB Bank (digital transformation, AI/ML roadmap RFP,[64] SimBanking); M-Pesa (AI for credit scoring)	Data intensity, risk management needs, customer experience enhancement, operational efficiency, regulatory support (BoT Sandbox)	Legacy systems, data quality, security/privacy, algorithmic bias, skills gap, cost of transformation
Telecommu-nications	Emerging to Operational	AI-powered IVR/customer service, network optimization, fraud prevention, personalized recommendations	Leading Tanzanian telecom (AI-IVR implementation with significant cost/efficiency gains) ; Vodacom Tanzania (Digital Accelerator, innovation partnerships, connectivity improvements) [65]	Customer experience, operational efficiency, network performance, new service development, competitive pressures	Need for AI experts, cybersecurity threats to AI systems, cost of advanced AI (e.g., GenAI)

62. https://tmc.co.tz/wp-content/uploads/2025/05/REPORT-Artificial-Intelligence-Data-and-Power-NOV2024.pdf?download=10756
63. https://tsa.co.tz/storage/documents/w9Fsk1RQDCUKtfNiUXxOGijbCqjKBHeuB8SNKwxx.pdf
64. https://crdbbank.co.tz/storage/app/media/AI%20AND%20MACHINE%20LEARNING%20IMPLEMENTATION%20ROADMAP%20DEVELOPMENT.pdf
65. https://www.thecitizen.co.tz/tanzania/supplement/the-vodacom-digital-accelerator-fueling-innovation-transforming-lives-5004254

Sector	General Level of AI Adoption	Key AI Applications/Use Cases	Notable Established Company Examples/ Initiatives	Key Drivers	Major Hurdles
Manufacturing (Large Scale)	Nascent to Emerging	IoT & data analytics for process monitoring, operational optimization, predictive maintenance (potential), quality control (potential)	MeTL Group (IoT & data analytics for manufacturing processes); TBL (potential Industry 4.0 exploration, Microsoft 365 for collaboration)[66]	Productivity enhancement, resource optimization, quality control, operational efficiency	Resource scarcity (for some), technical naivety (for some), infrastructure for supply chains, skills gap
Agribusiness (Large Scale)	Nascent to Emerging	Predictive analytics, resource management, supply chain optimization, leveraging smallholder AI tools for supplier networks (e.g., disease detection, market access)	(Specific large agribusiness AI projects not detailed, but potential for using platforms like Hello Tractor or Agripoa in supply chains) [67,68]	Yield improvement, resource efficiency, supply chain predictability, quality control	Rural infrastructure (internet, power), lack of trained personnel, cost of AI, data quality/availability
Supply Chain & Logistics	Nascent to Emerging	Delivery route optimization, market intelligence, supply chain optimization, automated compliance checks, inventory management	Dar es Salaam logistics company (AI for route optimization) ; MeTL Group (extensive distribution network leveraging technology)	Efficiency gains, cost reduction, improved delivery times, better decision-making	Poor infrastructure, logistical inefficiency, lack of trained personnel, technical infrastructure limitations

66. https://www.digest.tz/industry-4-0-the-future-of-manufacturing-and-automation-in-tanzania/
67. https://blogs.worldbank.org/en/agfood/artificial-interlligence-in-the-future-of-sub-saharan-africa-far
68. https://idrc-crdi.ca/en/research-in-action/how-agripoa-using-ai-empower-tanzanian-poultry-farmers

Sector	General Level of AI Adoption	Key AI Applications/Use Cases	Notable Established Company Examples/ Initiatives	Key Drivers	Major Hurdles
Tourism & Hospitality	Nascent to Emerging	Smart wildlife monitoring (public/PPP), smart ticketing (public/PPP), customer service chatbots, marketing automation, sentiment analysis of reviews	Auric Air (AI WhatsApp chatbot)[69]; (International hotel chains present in Tanzania likely use global AI tools)	Enhanced visitor experience, operational efficiency, personalized services, competitive marketing	Digital infrastructure needs, data management practices, technical expertise for local firms
Healthcare (Private Providers)	Nascent to Emerging	EHR adoption & optimization, medical image analysis (potential), remote patient monitoring (potential), AI-based diagnostics (emerging)	(Private sector role in EHR development/ deployment, but specific large private provider AI projects not detailed)[70]	Improved patient outcomes, operational efficiency, resource optimization, enhanced diagnostics	Infrastructural limits, low digital literacy, policy gaps, data quality, cost, skills gap
Media	Nascent	Content curation, audience engagement (potential), automated news writing (potential)	(No specific established media houses detailed with AI adoption for complex tasks)	Efficiency in news production, enhanced access to information, personalized content	Low AI awareness among journalists, lack of skills for complex AI tasks, ethical concerns (misinformation, bias)
Legal/ Judiciary	Nascent (Public sector leading)	AI transcription & translation in courts (Judiciary project), legal analytics (potential)	Judiciary of Tanzania (partnership with Almawave) [71]	Improved efficiency in legal processes, enhanced case documentation, broader access to justice	Varied awareness among legal professionals, limited training, infrastructure constraints for private law firms [72]

69. https://www.cnbcafrica.com/media/6351572551112/tanzanias-ict-sector-minister-nape-nnauye-speaks-on-progress-future-prospects/
70. https://www.emerald.com/insight/content/doi/10.1108/tg-08-2024-0195/full/html
71. https://tmc.co.tz/beyond-fragmentation-why-tanzania-needs-a-national-ai-strategy-for-sustainable-growth/
72. https://cipit.org/wp-content/uploads/2024/09/Promotion-of-Artificial-Intelligence-AI-Technology-in-East-African.pdf

The Tanzania Digital Economy Strategic Framework acknowledges the importance of developing a digital-ready workforce and fostering innovation. It states that "Tanzania is digitizing and prospering" with the growth of mobile phones, application developers, network providers, mobile money, and internet services.

According to stakeholder consultations, there is growing recognition of the need for a strategy to respond to AI's impact on the labor market. Participants identified the importance of both technical skills development and complementary soft skills that enhance human capabilities alongside AI technologies.

Technical and Infrastructural

Infrastructure and Connectivity

The Tanzania Digital Economy Strategic Framework 2024-2034 provides some insights into the country's digital infrastructure:

- There has been a remarkable increase in registered mobile phone subscriptions, rising from 58.1 million in September 2022 to 67.1 million in September 2023, marking a 15.5% surge.
- Internet users have expanded from 31.1 million in September 2022 to 34.5 million in September 2023, signifying an 11.0% increase.
- Mobile broadband population coverage has increased from 72% in September 2022 to 83% in September 2023, recording an 11-percentage point increase.

The National ICT Broadband Backbone (NICTBB) serves as a critical infrastructure component, though coverage remains a challenge particularly in rural areas.
According to stakeholder consultations, infrastructure needs extend beyond basic connectivity to include:

- Data infrastructure (data centers, GPUs, high-performance computing)
- Connectivity enhancements (5G, fiber optic expansion, satellite)
- Power systems upgrades (from Tier 3 to Tier 4 capability)
- Research infrastructure and funding mechanisms
- Green infrastructure investments in renewable energy

Mobile Network Coverage and Technology (3G, 4G, 5G)

Mobile networks form the backbone of Tanzania's connectivity. Significant investments have been made in expanding coverage, particularly through initiatives supported by the Universal Communications Service Access Fund (UCSAF) targeting rural and underserved areas in both Mainland and Zanzibar.[73]

As of December 2024, population coverage for mobile broadband technologies stood at 91% for 3G and 88% for 4G. Geographical coverage was lower but also expanding, reaching 67% for 3G and 55% for 4G by September 2023 , with further growth likely reflected in the December 2024 base station deployments. 2G coverage remains extensive, covering 98% of the population and 81% geographically as of December 2024.[74]

The rollout of 5G is nascent but growing. Population coverage reached 20% by December 2024, up from 15% in June 2024, with geographical coverage at 2%. The number of 5G base stations increased by 8% in the quarter ending December 2024, reaching 900 sites, primarily concentrated in urban areas. TCRA facilitated this by auctioning spectrum in the 700 MHz, 2300 MHz, 2600 MHz, and 3500 MHz bands in October 2022.[75]

Infrastructure deployment varies regionally. Dar es Salaam leads significantly in the number of base stations for all technologies (2G, 3G, 4G, 5G). Zanzibar regions (Kaskazini Pemba, Kaskazini Unguja, Kusini Pemba, Kusini Unguja, Mjini Magharibi) have considerably fewer base stations across all technologies compared to major mainland urban centers. This disparity in infrastructure underpins regional variations in service quality and availability.

The increasing availability of 3G and 4G has been a key driver of smartphone adoption and mobile internet usage. However, a significant portion of the population, particularly in Sub-Saharan Africa, still relies on 3G or even 2G connections and devices. This reliance on older technologies limits the ability to access data-intensive services, including many potential AI applications. The growth of Machine-to-Machine (M2M) subscriptions, reaching over 1 million by December 2024, signifies an emerging opportunity for IoT applications, which often serve as crucial data sources for AI systems. Vodacom holds a dominant share (54%) of these M2M subscriptions.[76]

73. https://www.tcra.go.tz/uploads/documents/sw-1702305339-TCRA%20-%20The%20Regulator%20Magazine%20v7%20FINAL_tprevision.pdf
74. https://www.tcra.go.tz/uploads/text-editor/files/Communication%20Statistics%20Report%20-%20December%202024_1736975031.pdf
75. https://documents1.worldbank.org/curated/en/099101524053076803/pdf/P1607661bae3dfb21829b142db1bd29162a874d086bd.pdf
76. https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-for-development/blog/the-impact-of-mobile-broadband-coverage-on-poverty-in-tanzania/

Broadband Access and Quality (Fixed vs. Mobile)

While mobile broadband coverage is extensive, fixed broadband infrastructure lags significantly. As of December 2024, TCRA reported 48.0 million internet subscriptions, the vast majority likely mobile, against only 78,299 fixed telephone subscriptions. This minimal fixed-line penetration highlights the country's heavy reliance on mobile networks for internet access.

The National ICT Broadband Backbone (NICTBB) has deployed over 7,910 km of fiber optic cable, connecting regions and neighboring countries. This has drastically reduced backhaul transport costs. However, underinvestment in backbone and especially last-mile fiber connectivity remains a constraint. The Draft NICTP 2023 aims to address this by encouraging investment in fiber-to-the-premises and promoting infrastructure sharing.

