



STRATEGY FOR GRAND CHALLENGES RWANDA 2023-2028

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Abbreviations and Acronyms

ACEDS	African Center for Excellence in Data Science
ACE-ESD	African Center for Excellence in Energy for Sustainable Development
ACEIoT	African Center for Excellence in Internet of Things
ACEITLMS	African Centre of Excellence for Innovative Teaching and Learning Mathematics and Science
AI	Artificial Intelligence
AU	African Union
AUDA-NEPAD	African Union Development Agency- New Economic Partnership for Africa Development
CEBE	Centre of Excellence in Biomedical Engineering and e-Health
CMU-A	Carnegie Mellon University- Africa
CoEB	Center of Excellence in Biodiversity and Natural Resources Management
EAC	East African Community
EASTECO	East African Science and Technology Commission
FINTECH	Financial Technology
FY	Fiscal Year
GC	Grand Challenges
GCR	Grand Challenges Rwanda
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure on R&D
GIS	Geographical Information System
HIC	High-Income Countries
ICT	Information and Communication Technologies
KIC	Kigali Innovation City
KPIs	key performance indicators
LMICs	Low- and Middle- Income-Countries
M&E	Monitoring and Evaluation
MEL	monitoring, evaluation and learning
MINICT	Ministry of ICT and Innovation
MOU	Memorandum of Understanding
MTEs	Mid-Term Evaluations
NCST	National Council for Science and Technology
NIRDA	National Industrial and Research Development Agency

NIS	National Innovation System
NRIA	National Research and Innovation Agenda
NRIF	National Research and Innovation Fund
NST-1	National Strategy for Transformation-1
PIs	principal investigators
PPPs	Public-Private Partnerships
R&D	Research and Development
RAB	Rwanda Agriculture and Animal Resources Development Board
RBC	Rwanda Biomedical Center
RCESCM	Regional Centre of Excellence for Vaccines, Immunization and Health Supply Chain
RIC-R&D	Rwanda Innovation Challenges for Academia-Industry Research and Development Collaboration Grant
RIF	Rwanda Innovation Fund
RIGMS	Research and Innovation Grant Management System
RISA	Rwanda Information Society Authority
RSB	Rwanda Standards Board
SDGs	Sustainable Development Goals
SFA	Science Foundation for Africa
STI	Science, Technology, and Innovation
STISA	Science, Technology, and Innovation strategy for Africa
THICK	Technology resources, Human capital development, Infrastructure, Collaboration & cooperation and Knowledge resources
ToRs	Terms of References
UGHE	University of Global Health Equity
UR	University of Rwanda
USD	United States Dollar

1. INTRODUCTION

The Rwanda National Council for Science and Technology (NCST) is partnering with national and global stakeholders to develop scientific and technological research leading to improved innovation in Rwanda. This collaboration has the potential to alleviate some of the world's most critical challenges and development issues, especially those identified to be pressing societal needs for Rwanda and Africa. The collaboration will initially be for a period of five years, and delivered under the name '**Grand Challenges Rwanda**'– A program to support global and intra-African research collaborations to strengthen research excellence through increasing research and development (R&D) funding and innovation development in Rwanda. This strategy for Grand Challenges Rwanda highlights among others the priority areas, Strategic Objectives and activities, Fund Mobilization approach and Monitoring and Evaluation.

