

SCIENCE, TECHNOLOGY, & GLOBALIZATION

Rebooting African Development

Science, Technology, and
Innovation Strategy for Africa

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HARVARD Kennedy School
BELFER CENTER
for Science and International Affairs



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Design & Layout by Andrew Facini
Editorial Support by Katherine Gordon

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Printed in the United States of America



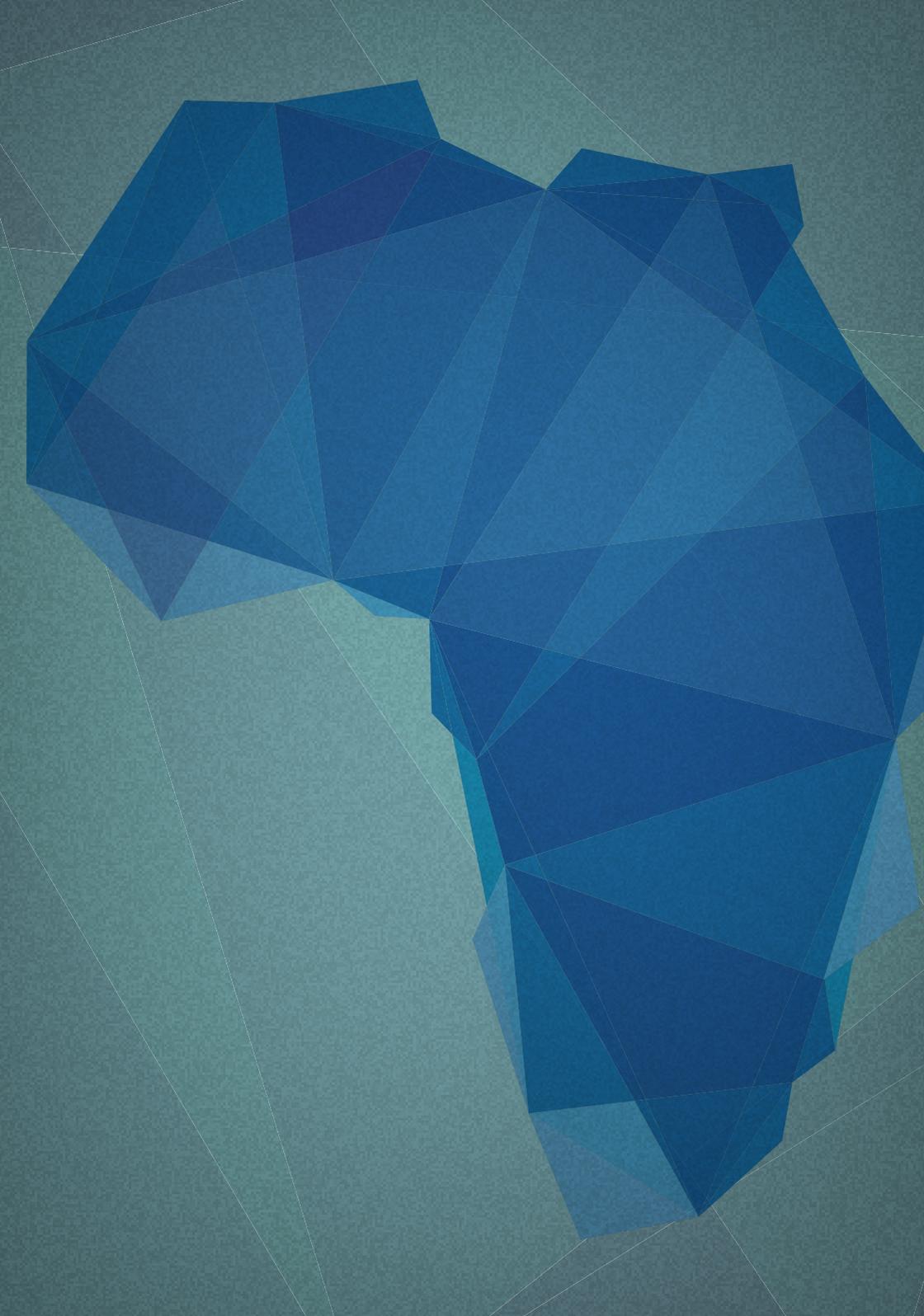
About this Report

Science, Technology, and Innovation for Africa–2024 (STISA–2024) is a popular version of the full report, which was developed as a result of the review of the Africa Science and Technology Consolidated Plan of Action (CPA), following an inclusive participatory process involving policymakers, prominent scientists, and researchers in Africa and in Diaspora, institutions, and organizations including the AU Commission and the NEPAD Agency. Professors Calestous Juma (Harvard Kennedy School) and Ismail Serageldin (Library of Alexandria) co-chaired the 8-member high-level panel that conducted the review. The outcome of the review contributed to the development of STISA–2024.

To read the full report, see African Union, *On the Wings of Innovation: Science, Technology and Innovation for Africa 2024* (Addis Ababa: African Union Commission, 2014).

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Executive Summary

As the African Union develops its long-term agenda 2063 for the continent, science, technology and innovation will play a bigger part in development goal setting, especially in the context of social and economic growth.

In 2014, the African Union established the Science, Technology and Innovation Strategy for Africa 2024 (STISA–2024). It is the first phase of a ten-year strategy that places science, technology and innovation at the epicentre of the African Union’s outlook for the continent as envisioned in its “Agenda 2063.” The strategy aims to address the challenges that hinder development in critical sectors such as agriculture, energy, environment, health, infrastructure, mining, security and water. The strategy is anchored in six distinct priority areas that contribute towards the African Union vision and includes four strategic action areas to be undertaken.

The strategy aims to enhance the implementation of science, technology and innovation programs across the continent through increased technical skills and institutional capacity, promotion of economic competitiveness by fostering entrepreneurship and innovation, stronger protections for intellectual property and improvements to research and innovation infrastructure.