Regarding quality, Ookla's Speedtest Global Index provides insights, though recent data shows significant volatility. **For fixed broadband** in March 2025, Tanzania ranked 140th globally (down from 136th in Feb 2025), with a median download speed of 38.40 Mbps, upload of 32.00 Mbps, and latency of 25 ms. Notably, this represents a substantial increase from February 2025 figures (18.63 Mbps download, 14.52 Mbps upload, 12 ms latency). This dramatic jump warrants caution and further investigation to determine if it reflects sustained improvement or a data anomaly. Tanzania lags significantly behind global leaders (e.g., UAE #1 at 553 Mbps) and regional peers like South Africa (#59 at 98 Mbps) and Kenya (#77 at 60 Mbps).[77]

For **mobile broadband**, Ookla data for March 2025 showed Tanzania ranking 82nd globally with a median download speed of 52.23 Mbps. Specific upload and latency figures for mobile were marked "N/A" for March 2025 on the index page. Average download speeds in Africa have generally increased, reaching 8.18 Mbps in 2022 from 2.68 Mbps in 2019, alongside decreasing data prices.[78]

The stark difference between mobile and fixed broadband penetration, coupled with relatively low fixed speeds, presents a significant challenge. Advanced AI applications, including model training, large dataset transfers, and real-time high-resolution data processing, often demand the high speed, stability, and low latency typically offered by fixed fiber connections. The current reliance on mobile networks, while crucial for basic access, may not be sufficient for widespread development and deployment of sophisticated AI applications, potentially limiting them to areas with the best mobile coverage or requiring dedicated, costly infrastructure solutions.

Applied Standards

The Tanzania Bureau of Standard (TBS) has produced a draft standard on “Information technology — Artificial intelligence — Guidance on risk management”,[79] an adoption of the International Standard ISO/IEC 23894:2023, Information technology — Artificial intelligence — Guidance on risk management, which has been prepared by jointly by the International Organisation for Standardisation (ISO) and the International Electrotechnical Commission (IEC).

TBS also indicates development of further standards such as:[80]

- Artificial intelligence concepts and terminology (ISO/IEC 22989:2022),
- Artificial intelligence - Management system (ISO/IEC 42001:2023),
- Artificial intelligence - Process management framework for big data analytics (ISO/IEC 24668:2022),
- Governance of IT - Governance implications of the use of artificial intelligence by organizations (ISO/IEC 38507:2022)

77. *https://www.speedtest.net/global-index/tanzania*
78. *https://www.worldbank.org/en/results/2023/06/27/from-connectivity-to-services-digital-transformation-in-africa*
79. https://www.tbs.go.tz/uploads/publications/en-1739785415-EDC%204%20(3131)%20DTZS%20ISO_IEC%2023894-2023,%20Information%20technology%20%E2%80%94%20Artificial%20intelligence%20%E2%80%94%20Guidance%20on%20risk%20management.pdf
80. *https://www.tbs.go.tz/uploads/publications/en-1746187498-TITLE%20AND%20SCOPE%20FOR%20THE%20DRAFT%20STANDARDS.pdf*

Compute Infrastructure

The data center landscape in Tanzania is characterized by a mix of modern, carrier-neutral facilities and more traditional co-location providers.

- **Wingu Africa Data Center:** This facility stands out as a significant and modern development in Tanzania's digital infrastructure. Following its initial launch in 2022, Wingu Africa inaugurated the second phase of its Dar es Salaam data center in March 2025, backed by a $50 million investment.[81] The facility is designed to meet Tier III standards for concurrent maintainability, ensuring high availability with a 99.983% uptime guarantee. With the completion of Phase 2, the data center houses a total of 110 racks, including provisions for high-density racks specifically suited for power-intensive compute applications such as AI. It has established itself as the most interconnected data center in Tanzania, boasting connections to 13 different operators. The target IT load capacity for the fully built-out campus is **3 MW**. Crucially, the Wingu Africa facility is explicitly designed to accommodate the escalating demand for data processing, cloud services, AI workloads, and high-speed digital transactions. It also supports local content caching and traffic aggregation, which can improve performance and reduce costs for local users.
- **National Internet Data Centre (NIDC):** NIDC is a tier-III Data Center in Tanzania operated by state-owned telecommunications operator, Tanzania Telecommunications Corporation (TTCL). The NIDC is accredited to ISO 27001 certification on Information Security Management System (ISMS). The facility offers infrastructure and hosting services to local and international clients both from government and private institutions. NIDC has 2MW capacity of power and 3 x 900kVA from three stand-by generators. The total number of racks are 183. Power utilisation stands at 33% . New UPS system has been installed recently this year making the center more efficient in terms of power provision to ICT devices.
- **Dar es Salaam Institute of Technology (DIT) HPC Center:**[82] An International Telecommunication Union (ITU) report from 2012 mentioned a High-Performance Computing Center at DIT. However, more recent documents, including the DIT's 2023/2024 prospectus and other contemporary mentions, do not provide updates on its current operational status, capacity, or specific relevance to AI research. The prospectus primarily focuses on expanding student enrollment and general teaching infrastructure.
- **Cassava Technologies' AI Factory (via Liquid Intelligent Technologies):** A landmark development for the African continent is Cassava Technologies' plan to establish "Africa's first AI factory." This initiative involves building powerful and secure data center facilities equipped with NVIDIA AI computing technology, including supercomputers and AI software. The initial deployment is slated for Cassava's data centers in South Africa by June 2025, with subsequent expansion planned for facilities in Egypt, Kenya, Morocco, and Nigeria. While Tanzania is not explicitly named as an initial site for an AI factory, Cassava Technologies is the parent company of Liquid Intelligent Technologies, which has a significant operational presence in both Mainland Tanzania and Zanzibar. Cassava's AI-as-a-Service (AIaaS) offering is intended to leverage its extensive pan-African high-speed fiber-optic network. This existing network infrastructure and Liquid's presence could potentially facilitate access to the AI Factory's resources for Tanzanian clients in the future, even if the physical supercomputers are hosted regionally
- **YEESI Lab at Sokoine University of Agriculture (SUA):**[83] The Morogoro Youth Empowerment through Establishment of Social Innovation (YEESI) Lab at Sokoine University of Agriculture (SUA) is actively involved in AI research, particularly in agriculture. Notably, the YEESI Lab received a high-computing node from Lambda Labs on November 4th, 2021. This is a master Quad AI workstation equipped with **twin NVIDIA RTX A5000 GPUs**, an Intel i9 18-core processor, and 256GB RAM. This was highlighted as the first modern GPU-installed node at SUA.

81. https://www.thecitizen.co.tz/tanzania/news/national/tanzania-s-digital-shift-gathers-pace-with-50-million-data-centre-4970620
82. https://www.itu.int/ITU-D/treg/publications/Cloud_Computing_Afrique-e.pdf
83. https://www.yeesi.org/

Statistical Performance

According to global statistical performance indicators of 2023, Tanzania score 69.9[84] basing on four pillars which are Data services, Data products, Data sources and Data infrastructure.

Each pillar has been measured in scale of 0-100 see figure below. It has been shown that Tanzania excels in producing and disseminating statistical outputs, by its high scores in Data Products (81) and Data Services (71). However, the country faces notable challenges in the foundational aspects of its statistical system, with lower scores in Data Sources (50) and Data Infrastructure (55). This suggests that while Tanzania is strong in making data available and accessible, it needs to improve the underlying systems for data collection, management, and technology, as well as strengthen its legal and institutional frameworks.

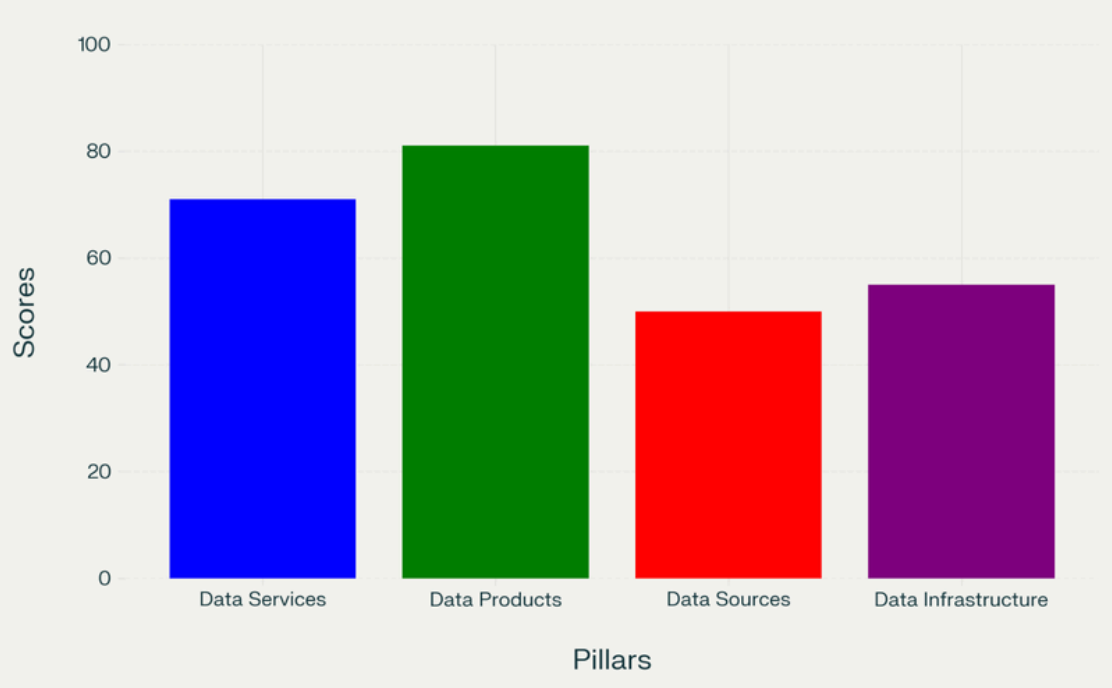

Figure 5. Statistical Performance Indicators

84. https://www.worldbank.org/en/programs/statistical-performance-indicators

Developing A National AI Multi-stakeholder Roadmap

The AI ecosystem in Tanzania comprises a diverse array of stakeholders across government, academia, private sector, and civil society. Each brings distinctive capabilities and perspectives to the emerging AI landscape, creating a foundation for collaborative development that reflects Tanzania's unique context and aspirations.