1.1. Background

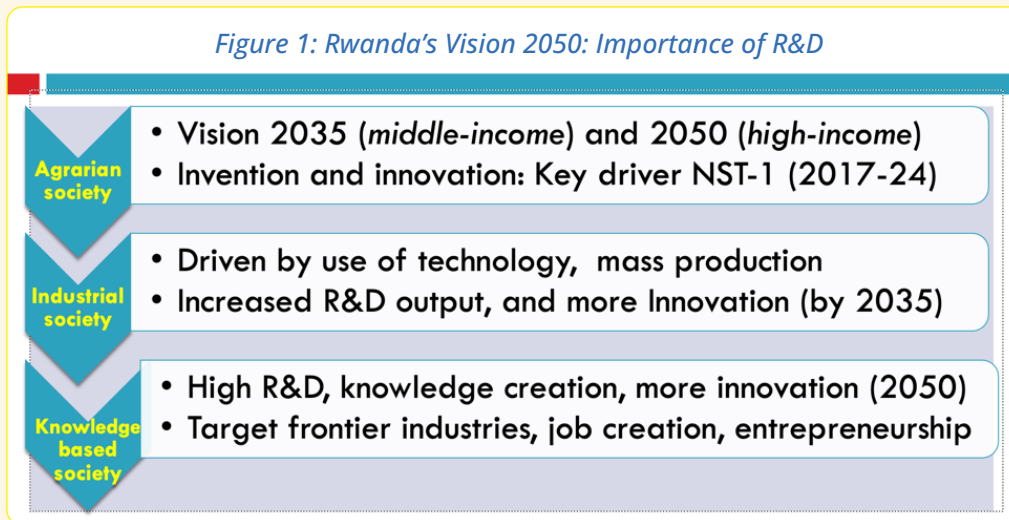
Rwanda has the ambition to leverage the transformative potential of Science, Technology, and Innovation (STI) to position herself as a globally-competitive knowledge-based economy. This strategic orientation is founded on the premise that knowledge is essential to addressing social-economic challenges, and is a crucial driver of growth and competitiveness and is indispensable in achieving high quality of living.

1.1.1. Importance of research and innovation for national development

Science, technology, research and innovation are universally regarded as an engine of economic growth and fundamental to achieving sustainable development. They provide further fundamental tools for transformation of wealth creation, improvement of the quality of life and real economic growth and transformation in any society. The Government of Rwanda through the National Strategy for Transformation-1 (NST-1)¹ and the National Vision 2050² underscores the need for promoting research and development (R&D) and innovation (Figure 1) as key drivers of science, technology, and industrial development for economic transformation. Realizing this vision requires strengthening collaboration and partnership among all stakeholders.

¹ The 7-Years Government Program: National Strategy for Transformation (NST1) 2017-2024.

² Republic of Rwanda, "Vision 2050", https://www.minecofin.gov.rw/fileadmin/user_upload/Minecofin/Publications/REPORTS/National_Development_Planning_and_Research/Vision_2050/English-Vision_2050_Abridged_version_WEB_Final.pdf



Rwanda's ambition to leverage the potential of research and innovation is consonant with regional and international commitments. The UN 2030 Agenda for Sustainable Development Goals (SDGs) highlights the urgent need to move towards new models of growth and development, with more sustainable and inclusive patterns of consumption and production. In particular, research and innovation are the most visible focus of SG#9: "*Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation*", while SDG#9.5 emphasizes on the need to "*enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries by 2030*"³. Moreover, the African Union (AU) STI strategy for Africa (STISA-2024) emphasizes on the needs for Africa to become knowledge-based economies through: "*Building resilient economic growth & promoting sustainable industrialization while fostering innovation*". These regional and global goals are also aligned to the national STI policy⁴ with vision for Rwanda to attain and sustain an innovation-driven society through efficient and effective application of knowledge and technology.

1.1.2. Rwanda's Strategic Investments to foster research and innovation

To ensure that scientific research and technological innovation play a key role in the achievement of the national development goals; there have been several investments and achievements in STI by the Government of Rwanda.

These include, for example, the STI policy; establishments of various science, technology, research and innovation performing institutions such as the University of Rwanda (UR) and affiliated Centers of Excellence, namely the African Center for Excellence in Internet of Things (ACEIoT), African Center for Excellence in Energy for Sustainable Development (ACE-ESD), African Center for Excellence in Data Science (ACEDS), African Centre of Excellence for Innovative Teaching and Learning Mathematics and Science (ACEITLMS), Regional Centre of Excellence in Biomedical Engineering and e-Health (CEBE), Regional Centre of Excellence for

³ Transforming Our World: The 2030 Agenda for Sustainable Development, A/RES/70/1, United Nations

⁴ Science, Technology and Innovation Policy, June 2, 2020. https://www.ncst.gov.rw/fileadmin/user_upload/NCST/Publications/Policies/STI_POLICY_2020.pdf

Vaccines, Immunization and Health Supply Chain (RCESCM), Center of Excellence in Biodiversity and Natural Resources Management (CoEB), Centre of Mental Health, and Centre of GIS and Remote Sensing (GIS).

