# POLICY BRIEF

**MASAMHA B., MKHONGI F.A., AND SEKHEJANE P.**
JULY 2024

# Strengthening Science, Technology and Innovation (STI) policy to promote gender equity and inclusivity: Artificial Intelligence (AI) policy status in Africa

## Key message

The emerging artificial intelligence (AI) technologies have caught the attention of Africa's economic, environmental, social, and health sectors. The AI Innovation technology is critical for realising societal benefits, particularly with the involvement of women and marginalised groups, such as the youth, who constitute more than 60% of the continent's population. Africa must be adequately prepared regarding gender-mainstreamed policy, skill sets, and diverse access to technology to match AI technology advancement, so that the existing gender inequalities, technology access, and use gaps will not be exacerbated. We recommend the following policy shifts to reduce gender inequalities, and improve the access and use of AI in Africa:

Promote multilateral science-policy dialogues and collaborative community of practice with women and youth quota targets across Africa.

Develop catalytic approaches to building capacity regarding women and youths' skill sets and technological access to leverage AI. These include promoting initiatives, such as ICT and AI technologies teaching in the school curricula. Providing marginalised groups access to computers, software, and internet broadband is a priority for Africa.

Establish a community of practice across Southern Africa, West Africa, East Africa, and North Africa underpinned by pooling of resources and expertise prioritising women and youths through regional economic platforms, such as SADC, ECOWAS, and COMESA, culminating in coordinated and integrated policy-driven interventions

Develop public-private partnership (PPP) models involving public entities, such as the Department of Information, Communication and Digital Technologies and the Department of Science and Innovation. The private sector must include communications and mobile technology service providers and lending institutions, such as banks, to encourage investment in AI initiatives prioritising women and youths'. This is a win-win scenario regarding profiteering for private institutions and ensuring affordable service delivery to the community by the public sector will be achieved.

## Introduction

Achieving the Sustainable Development Goals (SDGs) and Agenda 2063 forms one of the critical imperatives of countries in Africa. Although the 2023 Global Gender Gap Index indicates Namibia has closed approximately 80% of its gender gaps, many African countries still struggle to bridge the gender gap particularly in the Science Technology and Innovation sectors. This is because Science, Technology, and Innovation (STI) are the main drivers that could facilitate the effective achievement of the SDGs since they crosscut almost all sectors of the society and economy (Manasi et al., 2022). An effective STI policy framework has the potential to transform production and promote inclusion and equality among vulnerable and marginalised groups, such as women and youths, while minimising negative economic, social, and environmental impacts (Walsh et al., 2020). If technologies, such as AI, are implemented without gender and youth-sensitive STI policies, it can have negative effects that exacerbate socio-economic and environmental challenges and gaps (Walsh et al., 2020).

The emerging AI technology has been very disruptive in low- and middle-income countries (LMICs), particularly in the labour industry where value chain processes were not previously automated (Fox and Signe, 2021). For instance, AI can be disruptive because robotics may terminate employment in the low-wage assembling and services industry, mostly occupied by women and youths. In addition, developing countries are not only confronted by an under-representation of women in the science environment but also limited resources toward STI goals (UNCTAD, 2011). This gap in gender representation calls for the implementation of gender-sensitive policies that promote equity and inclusivity for a just transformation of STI advancement in Africa. Literature has revealed a minimal gender focus in policies, regulatory frameworks, plans and national development strategies in most African countries. In cases where gender issues are mentioned, they are merely statements of intent with minimal specific information about the target beneficiary and plan of action. Additionally, the policy frameworks do not provide a monitoring and evaluation framework to track progress owing to the paucity of empirical evidence on this subject. The use of AI is mediated by access to technologies, such as computers, software, and internet broadband (Goldenthal et al., 2021). However, the energy crisis currently affecting most African countries provides a major limitation to accessing these technologies. Most remote areas are 'internet deserts' characterised by very limited internet connection in addition to exorbitant internet access prices, which is mostly experienced by women and youths with limited income (Ruand-Martinez and Esparcia, 2020).

To bridge these gaps, this policy brief highlights the need to strengthen national STI policy frameworks in Africa through harnessing gender dividend to embrace the emerging artificial intelligence (AI) technology. One of the critical questions to be addressed is: "What possible technical and infrastructural development initiatives are needed to improve women and youths' inclusivity and equitable access and use of AI in Africa?" Addressing these issues is critical, considering the complexity of AI, data and communications policies as well as the magnitude of AI disruptions in socio-economic, environmental and health sectors in the continent.

To adequately address this important goal, an in-depth literature review was done (see Table 1) with a particular focus on thematic analysis of ICT, digital and technology policies, development plans, regulatory frameworks, and strategies from selected countries in Africa. Information from multi-stakeholder engagements convened in the SADC, COMESA, ECOWAS and North African regions during the June to September 2023 period was qualitatively analysed and incorporated as empirical evidence.