Government Institutions

Policy and Regulatory Bodies:

- **Ministry of Communication and Information Technology (MoCIT):** Leading the draft national AI strategy development and overseeing broad digital transformation initiatives. The ministry coordinates digital economy advancements through the Tanzania Digital Economy Strategic Framework 2024-2034.
- **ICT Commission (ICTC):** A government organization committed to driving digital transformation and fostering an ICT-enabled knowledge society. The Commission focuses on building digital infrastructure, empowering local talent, and creating a conducive environment for technological advancements through strategic partnerships, policy formulation, and capacity-building initiatives. Key functions include fostering investment in ICT, building capacity, promoting ICT profession standards, advising on research and standards, and hosting national ICT infrastructure and programs.
- **Tanzania Communications Regulatory Authority (TCRA):** Regulates the communications sector, establishing frameworks for telecommunications, broadcasting, and postal services that impact digital infrastructure for AI.
- **e-Government Authority (eGA):** Coordinates digital government initiatives and implements the Government Enterprise Service Bus (GovESB) for information exchange between public institutions.
- **Personal Data Protection Commission (PDPC):** Established under the Personal Data Protection Act of 2022 to oversee data protection implementation, though not yet fully operational.

Sectoral Implementation Bodies:

- **Ministry of Education, Science and Technology:** Developing guidelines for AI implementation in education and overseeing educational reforms relevant to digital skills development.
- **Ministry of Health:** Developed the AI Policy Framework for the health sector in 2022, pioneering sectoral AI governance.
- **Ministry of Agriculture:** Overseeing agricultural initiatives, including digital and AI applications in farming, livestock, and food security.
- **National Identification Authority (NIDA):** Managing digital identity systems that serve as foundational infrastructure for AI services.
- **Tanzania Revenue Authority (TRA):** Implementing digital taxation approaches including frameworks for taxing digital transactions.

Research and Innovation Bodies:

- **Commission for Science and Technology (COSTECH):** Supporting research and innovation across sectors, including AI-related initiatives through research, funding and coordination.
- **Tanzania Atomic Energy Commission (TAEC):** Regulating nuclear and radiation technology with potential intersections with advanced computing technologies.

Key Institutions (Zanzibar): Zanzibar has established specific institutions to manage its digital agenda:

- **Ministry of Infrastructure, Communication and Transport (MOICT):** The lead ministry responsible for ICT policy development and oversight in Zanzibar. It was involved in the agreement with ICTC (Mainland) to establish an ICT Innovation Development Center and is a partner in the DTP.
- **Zanzibar e-Government Agency (eGAZ):** Responsible for coordinating and implementing e-government initiatives. It provides government internet services , manages the government payment portal (ZanMalipo), and collaborates with partners like Mastercard on implementing the Digital Government Strategy 2023-2027. eGAZ also conducts digital skills training, such as cybersecurity courses , and participates in knowledge exchange, for example observing digital systems in India related to digital lending.
- **Zanzibar Information Communication Technology Infrastructure Agency (ZICTIA):** Established by law in 2020, ZICTA focuses on managing and maintaining core ICT infrastructure, including the fiber optic backbone, the Zanzibar Data Centre, and the Zanzibar domain name. It aims to provide affordable, secure infrastructure services and connectivity for all government institutions. It offers various infrastructure-related services to the government and potentially other clients.
- **Zanzibar Planning Commission:** The highest authority for economic development planning, responsible for formulating long-term plans (like ZADEP) and coordinating their implementation. It advises on institutional development, including capacity building for research and planning , and is involved in coordinating spatial data infrastructure initiatives under projects like the World Bank's BIG-Z.
- **Civil Service Commission / President's Office Labour and Public Services:** Oversees the management of civil servants, including aspects like discipline and recruitment. It was identified as a key stakeholder in the 2015 e-Government policy.
- **Zanzibar Revenue Board (ZRB):** Has developed its own specific ICT strategy and policy to support its functions, aligning with broader government ICT goals and international standards.

Academic and Research Institutions

Universities and Higher Education:

- **University of Dar es Salaam (UDSM):** Tanzania's oldest and largest university contributing to technology education and research, particularly through the College of Information and Communication Technologies.
- **Nelson Mandela African Institution of Science and Technology (NM-AIST):** Research based institution conducting AI research, particularly in ML applications for agriculture and other sectors.
- **Sokoine University of Agriculture (SUA):** Researching AI applications in agriculture, including smart farming techniques and sustainable agricultural practices.
- **Muhimbili University of Health and Allied Sciences (MUHAS):** Exploring AI applications in healthcare through research and practical implementation.
- **State University of Zanzibar (SUZA):** Contributing to educational and research initiatives in Zanzibar, including digital technologies.
- **University of Dodoma (UDOM):** Offering technology programs and expanding technological education beyond major urban centers.
- **Indian Institute of Technology - Madras (IIT-M) Zanzibar Campus:** Providing Undergrad and Masters in Technology for Data Science and AI
- Karame Institute of Science & Technology

Research Centers and Institutes:

- **Tanzania Industrial Research and Development Organization (TIRDO):** Conducting research on industrial applications of technology including automation and digital technologies.
- **Tanzania Engineering and Manufacturing Design Organization (TEMDO):** Supporting manufacturing innovation and engineering solutions.

- **Dar es Salaam Institute of Technology (DIT):** Providing technical education and applied research in technology fields.
- **College of Business Education (CBE):** Offering education in business technology and digital commerce.
- **AfriAI Lab (Prev. AI4d Anglophone multidisciplinary Research Lab):** A Partnership between UDOM and NM-AIST, funded by AI4D. With the objective of fostering capacity development, research, and innovation in responsible AI and its application in addressing societal and developmental problems in Africa

Private Sector Entities

Technology Companies:

- **Healthcare Technology Developers:** Creating platforms like Dawa Mkononi for healthcare access and information.
- **Agricultural Technology Companies:** Developing solutions like AgriMfumo and AgroScan for agricultural applications of AI and data analytics.
- **Educational Technology Providers:** Creating platforms like Twiga, Tusome, and SomaApp for digital education and learning analytics.
- **Cultural Technology Developers:** Building platforms like Ona Stories for cultural heritage preservation.

Telecommunications and Infrastructure:

- **Mobile Network Operators (MNOs):** Including Vodacom Tanzania, Tigo, Airtel Tanzania, and Tanzania Telecommunications Corporation (TTCL), providing digital infrastructure and mobile services essential for AI application delivery.
- **Internet Service Providers (ISPs):** Providing connectivity solutions for businesses and individuals.

Financial Technology:

- **Commercial Banks:** Including CRDB Bank, NMB Bank, and NBC, increasingly adopting digital and AI-driven financial services.
- **Mobile Money Providers:** Offering financial services through platforms like M-Pesa, Tigo Pesa, and Airtel Money.
- **Fintech Startups:** Developing innovative financial services leveraging AI and data analytics.

Innovation Ecosystem:

- **Innovation Hubs:** Including DTBi (Dar Teknohama Business Incubator), and Sahara Ventures, providing support and infrastructure for technology startups.
- **Technology Accelerators:** Offering mentorship, funding, and growth support for technology ventures.
- **Investment Groups:** Providing capital for technology ventures and digital innovation.

Civil Society Organizations

Digital Rights and Inclusion:

- **Digital Rights Organizations:** Advocating for equitable access to digital technologies and ethical use of AI.
- **Consumer Protection Groups:** Monitoring technology applications for potential harms to consumers.
- **Disability Rights Organizations:** Promoting accessibility of digital technologies for persons with disabilities.

Education and Skills Development:

- **STEM Education Initiatives:** Including Apps and Girls, Tanzania Youth Icon, and She Codes for Change, promoting technical education, particularly for underrepresented groups.
- **Women in Technology Groups:** Addressing gender disparities in technology fields through targeted interventions.
- **Digital Literacy Organizations:** Promoting basic digital skills among broader populations.

Cultural and Linguistic Preservation:

- **Cultural Preservation Organizations:** Working to protect and promote Tanzanian cultural heritage in the digital era.
- **Language Technology Initiatives:** Developing resources for Kiswahili and other Tanzanian languages in digital contexts in partnership with organizations such as Kiswahili Commission (BAKITA)

International Partners

Development Partners:

- **World Bank:** Supporting the Digital Tanzania Project and other digital development initiatives.
- **UN Agencies:** Including UNESCO, UNDP, and ITU, providing technical assistance and normative frameworks.
- Bilateral Development Agencies: Including those from Japan, EU countries, the United States, and others supporting digital development.

Technical Collaboration:

- **Regional Organizations:** Including the African Union (AU), the East African Community (EAC) and SADC , coordinating regional digital policies.
- **International Technical Bodies:** Including IEEE, ICANN, and Internet Society, providing technical standards and collaboration opportunities.
- **Research Networks:** Connecting Tanzanian researchers with global AI research communities.

This ecosystem mapping reveals a rich tapestry of stakeholders with complementary capabilities and interests. The challenge—and opportunity—lies in coordinating these diverse entities toward coherent AI development that leverages Tanzania's unique assets while addressing its specific challenges. Stakeholder consultations emphasized the importance of multi-stakeholder approaches that bring together these various perspectives in collaborative governance, development, and implementation of AI systems.

Key Insights from Stakeholder Consultations

The stakeholder consultations in Dar es Salaam, Dodoma and Zanzibar, which involved over 240 participants between February and April 2025, revealed thoughtful, multidimensional perspectives on AI readiness that balance technological advancement with ethical considerations and cultural preservation. These discussions transcended simplistic techno-optimism or pessimism, instead articulating a nuanced vision for AI that serves human flourishing within Tanzania's unique context.

Governance Frameworks: Balancing Innovation and Ethics

Stakeholders articulated a sophisticated understanding of governance needs that neither overregulates innovation nor leaves vulnerable populations unprotected. This balanced approach emphasized:

- **Cultural Contextualization**: Participants called for AI frameworks that honor Tanzanian traditions and values rather than uncritically importing external models. This reflects a recognition that technology is never culturally neutral—effective AI governance must be rooted in local cultural contexts while engaging global standards.
- **Linguistic Inclusivity**: Natural language processing advancements for Kiswahili emerged as a critical priority, highlighting the understanding that technological inclusivity begins with language. Participants recognized that without indigenous language capabilities, AI systems risk reinforcing linguistic hierarchies and excluding significant portions of the population.
- **Stakeholder Diversity**: Consultations emphasized the importance of multi-stakeholder engagement across government, academia, the private sector, and civil society. This reflects an understanding that AI governance requires diverse perspectives to balance competing values and interests.
- **Regional Coordination**: Participants highlighted the need for coordinated policy implementation between mainland Tanzania and Zanzibar, acknowledging the political complexity of the United Republic while recognising the value of policy coherence.
- **Innovation-Enabling Safeguards**: The call for "safe spaces" to foster innovation while maintaining ethical guardrails demonstrated a sophisticated understanding that governance should enable rather than constrain technological progress.

These governance perspectives reflect a mature understanding that effective AI policy requires balancing innovation enablement with appropriate safeguards, particularly for vulnerable populations.