Implementation of STISA–2024 will take place at all three levels in the continent. At the national level, member states should incorporate the strategy into their National Development Plans. At the regional level, Regional Economic Communities, regional research institutions, networks and partners should leverage the strategy to design and coordinate initiatives. At the continental level, the African Union Commission, NEPAD Agency and

partners should advocate and create awareness; mobilize necessary institutional, human and financial resources; track progress; and monitor implementation.

The programs rolled out under STISA–2024 will be monitored and measured regularly. Data analysis, annual reports and regular progress reviews will be important management tools for the entire science, technology and innovation ecosystem in the continent.

While there are conventional mechanisms for funding research, development and innovation in existence, it's essential that STISA–2024 partners establish efficient, effective and coordinated financing mechanisms to implement the strategy. The African Union and its partner institutions will mobilize and coordinate resources to provide technical support to help develop and implement national and regional plans and priority programs. The African Union member states and regional economic groups will take a lead role to mobilize public, private and donor resources to ensure coordinated program implementation.

Introduction

Science, technology and innovation (STI) are vital to Africa's economic and social development. How the continent tackles water shortages, applies new crop growing technologies and adopts innovative methods to fight malaria will be critical to its future growth. The African Union envisages a continent that tackles these issues itself and relies less on foreign assistance.

Africa's sustained growth, competitiveness and economic transformation will therefore require long-term investment in new technologies and innovation in critical sectors such as agriculture, energy, environment, health, infrastructure development, mining, security and water. The continent has made strides to improve STI policy and investment into research and development, but more needs to be done.

To do more, the African Union has established a new ten-year strategy to improve the continent's science, technology and innovation capacity. The plan is called the Science, Technology and Innovation Strategy for Africa 2024 (STISA–2024). Its mission is to “accelerate Africa's transition to an innovation-led, Knowledge-based Economy.” It is part of the long-term people centered AU Agenda 2063 which underpins science, technology and innovation as multi-function tools and enablers to achieve continental development goals, diversification of sources of growth, sustenance of current economic performance, and aims in the long-run to uplift large sections of African citizens out of poverty.