## Contextualising National Science, Technology and Innovation in Africa

Science, Technology and Innovation Strategy for Africa (STISA) 2024 articulates the aspirations of African economic growth reliant on science and innovation. In developing policies for AI in Africa, the continent is faced with a digital divide as only 36% of the population in the continent had broadband internet access in 2022 (World Bank, 2023). The adoption of AI and the creation of an equitable and inclusive environment is critical to social, political and economic development. Countries that are making progress in AI policies (Table 1) include Sierra Leonne, South Africa and Namibia.

*Table 1. Empirical evidence on gender gaps from document analysis on policy, regulatory frameworks, strategies and plans among selected African countries.*

| Country | Policy/Strategy/Development Plan | Gaps |
|---|---|---|
| Sierra Leonne | National Cyber Security and Data Protection Strategy 2017-2022(Draft)[1] | Very limited focus on women and almost no existence of information about youths and those living with disabilities |
| Namibia | Task Force on the Fourth: Industrial Revolution "4IR as an Enabler of Green and Inclusive Industrialisation" Final Report August 2022.[2] | Very limited gender consideration, but the report refers to addressing gender inequalities, racial biases, and income and wealth disparities |
| Nigeria | Nigeria ICT Innovation and Entrepreneurship Vision (NIIEV)[3] | Minimal gender mainstreaming initiatives reported |
| Angola | Angola Science, Technology & Innovation Policy Review (UNDP, 2022)[4] | More women (51%) ventured into entrepreneurship, signifying women empowerment |
| South Africa | No. 4 of 2013: Protection of Personal Information Act, 2013. Government Gazette[5] | No provisions were made to speak to gender in the Act |
| Botswana | Botswana Institute for Technology Research and Innovation Intellectual Property Policy (2018)[6] | No information related to gender mainstreaming |
| Zimbabwe | Zimbabwe National Policy for ICT 2016[7] | Superficial mention of gender mainstreaming |
| Liberia | Liberia Information and Communications Technology (ICT) Policy(2019-2024)[8] | The Liberian ICT Policy (2019-2024) crafted with the objective of driving the inclusion of women and other marginalised groups of people, such as the disabled |
| Mauritius | The Republic of Mauritius Health Sector Strategic Plan (2020-2024)[9] | Inclusion for women and youth provided by The Strategic Plan, but did not speak to AI/ICT aspect |
| Ethiopia | National Science, Technology and Innovation Policy: The Federal Democratic Republic of Ethiopia, October 2010[10] | Gender issues in AI and ICT related policies not well captured in the said policy in Ethiopia |
| Ghana | Data Protection Act, 2012[11] | Gender issues in AI and ICT related policies not well captured in the said policy in Ethiopia |

1. National Cyber Security and Data Protection Strategy 2017-2022. Accessed from https://www.itu.int/en/ITU-D/Cybersecurity/Documents/National_Strategies_Repository/00090_03_Sierra%20Leone%20national-cyber-security-strategy-2017-final-draft.pdf.
2. Task Force on the Fourth: Industrial Revolution. 4IR as an Enabler of Green and Inclusive Industrialisation. Accessed from https://4irnamibia.com/.
3. Nigeria ICT Innovation and Entrepreneurship Vision (NIIEV). Accessed from https://nesgroup.org/download_policy_drafts/Nigeria%20ICT%20Innovation%20and%20Entrepreneurship.
4. Angola Science, Technology & Innovation Policy Review. Accessed from https://unctad.org/publication/science-technology-and-innovation-policy-review-angola.
5. Protection of Personal Information Act, 2013. Accessed from https://www.gov.za/documents/protection-personal-information-act.
6. Botswana Institute for Technology Research and Innovation Intellectual Property Policy. Accessed from https://www.bitri.co.bw/policy-documents/.
7. Zimbabwe National Policy for ICT 2016. Accessed from https://www.bitri.co.bw/policy-documents/
8. Liberia Information and Communications Technology (ICT) Policy (2019-2024). Accessed from https://docs.edtechhub.org/lib/742YQUUN
9. The Republic of Mauritius Health Sector Strategic Plan (2020-2024). Accessed from https://health.govmu.org/health/wp-content/uploads/2023/03/Health-Sector-Strategic-Plan-2020-2024.pdf
10. National Science, Technology and Innovation Policy: The Federal Democratic Republic of Ethiopia. Accessed from https://faolex.fao.org/docs/pdf/eth209515.pdf
11. Data Protection Act, 2012. Accessed from https://www.dataprotection.org.gh/data-protection/data-protection-acts-2012#:~:text=The%20law%20applies%20to%20all,of%20his%20or%20her%20communications.