Workforce Development: Education as Foundation

Both regions identified education as the fundamental foundation for AI readiness, with participants articulating nuanced perspectives on educational reform:

- **Lifelong Learning Continuum**: Stakeholders emphasized STEM education strengthening from primary through higher education, recognizing that AI readiness requires educational interventions across all levels rather than isolated programs.
- **Responsive Curriculum Design**: The call for curriculum modernisation with more frequent updates reflecting an understanding that educational systems must evolve rapidly to keep pace with technological change.
- **Complementary Skill Sets**: Participants highlighted the need for both technical skills (programming, data engineering, statistical analysis) and complementary soft skills (critical thinking, problem-solving, ethics), recognising that AI implementation requires this dual capability.
- **Inclusive Approaches**: Gender inclusion strategies emphasise the importance of addressing structural barriers to women's participation through targeted interventions, such as women-focused AI clubs, competitions, and community outreach.
- **Collaborative Models**: The proposed "Triple Helix" model, which integrates industry, academia, and government in curriculum development, demonstrates sophisticated thinking about moving beyond siloed approaches to create responsive educational ecosystems.

These educational perspectives reflect an understanding that AI readiness requires a fundamental educational transformation, rather than superficial technology integration—a transformation that addresses both technical capabilities and ethical frameworks.

Infrastructure Requirements: Beyond Basic Connectivity

Stakeholders articulated a layered understanding of infrastructure needs that extends far beyond basic connectivity:

- **Computing Infrastructure**: Participants identified the need for advanced data infrastructure, including data centres, GPUS, and high-performance computing resources, recognising that AI development requires specialised computing capabilities.
- **Enhanced Connectivity**: The call for connectivity improvements through 5G, fibre optic expansion, and satellite technologies demonstrated understanding that next-generation applications require robust connectivity.
- **Power Systems**: Recognition of the need for power systems upgrades from Tier 3 to Tier 4 capability reflected sophisticated understanding of the energy requirements for advanced computing.

- **Research Infrastructure**: Emphasis on research infrastructure and funding mechanisms demonstrated understanding that indigenous innovation requires dedicated facilities and resources.
- **Sustainable Approaches**: The call for green infrastructure investments in renewable energy reflected understanding that technological infrastructure must be developed with environmental sustainability in mind.

These infrastructure perspectives reflect understanding that AI readiness requires multidimensional investments across computing, connectivity, energy, and research domains—investments that must be made with sustainability as a central consideration.

Sectoral Applications: Contextual Implementation

Participants demonstrated sophisticated understanding of AI's sector-specific applications and implementation challenges:

- **Priority Sectors**: Stakeholders identified several sectors for targeted AI implementation, including healthcare (diagnostic support systems), agriculture (remote sensing, disease prediction), education (student performance prediction), cultural heritage (traditional storytelling preservation), and tourism (personalized recommendation systems).
- **Existing Initiatives**: Participants highlighted existing platforms like Dawa Mkononi (healthcare), AgriMfumo and AgroScan (agriculture), Twiga, Tusome, and SomaApp (education), and Ona Story (cultural heritage), demonstrating awareness of emerging applications.
- **Implementation Challenges**: Stakeholders acknowledged barriers including cultural resistance, high implementation costs, and expertise limitations, showing realistic understanding of practical challenges.
- **Practical Solutions**: Participants proposed solutions including incubation labs, business model support, and innovative approaches to data collection, demonstrating problem-solving orientation.

These sectoral perspectives reflect understanding that AI implementation must be contextualized to specific domains, addressing unique challenges and leveraging domain-specific opportunities while acknowledging implementation barriers.

Cross-Cutting Themes: Values-Based Approach

Five consistent themes emerged across all discussion tracks, reflecting a values-based approach to AI development:

- **Cultural Contextualization**: The emphasis on adapting AI development to Tanzania's cultural context rather than importing external models wholesale demonstrated commitment to locally appropriate technological development.
- **Inclusive Development**: Strong emphasis on gender equality, rural access, and addressing socioeconomic disparities reflected commitment to ensuring AI's benefits are widely shared.
- **Public-Private Collaboration**: Recognition that successful AI implementation requires coordinated efforts across sectors demonstrated understanding of the collaborative nature of effective innovation.
- **Ethical Implementation**: Consistent focus on ensuring AI development adheres to ethical principles and preserves human values reflected commitment to responsible technology development.
- **Sustainable Approaches**: Acknowledgment that technological development must consider environmental impacts demonstrated holistic understanding of technology's implications.

These cross-cutting themes demonstrate Tanzania's thoughtful approach to AI readiness—one that views technology not as an end in itself, but as a tool for addressing pressing societal challenges while preserving cultural identity and promoting equitable development.

National AI Strategy: Main Policy Recommendations

Based on the assessment of Tanzania's AI readiness and insights from stakeholder consultations, the following recommendations are proposed to strengthen the country's AI ecosystem, organized into three categories: regulation, institutional framework, and capacity building.

Regulation

1. **Finalise and adopt the national AI strategy with clear ethical guidelines, considering cultural and linguistic diversity:** Tanzania's draft national AI strategy should be finalised with ethical principles that reflect the country's cultural values while aligning with international standards. The strategy should establish a vision for AI development that prioritises human-centered design, transparency, fairness, and accountability. It should provide a framework for balancing innovation with appropriate safeguards, creating what stakeholders described as "safe spaces" for AI development, and practical guidance for implementation. This strategy should explicitly recognize AI not merely as a technological advancement but as a socio-technical system with profound cultural, ethical, and social dimensions, and implications for various stakeholder groups. It should articulate Tanzania's distinctive approach to AI that prioritizes cultural preservation, linguistic inclusivity, and equitable development.
2. **Develop specific regulations for AI ethics, accountability, and transparency:** Building on the Personal Data Protection Act of 2022, Tanzania should develop regulations that specifically address AI systems. These should include requirements for algorithmic impact assessments, transparency in AI decision-making, and mechanisms for human oversight of automated systems. The regulations should establish clear responsibilities for AI developers and deployers while providing practical guidance on implementation. The UNESCO Ethical Impact Assessment is a suitable tool to assess individual AI systems in use or planning and should be deployed across the country. These regulations should incorporate Tanzania's cultural values and priorities, ensuring that AI systems deployed in the country respect local contexts and ethical frameworks, while also aligning with continental and global standards. They should establish meaningful transparency mechanisms that go beyond technical explanations to provide accessibility to diverse stakeholders.
3. **Establish a liability regime for AI systems:** Tanzania currently lacks a dedicated liability regime for harms caused by AI systems. A legal framework should be developed to clarify responsibility and establish compensation mechanisms for individuals affected by AI-related harms. This framework should balance the need for accountability with the goal of fostering innovation, and assign responsibility within the government to develop and oversee the process. This liability regime should address the unique challenges of AI systems, including questions of foreseeability, causation, and responsibility in complex algorithmic systems. It should establish clear principles for attributing responsibility while providing accessible remedies for affected individuals.
4. **Develop sectoral AI guidelines for priority areas:** Building on existing sectoral frameworks like the AI Policy Framework for the health sector, Tanzania should develop specific guidelines for priority sectors, as assigned by the government, including but not limited to, agriculture, education, tourism, and financial services. These guidelines should address the unique considerations and stakeholder roles of each sector while maintaining consistency with the national AI strategy.These sectoral guidelines should be developed through collaborative processes involving domain experts, AI specialists, ethicists, and representatives of affected communities. They should address sector-specific risks and opportunities while establishing mechanisms for ongoing monitoring and adaptation as technologies evolve.
5. **Create data sharing frameworks with strong privacy protections:** Tanzania should develop frameworks to facilitate data sharing between public and private entities while protecting individual privacy rights. These frameworks should establish standards for data quality, interoperability, and security, enabling the development of AI systems while preserving trust. The Frameworks should allow for data sharing within the

country and internationally with partner governments. An assessment should be undertaken as to whether current data protection frameworks and regulations are adequately reflecting the challenges posed by AI systems.

These data sharing frameworks should recognize data as a national resource while establishing appropriate safeguards against misuse. They should facilitate responsible data sharing for research, innovation, and public service delivery while ensuring that individuals maintain meaningful control over their personal information.

Institutional Framework

1. **Establish a National AI Council with multi-stakeholder representation:** A National AI Council should be established with representatives from government, academia, private sector, and civil society. This council would provide oversight for national AI initiatives, coordinate activities across sectors, and advise on policy development as well as international engagement and coordination with other African countries on AI policy and government. The multi-stakeholder approach would ensure diverse perspectives are considered in AI governance. This council should serve as a forum for addressing emerging ethical, social, and legal issues related to AI deployment. It should facilitate ongoing dialogue across sectors while providing authoritative guidance on responsible AI development. Its diverse composition should ensure that multiple perspectives—including those of traditionally marginalized groups—are represented in AI governance.
2. **Create a National AI Research Centre:** Tanzania should establish a National AI Research Centre to drive innovation, conduct locally relevant research, and develop solutions to national challenges. The centre would serve as a hub for collaboration between researchers, industry, and government, focusing on applied research that addresses Tanzania's unique needs. This research centre should prioritize projects that leverage Tanzania's distinctive assets—including linguistic diversity, cultural heritage, and ecological knowledge—while addressing local challenges. It should establish collaboration mechanisms with international research networks while ensuring that research priorities reflect national development goals. The centre should also build strategic partnerships with international AI research networks while keeping national priorities at the core. It should serve as a training ground for Tanzanian AI talent, foster responsible AI practices and contribute to the formulation of evidence-based AI policies that support inclusive development.
3. **Develop AI testing and certification facilities:** Facilities for testing and certifying AI systems should be established to ensure quality, safety, and compliance with ethical standards. These facilities would provide validation services for AI applications, particularly in sensitive areas like healthcare and finance, building trust in AI technologies. These facilities should develop testing methodologies that address both technical performance and ethical considerations, ensuring that AI systems deployed in Tanzania meet appropriate standards. They should establish certification processes that provide meaningful assurance to users while not creating unnecessary barriers to innovation. International experts could be deployed to assist this process, including through the UNESCO AI Ethics Experts without Borders facility.
4. **Create regional AI innovation hubs:** Regional innovation hubs should be established across Tanzania to democratize access to AI resources and expertise. These hubs would provide infrastructure, mentorship, and funding opportunities for local entrepreneurs and researchers, fostering innovation that addresses regional challenges. These Hubs should leverage the existing rich resource of innovation hubs and higher learning institutions (Universities and Technical schools) across the country. These innovation hubs should be designed to reflect the unique characteristics and priorities of different regions, ensuring that AI development addresses diverse local needs. They should establish connections with local educational institutions, businesses, and community organizations while providing bridges to national and international networks.
5. **Establish an AI ethics review board:** An independent AI ethics review board should be created to assess high-risk AI applications, provide ethical guidance, and address emerging ethical challenges. This board would complement regulatory approaches with expert ethical analysis, helping to navigate complex issues as AI technologies evolve. This ethics board should develop review methodologies that address the unique ethical challenges presented by AI systems, including questions of fairness, transparency, and human agency. It should establish processes for ongoing monitoring of deployed systems while providing guidance for addressing unanticipated ethical issues that may emerge. International experts could be deployed to assist this process, including through the UNESCO AI Ethics Experts without Borders facility.