Further, Rwanda supports renown Universities and Research institutions such as Carnegie Mellon University Africa (CMU-Africa, Rwanda), African Institute for Mathematical Sciences (AIMS-Rwanda), University of Global Health Equity (UGHE, Rwanda), and others. Furthermore, Rwanda established National Research and Innovation Fund (NRIF) as a funding instrument for R&D; established Rwanda Innovation Fund (RIF) to support and boost innovations, and established Kigali Innovation City (KIC) with aim of becoming regional innovation hub to accommodate world-class universities, R&D centers, technology companies, and innovation startups. Moreover, there was the establishment of various institutions to support the development, management and application of STI. These include, the Ministry of ICT and Innovation (MINICT), the National Industrial and Research Development Agency (NIRDA), the Rwanda Information Society Authority (RISA), the Rwanda Agriculture and Animal Resources Development Board (RAB), the Rwanda Biomedical Center (RBC), the Rwanda Polytechnique and the Rwanda Standards Board (RSB), and the National Council for Science and Technology (NCST). As a result, Rwanda is gaining an international reputation as an emerging knowledge hub.

1.2. Rationale and Significance

1.2.1. The Mandate of National Council for Science and Technology

The Rwanda National Council for Science and Technology (NCST) advises the Government of Rwanda among others on matters related to:

- i) Setting priorities and promoting new sectors in the fields of science, technology, research and innovation as well as modalities for funding such activities;
- ii) Mobilizing funds and managing the National Research and Innovation Fund (NRIF) for strengthening R&D performance to harness transformative potential for economic development; and
- iii) Advancing strategic partnership and collaboration at national, regional and international levels to promote science, technology, research and innovation led-growth, inclusion and sustainability.

The NRIF provides merit-based funds to support both public and private sector research and R&D performing institutions. By coordinating research programs in public and private institutions and funding from development partners, the NCST through NRIF promotes well-managed basic and applied research programs aligned with national priority areas as per the National Research and Innovation

Agenda (NRIA)⁵. There has been an operationalization of NRIF through different funding schemes where since 2019 RWFs 4.5 billion have been invested to support more than 106 research and innovation projects.

Although this shows considerable progress in promoting research and innovation in Rwanda, there is a need to avail more resources for research and innovation projects funding. For example, the R&D report reference year 2018/19 indicates that the Gross Domestic Expenditure on R&D (GERD) as a percentage of GDP is 0.69% in comparison to the 1% AU and STISA-2024 proposed R&D investment by African countries. This is in line with the 2022 Global Innovation Index Report, which has indicated that Rwanda performed better in innovation inputs (91st out of 132 countries) than innovation outputs (123rd out of 132 countries). This indicates that there is a need to increase research and innovation funding towards improved R&D performance. This can be addressed through strengthening the cooperation between stakeholders for joint funding programs.

1.2.2 Partnership programs to strengthen research and innovation capacity

As Rwanda continues its transformation agenda to become a knowledge hub through utilization of STI and R&D programs to promote quality of life for Rwandan citizens and support industrialization, the need to strengthen STI and R&D excellence through collaboration with national, regional and international partners is vital, as well as collaboration with global experts in priority areas (as set in the NRIA). This is in alignment with the current STI policy under *objective 3: Increased R&D and Innovation financing*, highlighting the need of engaging national, regional and international partners as well as research foundations and philanthropic organizations for a broad range of funding schemes to support the different levels of technology, research and innovation development, through the strategy “*Increased investments in R&D and Innovation from public and private sector sources*”. Further, the STI policy under *objective 5: “Enhanced International STI Collaboration”*, highlights the need of engaging bilateral, multilateral, regional and international cooperation to strengthen national innovation system (NIS) through the strategy “*Promote strategic partnerships and collaborations*”.

1.3. Grand Challenges

Grand Challenges (GC) was established in 2003 by the Bill and Melinda Gates Foundation at World Economic Forum in Davos, Switzerland. The goal is to fund ground-breaking scientific research on specific unique health challenges in a country using bold mind ideas and innovative solutions. The first decade of progress yielded diverse types of impact, and new challenges continue to be launched. In 2007, the Gates Foundation launched Grand Challenges Explorations

⁵ National Research and Innovation Agenda (NRIA), June 2021, https://www.ncst.gov.rw/fileadmin/user_upload/NCST/Publications/Policies/NCST_National_Research_and_Innovation_Agenda-FINAL_10_06_2021.pdf

to engage more of the world's innovators more quickly through \$100K initial grants addressing a range of challenges.