However, through the introduction of AI robotics, new digital divides may be introduced and low-wage employment, normally conducted by women, could be reduced. Such inconsistent national development strategies undermine women empowerment and halt economic development, as well as the achievement of SDGs (UNCTAD, 2021).[12]

## How should gender be considered in STI policies?

In most developing countries, the STI policies have limited gender considerations and are incoherent with other development policies (Jackson et al., 2022). Gender diversity, equity and inclusion are important for knowledge production, science research and innovation (Love et al., 2022). However, research recognises that the participation of females in STI policy decisions is affected by cultural norms, traditions, male chauvinism, and stereotypes. Due to these complex influences, women, particularly in resource-constrained countries, are often underrepresented (OECD, 2021). Any STI policy, development plan, or report introduced by governments needs to consider questions of equitable gender inclusion: "Does this document promote gender equality?" "Where there are no considerations of gender, how can these gaps be closed?" Participation of women in different sectors of the economy is crucial because women are effective drivers of change, but lack a platform for consideration. Effective integration of gender dimensions in STI policies can be optimised through focusing on (1) science programmes for women, and (2) transformation targets to include women in science and innovation (UNCTAD, 2011).

Science for Women emphasises the development of science and technology, which support women's development and livelihood activities. Thus, using STI could significantly enhance production and services within these sectors. Therefore, the interests of women need to be considered, and women should also be effectively integrated into decision-making, as this could improve access to resources and services. The aspect of women in science is about promoting gender equality in science, technology, and engineering education, careers, and leadership. In sub-Saharan Africa, women's participation and progress in scientific careers are influenced by gender roles and social power relations within families, societies, and academic institutions (Liani et al., 2020). Women in Innovation focuses on encouraging and supporting the role of women in innovation systems at national and grassroots levels.

---

12. UNCTAD (Ed.). (2021). Catching technological waves: Innovation with equity.

## Policy recommendations

African governments need to comprehensively define, strengthen and implement policies focusing on harnessing AI and technology use to promote women and youths' active participation in technological advancement. This will help reduce existing inequalities and mitigate the adverse effects of AI on socio-economic, environment, health, and education systems in a continent where STI policies disproportionately vary and technologically lag across countries. In this policy brief, to address these gaps, we propose the following policy strengthening interventions for Africa:

- Promote regional multilateral science-policy dialogues and intentional collaborative community of practice with women and youth. Driving Science diplomacy initiatives in Africa, through the Department of Science and Innovation (DSI) of South Africa, to deliberately foster scientific collaborations and partnerships for technical expertise advancement is a priority.

- Prioritise women, girls, and youths as deliberate gender equity enabling mechanisms towards AI skills development through resources, such as research funding and STEM scholarships. must. Preliminary regional stakeholder engagements showed that limited access to resources precludes women from active participation in AI related technological advancement.

- Develop gender mainstreamed catalytic approaches for building capacity regarding digital skills set and access to technology to leverage AI. Initiatives, such as ICT and machine learning technologies teaching in school curriculum development and providing computers, software, and internet broadband access to women and youths, need to be emphasised in STI policies. Efficient electricity distribution network and solar power installation to provide energy for technologies, especially in marginal rural communities and vulnerable urban townships, is a priority.

- Establish a community of practice anchored on promoting women and youths' active participation in STI technical and leadership roles across Southern Africa, West Africa, East Africa, and North Africa. We propose the pooling of resources and expertise through regional economic platforms such as SADC, ECOWAS, and COMESA, culminating into coordinated and integrated policy-driven interventions leveraging the AfCFTA.

- Promote public-private partnerships (PPP) to encourage investment in initiatives that prioritise women and youths, thereby attaining win-win scenarios in terms of profiteering for private institutions and ensuring affordable service delivery to the community facilitated by the public sector. The PPP model must be driven by government departments, such as Information, Communication and Digital Technologies, Social Development and the Department of Science, Technology and Innovation. The private sector must include communications and mobile technology service providers and lending institutions, such as banks, to encourage investment in AI initiatives.

## References

Angola Science, Technology and Innovation Policy Review. Available from https://unctad.org/publication/science-technology-and-innovation-policy-review-angola. Accessed on 12 February 2024.

Botswana Institute for Technology Research and Innovation Intellectual Property Policy. Available from https://www.bitri.co.bw/policy-documents/. Accessed on 13 February 2024.

Data Protection Act, 2012. Available from https://www.dataprotection.org.gh/data-protection/data-protection-acts-2012#:~:text=The%20law%20applies%20to%20all,of%20his%20or%20her%20communications. Accessed on 23 February 2024.

Fox, L. and Signe, L. (2021). The fourth industrial revolution (4IR) and the future of work: Could this bring good jobs to Africa? Evidence Synthesis Paper Series 51.