Capacity Building and Training

1. **Integrate AI literacy into educational curricula at all levels:** AI literacy should be integrated into educational curricula from primary to tertiary levels, with age-appropriate content that builds a foundational understanding, technical knowledge, and skills. This would include both technical aspects and ethical considerations, preparing students to participate in an AI-enabled society. This curricular integration should move beyond narrow technical skills to address the broader social, ethical, and cultural dimensions of AI. It should cultivate critical thinking about technology while developing both practical skills and ethical frameworks for responsible participation in technological development.
2. **Develop specialised AI degree programs and professional certifications:** Universities and technical institutions should develop specialized degree programs and professional certifications in AI-related fields. These programs should be designed in collaboration with industry partners to ensure relevance to market needs, addressing critical skills gaps, while also advancing scientific discovery and knowledge in the field. These educational programs should balance technical depth with interdisciplinary breadth, ensuring that graduates understand both the technical foundations of AI and its broader implications. They should incorporate hands-on projects addressing real-world challenges while developing the ethical reasoning capabilities essential for responsible AI development. For responsible and sustainable AI growth, these programs should also promote ethical awareness, critical thinking and an understanding of AI's social and economic implications.
3. **Create public awareness programs on AI benefits and risks:** Public awareness campaigns should be developed to educate citizens about the benefits and potential risks of AI technologies, as well as existing initiatives in the country. These campaigns would build understanding, reduce fear and resistance, and empower individuals to engage critically with AI systems. These awareness programs should provide accessible explanations of complex technological concepts while addressing common misconceptions. They should be designed for diverse audiences, using culturally appropriate communication channels and languages to ensure broad reach.
4. **Implement targeted programs to increase women's participation in AI:** Specific programs should be implemented to increase women's participation in AI education and careers, including scholarships, mentorship, and women-focused AI clubs as suggested in stakeholder consultations. These initiatives would address gender disparities and ensure AI development benefits from diverse perspectives. These programs should address the structural barriers to women's participation in AI fields, providing both entry points and supportive environments for advancement. They should celebrate female role models while creating supportive communities that nurture talent and address challenges.
5. **Build infrastructure capacity for AI computing and data centres:** Tanzania should invest in critical infrastructure for AI, including high-performance computing facilities (including GPUs), data centres, and connectivity solutions. These investments would provide the foundation for AI research and deployment, enabling locally hosted AI applications. These infrastructure investments should be made with sustainability as a central consideration and in alignment with regional and international standards and requirements, incorporating renewable energy solutions and energy-efficient designs. They should be geographically distributed to promote equitable access while establishing appropriate security measures to protect critical digital assets. These recommendations draw on international good practices from countries at similar levels of economic development and AI readiness, while being tailored to Tanzania's unique context and priorities. Implementation should be phased, with short-term actions establishing the foundation for more ambitious medium and long-term initiatives. At all levels, the alignment of activities with applicable frameworks, including the African Union Continental Strategy on AI, the UNESCO Recommendation on the Ethics of AI, and the United Nations Global Digital Compact, should be taken into consideration.

Table 5. Recommendations Summary Table

Category	Recommendation	Timeframe	Responsible Agency	Potential Partners
Regulation	Finalise and adopt the national AI strategy with ethical guidelines and an implementation roadmap	Short-term (1-2 years)	MoCIT	TCRA, ICT Commission, Academic institutions, Private sector
Regulation	Develop specific regulations for AI ethics, accountability, and transparency, in alignment with global standards	Medium-term (2-3 years)	MoCIT, Attorney General's Office	TCRA, ICT Commission, International organizations
Regulation	Establish a liability regime for AI systems	Medium-term (2-3 years)	Attorney General's Office, MoCIT	Legal experts, Private sector
Regulation	Develop sectoral AI guidelines for priority areas including healthcare, agriculture, education	Short-term (1-2 years)	Sector ministries	MoCIT, ICT Commission, Industry associations
Regulation	Create data sharing frameworks with strong privacy protections, and updating existing frameworks and acts	Medium-term (2-3 years)	MoCIT, TCRA	Data protection authorities
Institutional Framework	Establish a National AI Council with multi-stakeholder representation	Short-term (1 year)	MoCIT	Government agencies, Academia, Private sector, Civil society
Institutional Framework	Create a National AI Research Centre	Medium-term (2-3 years)	MoCIT, Ministry of Education, COSTECH	Universities, Research institutions
Institutional Framework	Develop AI testing and certification facilities	Medium-term (2-3 years)	TCRA, Tanzania Bureau of Standards, ICT Commission	Private sector, International standards bodies
Institutional Framework	Create regional AI innovation hubs	Medium to long-term (3-5 years)	MoCIT, ICT Commission, Local governments	Private sector, Universities
Institutional Framework	Establish an independent AI ethics review board	Short-term (1-2 years)	MoCIT	Ethics experts, Civil society

Category	Recommendation	Timeframe	Responsible Agency	Potential Partners
Capacity Building	Integrate AI literacy into educational curricula at all levels	Medium-term (2-3 years)	Ministry of Education	MoCIT, Educational institutions
Capacity Building	Develop specialized AI degree programs and professional certifications	Medium-term (2-3 years)	Universities, Technical institutions	Industry partners
Capacity Building	Create public awareness programs on AI benefits and risks	Short-term (1-2 years)	MoCIT, TCRA, ICT Commission	Media, Civil society
Capacity Building	Implement targeted programs to increase women's participation in AI	Short to medium-term (1-3 years)	Ministry of Education, MoCIT	Women's organizations, Universities
Capacity Building	Build infrastructure capacity for AI computing and data centers	Medium to long-term (3-5 years)	MoCIT, Ministry of Works	Private sector, Development partners

Summary: Tanzania's Human-Centred Path to AI Readiness

Tanzania stands at a transformative moment in its technological journey—one that presents both profound challenges and extraordinary opportunities. The stakeholder consultations revealed a vision of technological advancement that transcends binary perspectives of either uncritical adoption or wholesale rejection. Instead, participants articulated a thoughtful path forward that honors Tanzania's cultural heritage while engaging with global technological developments in ways that center human flourishing.

This balanced approach recognizes that the most powerful AI solutions will emerge from the creative tension between universal technological capabilities and contextual human wisdom. It acknowledges that technological advancement is never culturally neutral—that meaningful innovation must be rooted in local contexts, values, and aspirations while leveraging global knowledge.

The insights from over 240 stakeholders across Dar es Salaam, Dodoma, and Zanzibar reflect a sophisticated understanding that AI development is fundamentally about expanding human capabilities rather than replacing them. Participants consistently emphasized the importance of education, ethical frameworks, cultural preservation, and inclusive participation—demonstrating an intuitive understanding that technology must serve human purposes rather than subordinating human experience to technological imperatives.

As Tanzania develops its AI readiness through policy frameworks, institutional capacity, and human capital development, this human-centered perspective offers a compelling alternative to techno-deterministic approaches that dominate much global discourse. By placing cultural context, ethical considerations, and human experience at the center of technological development, Tanzania has the opportunity to create AI systems that enhance rather than diminish human agency—systems that amplify human creativity, strengthen cultural identity, and address pressing societal challenges.

The journey ahead will require sustained commitment, collaborative effort, and thoughtful navigation of complex challenges. Yet the foundation being established through frameworks like the Tanzania Digital Economy Strategic Framework 2024-2034 and emerging sectoral policies provides reason for optimism. With continued attention to inclusive development, ethical implementation, and sustainable approaches, Tanzania can forge a distinctly human-centred path toward AI readiness—one that may offer important lessons for countries worldwide grappling with similar challenges.

In this vision, AI becomes not merely a technological revolution but a platform for human advancement, expanding our collective capabilities, preserving cultural heritage, promoting social cohesion, and addressing pressing development challenges. By maintaining this human-centered orientation while developing technical capabilities, institutional frameworks, and human capital, Tanzania has the opportunity to create an AI ecosystem that truly serves its people's aspirations and enhances their capabilities for generations to come.

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Annex

Below is a tabulated list of startups, organisations and academic institutionsactive in AI in Tanzania.Their use of AI is self report and not necessarily validated. This is NOT an exhaustive list and some may not be listed. The Tanzania AI Community maintains a Tanzania AI Directory which can be found on *community.ai.or.tz*.

AI Initiatives

Name	Type	Sector	Description / Mission
Ada Health (Swahili)	International Implementation	Health (Digital Health)	An AI-powered health guidance app that was launched in Swahili for Tanzania. Ada is a symptom-checker app (by a Berlin-based company) which was localized to Swahili to improve healthcare access, allowing users to input symptoms in Swahili and receive preliminary health guidance. It addresses Tanzania's doctor-patient ratio by providing instant triage advice.
AdBox	Startup	Marketing (AI)	AI-powered marketing and social media management platform. AdBox provides "AI Social Media Marketing Management and Automation for SMEs, corporates", enabling automated content posting, customer engagement, and multi-channel advertising driven by AI. Founded in 2024 (unfunded) in Dar es Salaam.
AfriAI Lab	Academic (Research Lab)	Multidisciplinary AI R&D	A new AI4D-supported research lab run jointly by University of Dodoma (UDOM) and NM-AIST (Arusha). This lab seeks to strengthen local AI research capacity and develop responsible AI solutions for societal challenges. It is a multidisciplinary, gender-inclusive initiative that brings together academia, industry and government to collaborate on AI projects in agriculture, health, NLP, etc. The AfriAI Lab also focuses on training students and publishing research to put Tanzania on the AI research map.
Afya Intelligence	Startup/ Consultancy	Health (Public Health Analytics)	A local health-tech firm offering AI-powered public health analytics and management tools. Afya Intelligence leverages data and emerging tech to help healthcare providers and policymakers make data-driven decisions. For example, it develops predictive analytics platforms (e.g. "DukaDawa") to improve supply chains and healthcare access. (Part of the HealthTech Hub Africa community).

