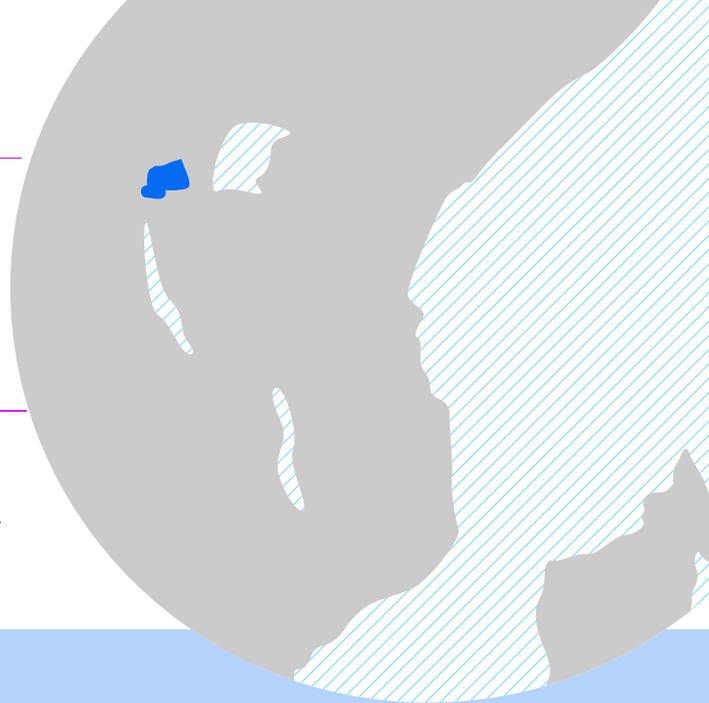

RWANDA

Advancing science through the development of artificial intelligence

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Key takeaways

- Rwanda's government recognizes AI as a key enabler of socio-economic transformation.
- *The National AI Policy* of the Republic of Rwanda identifies science, education, agriculture and health as priority areas for AI deployment.
- Rwanda has made notable strides in establishing the foundation for an AI-enabled scientific ecosystem.
- Rwanda aims to transition from being a technology consumer to becoming a producer of scientific innovation grounded in AI.

In recent years, the Republic of Rwanda has emerged as one of Africa's most ambitious adopters of AI, positioning the technology not just for economic growth but as a vehicle for scientific progress. The *National AI Policy* of Rwanda – with its emphasis on skills development, infrastructure, governance and dedicated partnering hubs – reflects this ambition. This policy, approved in April 2023, articulates the mission 'to leverage AI to power economic growth, improve quality of life and position Rwanda as a global innovator for responsible and inclusive AI' (MINICT, 2023a).

With its clear national policy, targeted investments, enabling institutional frameworks and emerging partnerships, Rwanda has taken a pivotal shift – forging a path in which AI supports research, data analysis, public service delivery and innovation. This offers a strategic path towards the broader goal of a knowledge-based economy that advances scientific capability, fosters innovation and achieves socio-economic development.

Institutional framework

Rwanda's AI ecosystem is still in its early stages but is growing rapidly. Key institutions driving the agenda include the Ministry of ICT and Innovation, the Rwanda Information Society Authority, and the National Council for Science and Technology. These bodies coordinate digital innovation and scientific policy, ensuring alignment with national development goals.

In addition, higher education and research institutions such as the University of Rwanda, Carnegie Mellon University Africa (CMU-Africa) and the African Institute for Mathematical

Sciences (AIMS) in Kigali play vital roles in AI education and applied research. By integrating AI and data science programmes into their curricula, these institutions aim to produce skilled researchers capable of using AI tools for modelling, simulation and data interpretation. Rwanda’s tech hubs Kigali Innovation City and FabLab Rwanda also nurture startups and projects focused on AI applications.

Development of policy and practice

The National AI Policy developed by Rwanda’s Ministry of ICT and Innovation and the Rwanda Information Society Authority (RISA) aims ‘to leverage AI to power economic growth, improve quality of life and position Rwanda as a global innovator for responsible and inclusive AI’. Towards this end, Rwanda has made notable strides.