The strategy relies on active engagement by the 54 African Union Member States, all the Regional Economic Communities and several regional and international agencies and development partners. Active participation and engagement will promote

strategic collaboration and partnerships and reduce the risk of failure. The STISA–2024 plan is based on the last seven years of experience working with the previous plan and includes the lessons learnt, good practices and success stories.

The following document provides a template that government officials, the private and public sector and academics can use to improve Africa’s science and technology capacity through the implementation of STISA–2024.

Background

The African Union adopted STISA–2024 in June 2014. It replaces a previous plan called the Consolidated Plan of Action (CPA), which the African Union reviewed five years after it was first implemented. The African Union concluded several barriers to STI development remained that required a new strategic approach.

The African Union review found that there continues to be insufficient funding for programs or too much reliance on external sources that mostly target short-term projects. It also concluded that STI policy makers operate in isolation. There are weak links between the private sector, education institutions and research entities as well as between African and international policy research think tanks.

Weak infrastructure, including low rankings for African universities and lack of competitiveness, is a problem. Additionally, policy makers drafting STI issues require more experience and better access to information. Lastly, bilateral and multilateral partnerships such as the European Union–Africa

Joint Strategy, the India–Africa Science and Technology Initiatives and the China–Africa Science and Technology Partnership should move towards promoting African ownership, accountability and sustainability.

In light of the problems hindering greater STI development, the African Union established STISA–2024 to help countries in Africa be better equipped to tackle barriers to growth and development. The African Union’s aim is for the strategy to address the problems that remain and to provide a framework that is more accessible and adoptable for different governments and regional groupings across the continent.

STISA–2024 is founded on six priority areas vital to Africa’s long-term economic and social health that are in need of STI focus and investment. To advance the six priority areas, STISA–2024 recommends actions be taken in four mutually reinforcing strategic areas that are necessary to improve STI in Africa at the national, regional and continental levels.

Priorities		Key Domain (Illustration)	
1	Eradicate Hunger and ensure Food and Nutrition Security	Water Availability	
2	Prevent and Control Diseases and ensure Well-being	Water Quality	
3	Communication (Physical and Intellectual Mobility)	Water (River regimes)	
4	Protect our Space	Water Cycle	
5	Live Together—Build the Society	Water Availability	
6	Create Wealth	Water Resources	

Political Responsibility

Flagship Programmes

Research Programmes

Scientists, Economic operations,
Private sector, Civil society,
Funding agencies

RECs and Countries Public and
Private research structures

Teams and networks of
researchers with program
Leaders within ASRIC
Scientific Committee

The six priority areas

STISA–2024 is the first of a ten-year incremental phasing strategy to respond to the demand for science, technology and innovation to improve critical development sectors such as agriculture, energy, environment, health, infrastructure, mining, security and water among others. The strategy is firmly anchored on six distinct priority areas that will contribute to the achievement of the AU Vision. These priority areas are shown in the table below.

Priorities		Research and/or innovation areas
1	Eradicate Hunger and ensure Food and Nutrition Security	<ul style="list-style-type: none"> Agriculture/Agronomy in terms of cultivation technique, seeds, soil, and climate Industrial chain in terms of conservation and/or transformation and distribution infrastructure and techniques
2	Prevent and Control Diseases and ensure Well-being	<ul style="list-style-type: none"> Better understanding of endemic diseases: HIV/AIDS, Malaria Hemoglobinopathie Maternal and Child Health Traditional Medicine
3	Communication (Physical and Intellectual Mobility)	<ul style="list-style-type: none"> Physical communication in terms of land, air, river, and maritime routes equipment, infrastructure, and energy Promoting local materials Intellectual communications in terms of ICT
4	Protect our Space	<ul style="list-style-type: none"> Environmental Protection including climate change studies Biodiversity and Atmospheric Physics Space technologies, maritime and sub-maritime exploration Knowledge of the water cycle and river systems as well as river basin management
5	Live Together—Build the Society	<ul style="list-style-type: none"> Citizenship, History, and Shared values Pan-Africanism and Regional integration Governance and Democracy, City Management, Mobility Urban Hydrology and Hydraulics Urban Waste management
6	Create Wealth	<ul style="list-style-type: none"> Education and Human Resource Development Exploitation and management of mineral resources, forest, aquatics, marines, etc. Management of water resources