Global Gender Gap Report (2023). World Economic Forum.

Goldenthal, E., Park, J., Liu, S.X., Mieczkowski, H. and Hancock, J.T. (2021). Not all AI are equal: Exploring the accessibility of AI-mediated communication technology. *Computers in Human Behavior, 125*, 106975.

Government AI Readiness Index (2023). Available from https://oxfordinsights.com/ai-readiness/ai-readiness-index/. Accessed on 22 February 2024.

Jackson, J.C., Payumo, J.G., Jamison, A.J., Conteh, M.L. and Chirawu, P. (2022). Perspectives on gender in science, technology, and innovation: A review of sub-Saharan Africa's science granting councils and achieving the Sustainable Development Goals. *Frontiers in Research Metrics and Analytics, 7*, 814600.

Liani, M.L., Nyamongo, I.K. and Tolhurst, R. (2020). Understanding intersecting gender inequities in academic scientific research career progression in sub-Saharan Africa. *International Journal of Gender, Science and Technology, 12*(2), pp. 262-288.

Liberia Information and Communications Technology (ICT) Policy (2019-2024). Available from https://docs.edtechhub.org/lib/742YQUUN. Accessed on 13 February 2024.

Love, H.B., Stephens, A., Fosdick, B.K., Tofany, E. and Fisher, E.R. (2022). The impact of gender diversity on scientific research teams: A need to broaden and accelerate future research. *Humanities and Social Sciences Communications, 9*(1), pp.1-12.

Manasi, A., Panchanadeswaran, S., Sours, E. and Lee, S.J. (2022). Mirroring the bias: Gender and artificial intelligence. *Gender, Technology and Development, 26*(3), pp. 295-305.

National Cyber Security and Data Protection Strategy (2017-2022). Available from https://www.itu.int/en/ITU-D/Cybersecurity/Documents/National_Strategies_Repository/00090_03_Sierra%20Leone%20national-cyber-security-strategy-2017-final-draft.pdf. Accessed on 12 February 2024.

National Science, Technology and Innovation Policy: The Federal Democratic Republic of Ethiopia. Available from https://faolex.fao.org/docs/pdf/eth209515.pdf. Accessed on 13 February 2024.

Nigeria ICT Innovation and Entrepreneurship Vision (NIIEV). Available from https://nesgroup.org/download_policy_drafts/Nigeria%20ICT%20Innovation%20and%20Entrepreneurship. Accessed on 12 February 2024.

OECD (2021). Science, Technology, and Innovation Outlook 2020: Science and Innovation in Times of Crisis. OECD.

Protection of Personal Information Act (2013). Available from https://www.gov.za/documents/protection-personal-information-act. Accessed on 13 February 2024.

Ruiz-Martínez, I. and Esparcia, J. (2020). Internet access in rural areas: Brake or stimulus as post-Covid-19 opportunity? *Sustainability, 12*(22), pp.9619.

Task Force on the Fourth: Industrial Revolution. 4IR as an Enabler of Green and Inclusive Industrialisation. Available from https://4irnamibia.com/. Accessed on 12 February 2024.

The Republic of Mauritius Health Sector Strategic Plan (2020-2024). Available from https://health.govmu.org/health/wp-content/uploads/2023/03/Health-Sector-Strategic-Plan-2020-2024.pdf. Accessed on 13 February 2024.

UNCTAD (2011). Applying a Gender Lens to Science, *Technology and Innovation*. UN.

UNCTAD (Ed.). (2011) UN Gender Science and Technology.pdf. Available from https://unctad.org/system/files/official-document/dtlstict2011d5_en.pdf. Accessed on 12 February 2024.

UNCTAD (Ed.). (2021). Catching technological waves: Innovation with equity.

United Nations Secretary-General's High-Level Panel on Women's Economic Empowerment, (2016). Leave No One Behind—A Call to Action for Gender Equality and Women's Economic Empowerment. New York: UN.

Valenius, J. (2007). Gender mainstreaming in ESDP missions. *Institute for Security Studies*. 1-77.

Wajcman, J. (1991). *Feminism confronts Technology*. Penn State Press.

Walsh, P. P., Murphy, E., & Horan, D. (2020). The role of Science, Technology and Innovation in the UN 2030 agenda. *Technological Forecasting and Social Change, 154*, 119957.

World Bank (2023). From Connectivity to Services: Digital Transformation in Africa. Available from https://projects.worldbank.org/en/results/2023/06/26/from-connectivity-to-services-digital-transformation-in-africa#:~:text=Despite%20improvements%2C%20in%202022%2C%20only,services%20still%20lag%20other%20regions. Accessed on 12 February 2024.

Zimbabwe National Policy for ICT (2016). Available from https://www.bitri.co.bw/policy-documents/. Accessed on12 February 2024.