Name	Type	Sector	Description / Mission
AI in E-Government (Tax & Services)	Government Initiative	Public Sector (Fintech)	Government program to integrate AI into e-government platforms for better public service delivery. Announced in Feb 2025, initial focus is using AI to enhance tax collection efficiency and transparency. Plans include AI-powered systems for automated tax filing, fraud detection, and virtual assistants for taxpayer support. This initiative reflects Tanzania's push to leverage AI in public administration and digital economy growth.
AI Mapping Initiatives (MapwithAI & Ecopia)	Project(s)	Mapping (GIS)	Tanzania's mapping has benefited from international AI tools. Facebook's MapwithAI project used computer vision to predict roads and features from satellite imagery, integrated via the RapiD editor for OpenStreetMap (OSM) – enabling faster mapping of Tanzania's roads. Similarly, Canadian startup Ecopia AI applied its models to map all building footprints across Tanzania in just three weeks, dramatically accelerating the creation of base maps. These implementations illustrate AI's power in digital mapping of Tanzania.
Altitude-X	Startup	Drone Technologies	Using drones and satellite data for data collection, gather valuable insights and provide clients with advanced analytics and decision-making capabilities.Including Drone Surveys & Mapping, Drone Inspections, and utilising the data to train AI & ML systems.
Belltro	Startup	ICT (Conversational AI)	A Tanzanian startup focused on conversational AI solutions for customer service. Belltro (a Vodacom Accelerator alumnus) is building AI-driven chatbots/voice assistants to transform customer experience in Africa.
Code Her Initiative	NGO / Community	Tech Education (Youth/Women)	A grassroots initiative founded in 2021 to empower young people – especially girls – with coding and AI skills. Code Her runs workshops and "techathons" introducing secondary students to AI, data science and coding. It advocates for ethical and inclusive AI, and has been recognized among Tanzania's top changemaking programs.
CTRLX Africa	Startup	Transport/ Logistics	A Dar es Salaam–based startup providing AI-powered fleet management and telematics. CTRLX builds its own IoT hardware and AI software to monitor truck fleets in real time. The platform acts like "an expert mechanic, a data analyst, and an AI agent" for fleet operators – predicting maintenance needs, detecting driver fatigue or harsh driving, and optimizing routes. As of 2023 it is in early pilot with local transport companies, already catching issues (e.g. fuel leaks) before breakdowns.

Name	Type	Sector	Description / Mission
DataGirls Tanzania	NGO / Community	Data Literacy & STEM	An organization founded by Diana Robinson to empower girls through data literacy and tech skills. DataGirls Tanzania runs training, mentorship and workshops to close the gender gap in AI and data science. It equips young women with data analysis and programming skills, and advocates for women's inclusion in the AI/data field.
Elsa Health (Dr. Elsa)	Startup / Project	Health (AI Diagnostics)	A Tanzanian health-tech startup providing an AI-powered clinical decision support app for healthcare providers and patients. The "Dr. Elsa" mobile application uses AI to assess symptoms and assist diagnosis, helping doctors deliver remote advice and bridging the doctor shortage. Deployed in 20+ clinics by 2020, it offers symptom checking and treatment recommendations in Swahili. Winner of the 2018 Fondation Botnar challenge at Sahara Sparks.
eShangazi	Project (Chatbot)	Health Education (SRH)	A Swahili-language AI chatbot that educates youth on Sexual and Reproductive Health. Launched as a result of a UNFPA & Sahara Sparks challenge to reduce teen pregnancies, it provides info on family planning, rights, and clinic locations. eShangazi interacts via Facebook Messenger and SMS, even including quizzes and expert referral features.
GetAI (ClarioAI)	Startup	Retail / Consumer AI	AI startup (GetAI Africa) whose product ClarioAI is a smart assistant for authenticating consumer products. It "helps users access accurate local product information through barcode scanning and AI chatbots," allowing businesses and consumers to verify product legitimacy and details. Co-founded by data scientist Asya Haji; also engages youth in AI skills development.
Ifakara Health Institute (AI Projects)	Research Institute	Health Research	A leading health research institute in Tanzania that has incorporated AI/ML in its work. IHI scientists use AI and infrared spectroscopy to accelerate malaria vector control – e.g. using machine learning to identify mosquito species and infection rates in real time. These projects (funded by Gates Foundation, Wellcome Trust) exemplify AI's role in Tanzanian health research.
Index Labs	Company	AI Solutions	A Dar es Salaam-based artificial intelligence firm with a small team, offering AI development and custom software services. Focuses on building AI-driven systems tailored to client needs (industry-agnostic).Deveopers of eShangaze, an open-source SRH chatbot

Name	Type	Sector	Description / Mission
iPhytos Tanzania	Startup	Health / Biotech (AI)	Arusha-based biotech startup (founded 2022) using AI-driven in silico techniques for drug discovery. Operates an AI-powered drug discovery platform to innovate and develop new medicines. Leverages machine learning pipelines to accelerate finding effective compounds, breaking traditional R&D barriers.
LimaBot AI	Startup	Agriculture	LimaBot combines AI, drones, satellites, and soil sensors to provide comprehensive crop health monitoring and agricultural optimization. Available on WhatsApp, SMS, USSD & Mobile App
Macro-Eyes "CHAIN"	Startup / Project	Health (Supply Chain)	Macro-Eyes, a U.S.-based AI company, ran the Connected Health AI Network (CHAIN) project in Tanzania to optimize vaccine supply. Using AI-driven forecasting (trained on local clinic data and feedback from health workers), CHAIN could predict immunization attendance and was able to reduce vaccine wastage by 96% in pilot regions. This project demonstrated the power of AI in health logistics and was piloted across 3 regions of Tanzania.
MANKA (by Tausi Africa)	Product (Fintech)	Finance (AI Analytics)	Manka is an AI-powered financial analytics platform launched in 2024 by Tausi Africa to improve credit assessments in the informal economy. It analyzes bank and mobile money transaction data to speed up lending decisions – reducing credit evaluation from ~3 hours to under 2 minutes. Aims to boost financial inclusion by enabling faster, data-driven credit scoring.
Mipango	Startup	Finance (Fintech)	A personal finance app that uses artificial intelligence to guide users in budgeting, saving, and finding financial deals. Co-founded by Lilian Makoi, Mipango leverages AI to analyze users' spending behavior and provide tailored financial advice, aiming to improve financial literacy and freedom.
MkulimaGPT	Project / Product	Agriculture (AI for Farmers)	An AI chatbot for Tanzanian maize farmers that provides farming advice via text and voice in Swahili. MkulimaGPT is funded by the Gates Foundation (AI for Equity 2023) and powered by GPT-4 to assist with crop planning, disease management, etc. Users can interact through WhatsApp for free. The project is hosted at Sokoine University of Agriculture in collaboration with the Africa Centre of Excellence in IoT.
Mtabe	Startup	Education (EdTech)	An education technology startup providing an AI-enabled offline Q&A platform via SMS, allowing students to ask questions and receive answers without internet. Aims to bridge the educational resource gap for students in remote areas.

Name	Type	Sector	Description / Mission
Nena	Project/ Startup	ICT (NLP)	Nena is a Swahili Natural Language Processing tool (currently in beta) that enables sentiment analysis and language processing in Swahili. Developed by the Inspire Ideas startup (known for Dr. Elsa), Nena was created to fill the gap in social media analysis for Tanzanian content (most analytics tools didn't support Swahili). It provides an API for developers to incorporate Swahili language understanding into their projects.
Neurotech Africa (Sarufi)	Startup	AI Platform (NLP)	AI venture specializing in NLP for African languages. Its flagship product Sarufi is a Swahili-first conversational AI platform for building chatbots, enabling businesses to deploy AI chat solutions across SMS, WhatsApp, etc. Recognized as Tanzania's first Swahili-centric AI platform.
Nuru (AI Assistant for Farmers)	Project / App	Agriculture	Nuru (Swahili for "light") is an AI assistant for crop disease diagnosis, developed by IITA, Penn State and Google. The Nuru mobile app uses machine learning to recognize cassava diseases (Cassava Mosaic and Brown Streak) and maize pest damage (Fall Armyworm) via the phone's camera. Crucially, Nuru speaks Swahili, making the tool accessible to Tanzanian farmers. Deployed since 2018, it helps farmers identify diseases in the field and take action quickly.
Parrot AI	Startup	ICT (AI Solutions)	A Tanzanian AI startup with a broad mission to help businesses and society exploit the benefits of AI. Parrot AI builds AI-driven products that have positive social impact. The firm has worked on projects like machine-learning for agricultural disease detection, and is also active in AI advocacy – running training and outreach programs for students (e.g. AI4Good bootcamps). Parrot positions itself as a leading AI-as-a-service provider in Tanzania.
Redefine Africa	Startup	Finance (Enterprise AI)	A Tanzanian startup building machine-learning software for banks and telecoms to predict customer churn and behavior. Redefine Africa's solution can be deployed on retail customer and agent data to model usage patterns and churn risk. This helps companies proactively retain customers. (Selected in 2023 for an AI4D/Villgro Africa innovation bootcamp).

Name	Type	Sector	Description / Mission
Saratani AI	Startup	Health (Oncology)	An AI-health startup focused on cervical cancer screening. Saratani AI is developing a fast, affordable AI system to analyze cervical cell images for early cancer detection and diagnosis. By leveraging computer vision, it aims to shorten diagnostic time (which often takes weeks) and support healthcare providers at even primary facilities. (Selected by Villgro Africa for support in 2023).
Sartify LLC (PAWA AI, Swahili SMall Language Model)	Startup / Project	AI Tools (Data/ NLP)	An AI-focused software company behind PAWA AI, a Swahili Small Language Model, supported by Mozilla through the Builders Accelerator. Also developers of Pynotator, an open-source Python library for easy text data annotation (for NLP tasks like NER and Q&A). The company contributes to open-source AI tooling and mentors upcoming AI developers.
Shule Direct – "Ticha Kidevu"	NGO / Social Enterprise	Education (EdTech)	Shule Direct is a Tanzanian education platform; its Ticha Kidevu product is an AI-driven virtual teacher (chatbot) providing educational content and assistance in Swahili. It was introduced to support remote learning and personalized tutoring for students.
Sokoine University of Agriculture	Academic Institution	Higher Education (Agriculture)	Tanzania's leading agricultural university (Morogoro) that integrates data science and AI in agriculture. Host of the MkulimaGPT initiative for AI-based farming advice. Sokoine's researchers apply machine learning in crop science and its IT programs contribute to AI talent (ranked #3 nationally in AI research).
Tanzania AI Community	Community / NGO	Cross-sector (AI4Good)	A community-driven initiative that aims to empower Tanzanians to leverage AI for social good. This community brings together AI enthusiasts, developers, and problem-solvers to co-create solutions for local challenges. It runs events, workshops (e.g. IndabaX, FemAI labs), and develops open-source products such as TWIGA, and AI Assistant for teachers in public schools.
Tanzania Data Lab (dLab)	Public/NGO Partnership	Data Science & AI Capacity	An open innovation hub in Dar es Salaam focused on data and AI capacity-building. The dLab serves as a center for data analytics training, research, and community events, connecting the "data revolution" to national development priorities. It regularly hosts AI/ML bootcamps, hackathons (e.g. DataTamasha), and supports government and NGOs in data-driven projects. Established through a World Bank initiative, dLab has been instrumental in nurturing Tanzania's data science talent pool.