The centerpiece of STISA–2024 is the development of R&D flagship programs and projects that effectively address each of the six priority areas in an interlinked fashion. According to the implementation phases of this strategy, transformative programs and projects will be developed periodically by the scientific community through the African Scientific Research and Innovation Council (ASRIC) platform. ASRIC is a new organization that the African Union approved in 2014 to help facilitate the advancement of science and technology in Africa. ASRIC will be an umbrella organization for academics from all African Union member states.

Strategic Pillars

Governments and Regional Economic Communities should focus their energy and attention on four key strategic action areas that STISA–2024 designates as necessary pillars to lead to improved STI in Africa. These strategic actions are building and upgrading research infrastructures, enhancing professional and technical competencies, promoting entrepreneurship and innovation, and providing an enabling environment for STI development in the African continent.

Infrastructure Development

The development of Science, Technology and Innovation in Africa requires countries to upgrade scientific laboratories and to establish other world class STI infrastructure. This includes research and innovation facilities such as laboratories for teaching, engineering and clinical trials, teaching hospitals, ICT equipment and infrastructure, Innovation Spaces, Living Labs and National Research and Education Networks (NRENs).

Existing physical and digital infrastructure and resources can be leveraged and connected at national and regional levels to reduce maintenance and operating costs. NRENs will facilitate collaboration between education and research institutions as well as with Innovation Spaces and Living Labs. The collaboration will strengthen the overall research and innovation ecosystem in Africa as well as the scale and quality of training and support for entrepreneurs and other innovators.

Engineering applications will be used to develop and maintain scientific equipment that would allow the conduct of good science. This will require partnerships between scientists and engineers. To develop infrastructure, a human capital base must be trained with the skills to plan, organize, lead, coordinate and ultimately ensure that systems and resources are in place for implementation. Governments will need to take steps to ensure an enabling environment exists to build research innovations.

Technical Competence

African Union member states must continue to expand the availability of quality post-graduate education, and in particular programs that lead to doctoral qualifications. To achieve this goal, member states must take a systematic and coordinated approach to human capital development, and they should popularize science and technology research and innovation as potential career paths at both secondary and higher education levels. Success indicators will be based on comparative annual performance metrics including an increase in the number of Africans trained in STI, an increase in research and innovation output at national and regional levels. Other important measurements include an increase in qualified staff to support expansion of research-intensive Higher Education Institutes and

Technical Vocational Education and Training centres, especially multi-stakeholder centres of excellence on the continent. STI management should be properly resourced in terms of financial and human resources, skills training and knowledge of good working conditions.

Entrepreneurship Development

Governments in Africa should improve networking and collaboration between education and research bodies and between private and public sector stakeholders at both the national and regional level. A commitment to national and cross-border coordination between research and innovation actors will strengthen the socioeconomic situation of the continent through local ownership and wider utilization of research outputs and technology acquisition.

By promoting technology transfers and knowledge sharing governments and regional bodies will stimulate local, national and regional innovation ecosystems. Collaboration and coordination will result in better public services including entrepreneurial innovation based on Open Data, the creation of new economic sectors, wider employment opportunities in the formal economy and commercialization of technologies with regional relevance and global potential.

Enabling Environment

An overall enabling environment for STI must be created by member states. Member states, regional leadership and the African Union need to have evidence-based policies and programs that encourage STI development. Every member state requires a coherent national framework for actions that directly affect the promotion of STI.