For example, the University of Rwanda is training students and professionals in AI and data science skills, and has integrated AI and machine learning courses into its curricula. In particular, the Center of Excellence in Data Sciences trains postgraduate students, with combined expertise in statistics, economics, business, computer science and engineering, to use big data and data analytics to solve development challenges. This centre has established a high-performance computer that is used in processing a high volume of data for analytics.

As a result of all its innovations, Rwanda has been ranked highly for AI readiness – placed third in Africa in the 2023 Government AI Readiness Index.



Similarly, the University of Rwanda has established the African Center of Excellence in Internet of Things (ACEIoT) to train African scientists and engineers in developing and deploying innovative Internet of Things-enabled services. The aim is to address development challenges across Eastern and Southern Africa high-priority domains, focusing on innovative, low-cost, open and sustainable solutions, and excel as a focal point for regional and international research collaborations.

This centre also hosts a Transformative Artificial Intelligence Research and Innovation Lab that builds local AI research capacity, tailors AI solutions to Rwanda’s specific challenges in health, agriculture and the environment, and links research to policy and practice. This lab has been established with funds from the International Development Research Centre.

AI is also being integrated into other areas of policy and practice. For example, the National Institute of Statistics of Rwanda in its *Fourth National Strategy for the Development of Statistics (2024–2029)* explicitly emphasizes the ‘intensive use of artificial intelligence for advanced data analysis and innovative data dissemination’ (NISR, 2024).

Further, in March 2025 the Rwandan government announced an initiative to develop 50 AI applications across sectors such as health care, education, agriculture and public administration, signalling a scaling up of applied AI programmes (AIIAfrica, 2025). As a result of all its innovations, Rwanda has been ranked highly for AI readiness – placed third in Africa in the 2023 Government AI Readiness Index. This ranking is partly due to early adoption of a dedicated national AI policy (Mwaura, 2023).

Rwanda's artificial intelligence objectives in scientific systems

- Strengthen the national research infrastructure in order to produce high-quality scientific knowledge, supported by advanced computing, data analytics and AI capabilities.
- Build human capital by ensuring that researchers, scientists and technologists have 21st-century skills in AI, machine learning, data science and interdisciplinary methods. This is evident in *The National AI Policy* which emphasizes 'building 21st century skills and AI literacy' as a central objective (Digital Watch, 2023).
- Modernize data systems by creating open, accessible and secure data ecosystems, and integrating AI into the processing and dissemination of statistical and scientific information (NISR, 2024).
- Support evidence-based decision-making by applying AI tools across public sector research, policy analytics, monitoring and evaluation of programmes, and science–policy interfaces.
- Position Rwanda as a centre of excellence and innovation hub in Africa, thereby attracting international collaborations, research investment, and private sector research and development anchored in the local science ecosystem.

Targets and priorities

For Rwanda, harnessing AI for science means not only applying AI tools but also embedding them into the national research ecosystem, which includes universities, research institutes and governmental agencies, in order to produce home-grown innovation and solutions. Moreover, it means positioning Rwanda as a regional AI innovation hub (Rwanda in Zimbabwe, 2025).

Rwanda has a target of AI contributing up to 6 percent of GDP in the near future, as announced by the Minister of ICT and Innovation (Umusare News, 2025). In addition, *The National AI Policy* emphasizes 'inclusive and sustainable socio-economic transformations' through AI (MINICT, 2023a).

In order to realize these aims, Rwanda has articulated specific priority areas and enablers in its AI policy. These include:

- **Improving skills and AI literacy** by building capacity across schools, universities and professional training, and promoting AI and data literacy more broadly (Digital Watch, 2023).
- **Enhancing infrastructure and computational capacity** by ensuring reliable digital infrastructure, high-performance computing and storage resources to support scientific research and AI workflows (MINICT, 2023a).
- **Strengthening public sector transformation and research adoption** by embedding AI in government research institutions, public science agencies and innovation hubs, and facilitating applied research using AI as a tool (JustAI, 2024).
- **Strengthening private sector acceleration and the innovation ecosystem** by fostering startups, private research–industry partnerships, and applied research and development that uses AI for science and innovation (AllAfrica, 2025).