Name	Type	Sector	Description / Mission
Tanzania Flying Labs	NGO / Lab	Drones & AI (Robotics)	A Tanzanian robotics and AI hub focusing on drones, AI and data for social good. Part of the global Flying Labs network, it works on local challenges with technology – e.g. drone mapping for agriculture and disaster response. "Tanzania Flying Labs is a robotics knowledge hub focusing on skill-building and use-cases for social welfare." Collaborates with WeRobotics and DataKind to apply AI in analyzing aerial imagery for development projects.
Techling (T) Ltd	Company	Software Dev (AI & IT)	Versatile software development company offering services such as AI integration, mobile and web app development. Noted for strong technical expertise and user-centric design. Provides AI development and generative AI solutions alongside traditional IT services.
Teens in AI – Tanzania	NGO / Program	Youth & Education (AI)	Tanzanian chapter of the global Teens in AI movement. Organizes hackathons ("national techathons") and bootcamps that introduce teenagers to AI, coding and data science in a fun, inclusive environment. Aims to inspire the next generation of AI practitioners; supported by local tech mentors and international partners (Teens in AI global).
Tembo+ (TemboPlus)	Startup	Finance (Fintech)	A fintech startup integrating with mobile money to help users save and invest. Tembo+ is researching AI-driven personal finance management – analyzing users' mobile money transactions to offer budgeting insights and investment recommendations. Currently in prototype/R&D stage.
TrailGuard AI	Project (NGO Tech)	Conservation (Anti-Poaching)	An AI-powered wildlife anti-poaching system deployed in Tanzania's game reserves. TrailGuard AI uses smart hidden cameras with on-device vision algorithms to detect humans (poachers) in the bush and send real-time alerts. In a test at Grumeti Reserve, it successfully helped park rangers seize ~1,300 lbs of illegal bushmeat and arrest 30 poachers. The system uses a low-power vision chip to identify poachers and can transmit images via GSM or satellite from the field.
WildEyes AI	Project (Conservation Tech)	Conservation (Human-Wildlife Conflict)	An AI-based elephant early-warning system aimed at reducing human-elephant conflict. WildEyes AI uses a thermal camera with an AI model (built on synthetic data by CVEDIA) to recognize elephants approaching farms at night. The device (with an Intel Movidius VPU) can alert communities of nearby elephants to prevent crop raids. Piloted in villages near Tanzanian parks, it addresses ~$600k in annual crop damage in Tanzania.

Name	Type	Sector	Description / Mission
BakiShule	Initiative	Education	An initiative to promote STEM among secondary school girls and introduce them to Artificial Intelligence at an early stage of their career development through a variety of activities, including mentorship programs, hands-on bootcamps, science fairs, and awareness campaigns that build confidence, skills and interest in technology-related fields.
Log AI	Startup	Education	A startup dedicated to advancing artificial intelligence through a comprehensive platform that offers a variety of learning resources, practical tools, and support services. Our mission is to democratize AI, making it accessible and understandable to everyone.
Quantum Intelligence	Startup	Data & AI Solutions	A research and product company offering solutions in predictive analytics and data engineering helping business with better understanding of complex sources of data, what is the cause over time and what would happen in the future.
Workwise	Startup	Enterprise Software (ERP)	Tanzanian-built cloud ERP platform using AI to automate business workflows. "Workwise is a cloud-based ERP, built locally with African market knowledge," providing modules for CRM, HR, accounting, etc., and integrating AI for workflow automation. Aims to boost efficiency for African businesses with smart, AI-powered solutions.
XSENSE AI	Startup	Health (MedTech)	A Tanzania-based health AI startup building an AI-powered diagnostic platform. XSense AI developed a web application that uses artificial intelligence on ultrasound images to detect breast cancer at an early stage (achieving ~91% accuracy). The team also partnered with UNDP Accelerator Lab to apply AI for COVID-19 "infodemic" analysis in Tanzania.

Academic Institutions offering AI related course and/or research

Institution Name	Relevant Department/ Lab/ Center	Key AI Programs Offered (Degrees, Certificates, Short Courses/Workshops)	Key AI Research Areas/ Projects
University of Dar es Salaam (UDSM)	College of Information and Communication Technologies (CoICT); UDSM DHIS2 Lab (Data Science, AI and Machine Learning); Embedded and Intelligent Systems (EIS) Group (within CoICT)	PhD in Data Science by Thesis; MSc in Data Science; Short courses in AI; Short Course: AI for Business; Short Course: Data Analytics with R	An AI-powered health guidance app that was launched in Swahili for Tanzania. Ada is a symptom-checker app (by a Berlin-based company) which was localized to Swahili to improve healthcare access, allowing users to input symptoms in Swahili and receive preliminary health guidance. It addresses Tanzania's doctor-patient ratio by providing instant triage advice.
Nelson Mandela African Institution of Science and Technology (NM-AIST)	AfriAI Lab (collaboration with UDOM); School of Computational and Communication Sciences and Engineering (CoCSE)	Postgraduate studies in SET including ICT with AI/ML components (e.g., Masters in Applied Mathematics and Computational Science)	BakiShule: Machine learning program for predicting student dropout; AI for Pneumonia Detection: Mobile app analyzing chest x-rays; AfriAI Lab: Responsible AI research, maternal/child health risk detection, automated diabetic retinopathy screening; Soil quality assessment using gamma ray sensors; Data Analysis, Computational Modelling, Data Science (within Biophysics)
University of Dodoma (UDOM)	College of Informatics and Virtual Education (CIVE); AfriAI Lab (collaboration with NM-AIST); UDOM AI Community (student-led); Dedicated AI laboratory in CIVE	PhD in Computer Science (with AI research potential); (Programs like MSc Computer Engineering may have AI components given the AI lab)	AfriAI Lab: Health AI (maternal/child health risks, diabetic retinopathy screening), responsible AI; UDOM AI Community: Solving local problems using AI, Data Science, Machine Learning; participation in IndabaX Tanzania, UmojaHack; Staff publications on AI in education
Muhimbili University of Health and Allied Sciences (MUHAS)	School of Biomedical Sciences; Emerging Technologies for Health Research and Development (ETH) Laboratory	PhD in Applications of AI in healthcare	AI for early breast cancer detection (collab. with University of Kent), AI for Rabies screening & outbreak prediction, AI for TB screening in HIV patients, AI in detection of dilated cardiomyopathy

Institution Name	Relevant Department/ Lab/ Center	Key AI Programs Offered (Degrees, Certificates, Short Courses/Workshops)	Key AI Research Areas/ Projects
Sokoine University of Agriculture (SUA)	Electronics and Precision Agriculture Lab (EPA Lab), Dept. of Agricultural Engineering	New 2024/2025 academic programs emphasize AI-powered advisory systems	EPA Lab: AI in precision agriculture, AIoT for agriculture, machine vision for disease/ pest/ weed detection, voice and AI-powered conversational apps for farming, digital crop phenotyping ; Crop disease prediction (AI image classification for maize, beans), Mkulima GPT (Swahili chatbot for farmers), Swahili NLP models (news classification), agricultural robotics (autonomous fertilizer distribution); Artificial Intelligence for Agriculture and Food Systems (AI4AFS) Project (ML for crop yield prediction); Digital Technology, Precision Agriculture, Smart Farming research
Mzumbe University (MU)	Faculty of Science and Technology (FoST)	(Programs like BSc Information Technology and Systems may have AI components, needs curriculum verification)	Research on: Assumptions, opportunities, challenges of AI in Tanzanian academic libraries; Influence of ChatGPT on digital learning experience of Mzumbe University students
Ardhi University (ARU)	Department of Computer Systems and Mathematics ; African Centre for Sustainable Cities Studies (ACS)	Planned: BSc in Data Science and Artificial Intelligence (from 2025/2026, AHUMAIN project); Training: Data Science and AI training program (AHUMAIN project, Erasmus+); Training on Ethical Use of AI in Higher Education (ACS); Short Course: Artificial Intelligence (AI) Leadership (Instructor: Dr. Eunice Likotiko; 5 days; 1,000,000 TShs)	Applied Human Machine Intelligence (AHUMAIN) project; AI for sustainable urban development, emerging technologies for health, climate change, environmental conservation; Publications: "Toward autonomous detection of anomalous GNSS data via applied unsupervised artificial intelligence"; "Garbage Content Estimation Using Internet of Things and Machine Learning"
Mbeya University of Science and Technology (MUST)	College of Information and Communication Technology (CoICT)	Bachelor in Engineering in Data Science	Academic staff research interests in Machine Learning, AI, Big Data ; Publication: "Unveiling the Potential of Artificial Intelligence in Human Resources Management"

Institution Name	Relevant Department/ Lab/ Center	Key AI Programs Offered (Degrees, Certificates, Short Courses/Workshops)	Key AI Research Areas/ Projects
Open University of Tanzania (OUT)	Faculty of Science, Technology, and Environmental Studies (FSTES)	BSc in Data Management (includes "Data Mining Techniques and Application" module; 3 years); Short Course: Artificial Intelligence in Educational Research (Content: AI fundamentals, AI in Ed research, ethics; 3 days; 250,000 TZS); Short Course: Artificial Intelligence Application for Beginners and Children (Content: Intro AI, Coding, Simple AI projects, ML for kids; 2 weeks; 300,000 TZS)	
Dar es Salaam Institute of Technology (DIT)	Department of Computer Studies; Innovation Hub; India-Tanzania Centre of Excellence in ICT (ITCoEICT)	Master in Computational Science and Engineering (AI/DS focus needs curriculum verification)	Innovation Hub projects: Deep Learning for maize yields; Intelligent Robotic System for Precision Agriculture; Deep Learning for microorganism image analysis; Neural Network for power system estimation
State University of Zanzibar (SUZA)	School of Computer Communication and Media Studies (SCCM)	Planned: BSc in Data Science, MSc in Data Science	Staff Research Interests (AI, Machine Learning, GeoAI, Big Earth Data); BERT Project (Tech for PWD inclusion - potential AI applications)
IIT Madras Zanzibar Campus	School of Engineering & Science	BS in Data Science and Artificial Intelligence (4 Years); MTech in Data Science & AI (2 Years; comprehensive curriculum, industry projects); Short Course: Empowering Zanzibar Through Digital Education (foundational digital skills)	MTech in DS & AI includes "industry driven projects"