Governments should develop national STI programs in consultation with national and regional research and innovation stakeholders from the public, private, education and research, societal, international development and funding sectors. An enabling environment also implies building a comprehensive science and technology research and innovation culture, strengthening legal and regulatory systems to ensure they protect innovation and intellectual property and actively promoting equal opportunity careers in STI research and innovation.

Implementation

The African Union envisions that STISA–2024 will be implemented over four phases at a continental, regional and national level. International and continental development partner institutions such as the African Development Bank and United Nations agencies will collaborate with stakeholders, including civil society and the media, to support successful implementation of STISA–2024. Collaborators will provide financial and technical assistance and help align current and future programs. Partners will also assist the African Union in popularizing the importance of research and innovation in Africa’s development.

The African Union recognizes that member states are at different stages of economic and STI development and will therefore provide support to African countries during the implementation process.

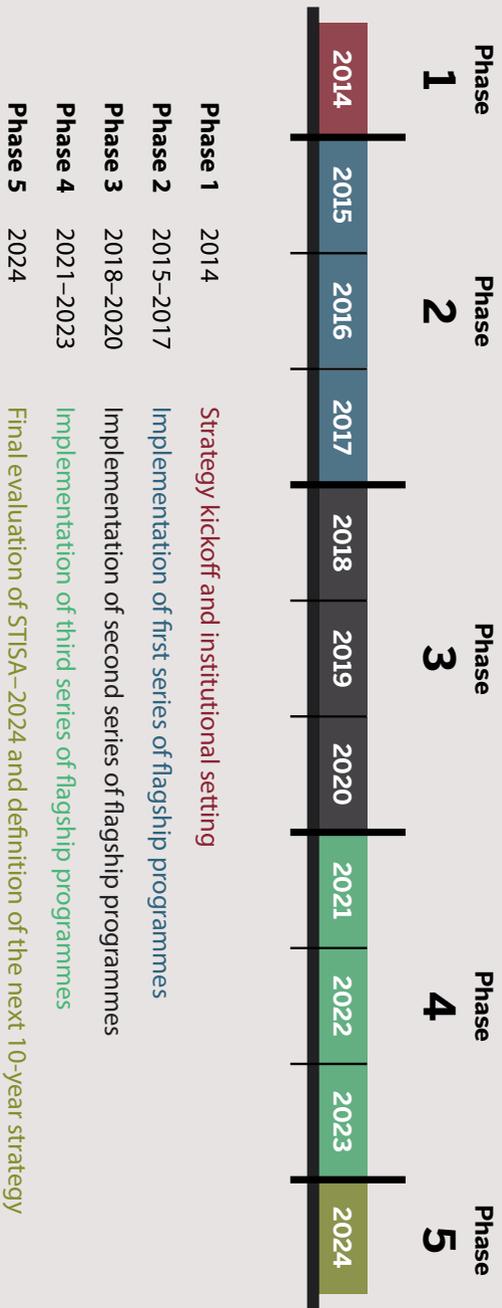
The African Union will also monitor and evaluate each member state by using mutually agreed upon metrics to assess progress in STI readiness of both a country's contribution to and benefits from participation in continental flagship programs used to roll out STISA-2024.

After comparable baseline data has been collected for all member states, the African Union will design and upgrade programs to be applied at national and regional levels to achieve the critical mass required to undertake coherent and efficient STI activity.

African Union member states will provide the leadership necessary to secure active participation and contribution by a critical mass of relevant public, private, education and research, societal, international development, and funding sector stakeholders. Participants will co-design and implement the various flagship programs and initiatives that result from STISA-2024. African Union member states will also coordinate with the African Union Commission and its technical body, and the New Partnership for Africa's Development Agency, to implement the STI strategy and to submit biannual implementation status reports to the Specialized Technical Committee on Education, Science and Technology.

The private sector should work closely with the public sector, education and research organizations, societal groups, and national and international development agencies. The private sector should support the building of necessary capacities and

Detailed Timing of STISA-2024



technical competencies of member states and other continental organizations necessary to achieve STISA–2024 objectives.