- **Ensuring ethics, governance and responsible AI** by implementing safeguards to ensure transparency, fairness, data privacy and algorithmic accountability, and aligning with international AI governance frameworks, e.g. *UNESCO's Recommendation on the Ethics of Artificial Intelligence* (UNESCO, 2023).

Challenges

Several challenges hinder the effective advancement of AI-driven science in Rwanda. These challenges span infrastructure, human capacity, data governance, funding and ethical regulation, and include the following:

- **Limited infrastructure and computational resources.** Rwanda has inadequate access to the high-performance computing facilities, data centres and reliable internet connectivity needed for large-scale AI experimentation. Although initiatives such as the Kigali Innovation City and the National Data Centre are under development, capacity gaps remain significant for high-end AI research (RISA, 2022).
- **A shortage of skilled human capita.** Availability of AI researchers, data scientists and machine learning engineers remains limited. While programmes at CMU-Africa and AIMS have begun to address this gap, the overall national talent pool is still insufficient to drive sustained innovation. This shortage affects not only research but also the practical application of AI in key sectors such as health care and agriculture (MINICT, 2023b).
- **Data accessibility and quality issues.** Collecting, curating and maintaining datasets that are diverse, representative and ethically managed remains challenging. A lack of open data policies and standardization frameworks limits the use of AI in scientific studies and innovation projects (RISA, 2022).
- **Limited research funding and collaboration.** Local funding mechanisms for advanced AI research are still evolving. Furthermore, international collaborations are often project-based rather than systemic, leading to short-term impacts rather than sustainable growth (World Bank, 2023).
- **Ethical, legal and policy challenges.** Rwanda's forthcoming AI policy (2024) aims to address issues of data privacy, algorithmic bias and accountability, but a lack of clear enforcement mechanisms and institutional capacity to monitor compliance remains a barrier to responsible AI development (MINICT, 2023a).

Next steps

Looking to the future, a strategic framework for AI-driven scientific advancement in Rwanda should align with the country's Vision 2050 and National Strategy for Transformation – focusing on research excellence, data infrastructure, development of human capacity and ethical governance. It should also encompass Rwanda's broader goal of becoming a regional hub for digital innovation. Specifically, Rwanda should first establish and strengthen AI research and innovation hubs within universities and research institutions to facilitate interdisciplinary collaboration. These centres should focus on sectors where AI can have transformative impacts – such as agriculture, health care, and energy and environmental management. For example, AI can enhance precision agriculture, optimize health care diagnostics, and support evidence-based policy-making through predictive analytics.

Through other innovation and research initiatives, Rwanda should establish partnerships with international AI research labs, develop local AI models (including for local languages and African datasets), target frontier scientific problems and position itself as a regional hub.

Secondly, a robust national data ecosystem is essential. This involves developing secure, interoperable data platforms governed by clear data-sharing protocols and privacy safeguards. The Rwanda Information Society Authority can play a central role in coordinating data governance and ensuring open access to non-sensitive datasets for research.

Thirdly, the development of human capital should be prioritized. Integrating AI and data science curricula across all levels of education can build a workforce capable of innovating and maintaining AI systems. Partnerships with regional institutions such as AIMS and CMU-Africa can accelerate this process by fostering high-level research and mentorship.

Fourthly, ethical and regulatory frameworks must ensure responsible deployment of AI. Rwanda's forthcoming AI policy (2024) emphasizes fairness, transparency and inclusivity – principles crucial to building public trust and international collaboration. Establishing an independent AI ethics council can guide implementation and oversee compliance with national and international standards.

Fifthly, Rwanda can ensure sustainability and global leadership by embedding continuous evaluation and improvement processes into national science–AI strategies, securing diversified funding sources (public, donor and private), contributing to global AI governance, exporting scientific AI innovations, nurturing home-grown AI scientific enterprises, and ensuring that benefits are inclusive and ethical.

Lastly, in operational terms, Rwanda's future framework should include measurable targets (e.g. number of AI-trained scientists, number of AI-embedded scientific research projects and improved scientific metrics), regular monitoring and evaluation, and adaptive governance to keep pace with rapid AI evolution. *The National AI Policy* emphasizes the establishment of a coordinating body to drive such implementation and anchor Rwanda's roadmap (Digital Watch, 2023).

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