Research Work

Title	Sector	Key Author(s)
A Farmers' Digital Information System (FDIS) for Sustainable Agriculture Among Smallholder Farmers in Tanzania	Agriculture	Mushi, G.E., Mwakifwamba, A.A., Burgi, P.Y., Di Marzo Serugendo, G.
A Machine Learning Model for Predicting Construction Project Success in Tanzania	Construction	Ntulo, A., Mkoba, E., Machuve, D., Pandhare, S. M.
A systematic review on the extent of Tanzania e-Government services for economic development	Public Admin, Governance	Mwilongo, K. J., Kachota, B.
AI-driven optimisation of EHR systems implementation in Tanzania's primary health care	Healthcare	Mwogosi, A.
AI-IoT integration in Tanzania's primary healthcare system: a narrative review	Healthcare	Mwogosi, A.
Analysis of Urban Green Spaces Using Support Vector Machine in Urban West Region of Zanzibar	Urban Planning, Environment	Hamad, A., Sheikh, Y. H., Bakari, A. D.
Artificial intelligence (AI) and financial technology (FinTech) in Tanzania; legal and regulatory issues	Finance, Legal, Governance	Ally, A.M.
Artificial intelligence and deep learning based technologies for emerging disease recognition and pest prediction in beans (phaseolus vulgaris l.): A systematic review	Agriculture	Mahenge, M.P.J., Mkwazu, H., Sanga, C.A., et al.
Artificial Intelligence in Academia: Assessing Copyright Awareness and Ethical Usage Among Tanzanian University Students	Education	Mollel, G.S.
Artificial intelligence in higher education institutions in Tanzania: Analysis of policy perspectives	Education	Matto, G., Ponera, J.M.
Assessing the potential of machine learning (ML) in predicting and managing weather-sensitive waterborne diseases (WSWDs) in selected districts of Tanzania	Public Health, Environmental Health	Not specified (Authors from Sokoine University of Agriculture implied)
Assumptions of the future of artificial intelligence in Tanzania academic libraries: A review of literature	Education (Academic Libraries)	Mwilongo, K. J., Mwageni, R.

Title	Sector	Key Author(s)
Banana Leaves Imagery Dataset	Agriculture	Mduma, N., Elinisa, C.
Benefits and Challenges of Artificial Intelligence in Tanzania Secondary Schools	Education	Maganga, C.J., Srivastava, A.
Bibliometric Analysis of Machine Learning Ethics	Policy & Governance	Not specified (Paper from AAIAC conference)
Common beans imagery dataset for early detection of bean rust and bean anthracnose diseases	Agriculture	Laizer, H., Mduma, N., Machuve, D., Maganga, R.
Constraints hindering ICT integration among teachers in enhancing literacy and numeracy skills of learners with hearing impairments in Tanzania	Education (Special Needs)	Mtani, H., Kaijage, S., Mduma, N.
Contribution of Artificial Intelligence Technology in Enhancing Organizational Communication Efficiency at Muhimbili University of Health and Allied Sciences	Education (Higher Ed Admin), Healthcare (MUHAS)	Malimi, G. E., Nikatan, C. A.
Data management system for sustainable agriculture among smallholder farmers in Tanzania: research-in-progress	Agriculture	Mushi, G.E., Serugendo, G.D.M., Burgi, P.Y.
Dataset of banana leaves and stem images for object detection, classification and segmentation: A case of Tanzania	Agriculture	Mduma, N., Leo, J.
Design of a centre-articulated and oscillating chassis robot for autonomous agricultural tasks (SUARIS 2 GRANT AWARD)	Agriculture	Fue, K. (PI), Mbilinyi, B., Sanga, C., Mbungu, W.
Designing a farmers digital information system for sustainable agriculture: The perspective of Tanzanian agricultural stakeholders	Agriculture	Mushi, G.E., Burgi, P.Y., GDM Serugendo
Digital Learning in the Age of Artificial Intelligence: Insights from Selected Higher Learning Institutions in Tanzania	Education	Baynit, M., Mnyanyi, C.B.F., Msoroka, M.S.
Digital technology and services for sustainable agriculture in Tanzania: A literature review	Agriculture	Mushi, G.E., Di Marzo Serugendo, G., Burgi, P.Y.
Emerging assumptions and the future of artificial intelligence in teaching and learning processes in higher learning institutions in Sub-saharan Africa: A review of literature	Education (Higher Learning)	Mwilongo, K. J., Mwageni, R., Matto, G.

Title	Sector	Key Author(s)
Enhancing Access and Utilization of Digital Library Resources using Machine Learning Techniques	Education (Digital Libraries)	Not specified (PhD/Research at NM-AIST, MU, UDSM)
Enhancing Crop Yield Prediction Models using Machine Learning in Internet of -Agro Things (IoAT) in Tanzania [ai 4 more crops project]	Agriculture	Sokoine University of Agriculture (Lead)
Ethical and privacy challenges of integrating generative AI into EHR systems in Tanzania: A scoping review with a policy perspective	Healthcare	Mwogosi, A.
Feature Selection Approach to Improve Malaria Prediction Model's Performance for High- and Low-Endemic Areas of Tanzania	Healthcare	Mariki, M., Mduma, N., Mkoba, E.
Fine-scale mapping of residential land price using machine-learning	Urban Planning, Land Management	Marandu, G. T., Tarimo, B., Mushi, V.
GOVERNANCE OF ARTIFICIAL INTELLIGENCE FOR GLOBAL HEALTH IN AFRICA A Review of Policy and Regulatory Frameworks	Policy & Governance	Alam, U. (Project Lead)
Impact of Disruptive Technologies on the Socio-Economic Development of Emerging Countries: Artificial Intelligence and Legal Liability in Tanzania	Policy & Governance	Ally, A.
Improving the Mkulima Repository Content: Utilizing Theses, Dissertations, and LLMs for Agricultural Knowledge Dissemination in Kiswahili	Agriculture	Telemala, J.P.
Influence of Artificial Intelligence on Selection Stage of Recruitment in Tanzania: A Case of Selected NGOs in Kinondoni Municipality	Human Resource Management	Michael, A., Komba, S., Mbogo, C.
Integration of Artificial Intelligence (AI) with Geographical Information System (GIS) at Institute of Resources Assessment (IRA), UDSM	Resource Assessment, Environmental Monitoring	University of Dar es Salaam (UDSM)
Irish potato imagery dataset for detection of early and late blight diseases	Agriculture	Laizer, H., Mduma, N.
KilimoKipya (AI-driven agricultural decision support)	Agriculture, Finance	UDSM CoICT Incubator (UDICTI) Project

Title	Sector	Key Author(s)
Machine learning based prospect targeting: A case of gold occurrence in central parts of Tanzania, East Africa	Mining, Mineral Exploration	Gawusu, S., Mvile, B. N., Abu, M., Kalimenze, J. D.
Machine Learning Imagery Dataset for Maize Crop: A Case of Tanzania	Agriculture	Mduma, N., Laizer, H.
Mobile-Based convolutional neural network model for the early identification of banana diseases	Agriculture	Elinisa, C., Mduma, N.
Optimum Sampling Plan on Quality Indices AOQL and MAPD	Quality Control	Balan, R. T., Massawe, E.
Prediction of the Rain-fed Maize Yield in Tanzania using Time-series Machine Learning Models (TanPredikt)	Agriculture	Sokoine University of Agriculture (Lead)
Prediction of zero-dose children using supervised machine learning algorithm in Tanzania: evidence from the recent 2022 Tanzania Demographic and Health Survey	Healthcare, Public Health	Asnake, A.A., Seifu, B.L., Gebrehana, A.K.
Prevention of adverse HIV treatment outcomes: machine learning to enable proactive support of people at risk of HIV care disengagement in Tanzania	Healthcare, Public Health	Xie, Z., Hu, H., Kadota, J.L., Mlowe, M., et al.
Review of Sources of Uncertainty and Techniques Used in Uncertainty Quantification and Sensitivity Analysis to Estimate Greenhouse Gas Emissions from Ruminants	Agriculture, Environment	Kimei, E.H., Nyambo, D.G., Mduma, N., Kaijage, S.
Roadmap to Systematic Understanding of Artificial Intelligence Technology Development and Implementation: A Narrative Review of Frameworks, Platforms, Scenarios of Use and Empirical Guide	ICT/AI General	Mutajwaa, S. A., & Didas, M.
Soil Quality Assessment using ML (NM-AIST Initiative)	Agriculture	Researchers at NM-AIST & University of Plymouth
State of agricultural E-government services to farmers in Tanzania: Toward the participatory design of a farmers digital information system (FDIS)	Agriculture	Mushi, G.E., Burgi, P.Y., Di Marzo Serugendo, G.
Tanzania Climate Sensitive Waterborne Diseases Dataset for Predictive Machine Learning	Healthcare, Public Health	Sokoine University of Agriculture (Lead)

Title	Sector	Key Author(s)
TECHNOLOGY LITERACY AMONG PRIMARY SCHOOL TEACHERS FOR ENHANCING NUMERACY AND LITERACY SKILLS OF EARLY-GRADE PUPILS WITH HEARING IMPAIRMENTS IN TANZANIA	Education (Special Needs)	Mtani, H., Kaijage, S., Mduma, N.
The Exploration of Artificial Intelligence Tools and Their Applications in Higher Education Institutions for Information Professionals in Tanzania	Education	Matendo, D., Mutajwaa, F.A.
The Use of Artificial Intelligence in Academic Writing: What is Ethical and What is Not	Education (Higher Learning)	Mwita, K. M., Mwilongo, N. H.
The Use of Artificial Intelligence-Based Innovations in the Health Sector in Tanzania: A Scoping Review	Healthcare	Sukums, F., Mzurikwao, D., Sabas, D., et al.
Unlocking the transformative potential of data science in maternal, newborn, and child health in Africa: a scoping review protocol	Healthcare (MNCH)	Akuze, J., Ngatia, B., Amare, S.Y., et al.
Updating “machine learning imagery dataset for maize crop: A case of Tanzania” with expanded data to cover the new farming season	Agriculture	Mduma, N., Mayo, F.

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