The African Union currently oversees bilateral and multilateral cooperation on the continent in regards to STI. It will continue to do so and member states must ensure that South-South and North-South cooperation helps Africa achieve its self-sufficiency goals. Cooperation should be primarily anchored around the African priorities laid out in STISA–2024. The African Union will also continue to strengthen international cooperation and work with Africa’s diaspora to enhance STI development in the stipulated areas.

Implementation Institutions

Member states will mobilize funds, promote active participation and get contributions from the public, private, education and research, societal, international development and funding sector stakeholders to implement the various initiatives emanating from STISA–2024.

Regional Economic Communities should mobilize funding and align regional STI and ICT plans with STISA–2024 by integrating the strategy into other existing or new sectoral development plans and coordinating program implementation at a regional level. They will also coordinate with the AUC and NEPAD Agency to implement the STI Strategy and submit status reports biannually to the Specialized Technical Committee on Education, Science and Technology.

The NEPAD Agency through its Science, Technology and Innovation Hub will support the technical implementation of the program and coordinate resource mobilization. Its specific roles

will include mobilizing and directing technical expertise such as regional and continental networks, mobilizing financial resources for the provision of technical support to implement strategic programs, providing support to the AU’s African Scientific Research and Innovation Council in the development of national and regional strategies and action plans, and providing technical support to the African Union Commission’s policy processes and activities.

The African Union will establish the African Scientific Research and Innovation Council. It will be an operational unit of the Ministerial Conference for Coordination of Flagship Programs and will be responsible for developing key areas and flagship programs. It will support leaders at regional economic community groups and member states with its expertise. The group will meet biannually or annually depending on the regulations the African Union sets. Other African Union bodies that will be involved are the African Observatory of Science Technology and Innovation, the Pan-African University, and the envisaged Pan-African Intellectual Property Organisation.

The private sector will work closely with the public sector, education and research institutes, and national and international development agencies to facilitate technology transfers, commercialize and exploit research and innovation, and support building the necessary capacities and technical competencies required to achieve the objectives of STISA–2024.

Funding

STISA’s successful implementation requires research and development budgets at the national, regional and continental levels. The African Union encourages each member state to take

concrete steps to allocate at least 1% of GDP to research and development according to prior commitments. The African Union will also develop a strategy to mobilize domestic and alternative financial resources to accelerate STISA–2024’s implementation and to reduce overreliance on external resources. STISA–2024 also suggests establishing an African Science and Technology Innovation Fund. The fund would be bankrolled by resources raised from the public and private sectors, as well as funding from organizations inside and outside Africa. STISA–2024 partners should also consider other alternative funding mechanisms.

At the national level, the African Union suggests member states streamline funding for STI and entrepreneurship in their national development strategies and adapt existing STI policies to support implementation of STISA–2024. At the regional level, the African Union encourages Regional Economic Communities to establish regional funds to support existing or new regional centers of excellence that respond to STISA–2024 priority areas as well as cross-border research and innovation collaboration to address common challenges.

Monitoring and Evaluation

STISA–2024 has a monitoring and evaluation mechanism built into its design to enable continuous performance assessment as programs and projects are rolled out by implementing agencies.

The monitoring and evaluation system will do the following: establish comparable baseline and performance metrics; facilitate learning, transparency and accountability; guide the design, implementation and review of policies and programs; enhance the processes of embedding STI in all development sectors; ensure effective communication and build trust among stakeholders; strengthen knowledge generation, management and translation; and support the implementation and coordination of STI programs.

In consultation with national, regional and continental stakeholders, both the NEPAD Agency and ASRIC will define a set of targets and performance indicators. NEPAD will then track a minimum set of performance indicators at the continental level to measure if member states and regional groups are meeting the STISA–2024 priorities. Each member state and regional STI program will incorporate a standardized monitoring and evaluation system to enable comparability.

During biannual reviews, stakeholders will share the lessons learnt, good practices and unintended impacts. These learnings will be documented and used in the next round of policy planning and program development.

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