Evolution of the initial projects over the first ten years confirmed that great ideas come from everywhere. To-date Grand Challenges has made investments in various African countries of >15 million USD. In the period 2015-2020 an additional \$15.9M (more than fifteen million US dollars) has been invested to support research and development programs.

The renewed science innovation and entrepreneurship strategy has resulted in GC having a coordination center at the Science Foundation for Africa (SFA) in Nairobi to coordinate efforts and to identify country-based Grand Challenges as integral for developing innovations on the African continent. Apart from sustainability for the support to scale up of innovations, country-based support can focus on innovations addressing specific priority areas.

1.4. Establishment of Grand Challenges Rwanda

To deliver on Rwanda's ambition to become a high-income economy, Rwanda National Council for Science and Technology, in collaboration with national stakeholders, plan to establish Grand Challenges Rwanda in partnership with global and African partners.

The purpose is for Rwanda to join a growing global network of innovation support and leverage the synergies from members of the Grand Challenges family. There will be collaborations mutual R&D funding and research implementation on ground breaking innovative research projects leading to products and services as unique solutions, and to develop innovations through research exchanges, best practices and experiences with global and African researchers.

Grand Challenges Rwanda prioritizes funding opportunity to high-level quality ideas by researchers and innovators with exciting ground breaking innovative research projects leading to products and services as unique solutions. The emphasis is that research is from evolving industry, companies, academic laboratories and using highly recognized labs, industries, innovation hubs and other relevant settings for practical research to develop research along technology readiness level leading to products and services and transfer knowledge and technology, as well as strengthen the ties between global and African collaborators.

2. STRATEGIC FRAMEWORK

The landscape of the Government of Rwanda's National Innovation System (NIS) continue to be strengthened by several unique high-end strategic investments in science, technology and Innovation (STI) and Research and Development (R&D). The goal is to ensure that advancement in science and technology lead to economic growth by increasing productivity, and that application and use of technology reduce costs and increase service delivery and efficiency. The strategy for Grand Challenges Rwanda is guided a strategic framework to achieve intended vision, mission and strategic objectives in priority areas as illustrated in organizational vision (Figure 2):

Figure 2: Grand Challenges Rwanda Organizational Vision



To achieve intended objectives, Grand Challenges Rwanda will strengthen and leverage on existing national and global partnership to ensure that STI and R&D contribute to social economic transformation of Rwanda and Africa. Grand Challenges Rwanda is committed to utilize robust synergy, collaboration and cooperation with all key players in the national innovation system in Rwanda, Africa and globally.

Improved innovation and technology development is based on strong partnerships between private sector, higher learning, non-for-profit organizations, public institutions and all other stakeholders. The purpose is capitalize on Rwanda's investments in technology resources, human capital development, infrastructure, collaboration & cooperation and knowledge resources (THICK) to support and concrete academia partnership with private sector to advance R&D performance and output towards more innovations. Additionally, all players under National Innovation System (NIS) will continue to ensure optimal networking and cooperation while identifying bottlenecks to solidifying STI programs in order to leapfrog and contribute to national transformation agenda towards 2050.

2.1. Vision, Mission and Values

Vision



To promote excellence and scale of research and development (R&D) leading to innovations as key solutions to national and Africa's development challenges.

Mission



To accelerate innovation growth that improves the quality and high standards of Rwandan and African citizens through mutually aligned sustainable cooperation

Core Values

Grand Challenges Rwanda is committed to ensuring that innovation growth become the standard to address key development challenges affecting Rwanda and other African countries, and shall be guided by the following fundamental core values:

Excellence Grand Challenges Rwanda shall adhere to highest standard of scientific performance in terms of quality and transparency, ensure that best science thrives in an enabling environment, and creating structures that enable knowledge sharing and replication nationally, and within African continent and beyond.

Integrity Grand Challenges Rwanda shall ensure honest, transparency and accountability through use of available resources to maximize intended outcomes and impact, while adhering to highest ethical standards.

Research culture for impact Grand Challenges Rwanda ensure highest commitment to national and intra-African research culture that address key social, scientific, technological related challenges to save the lives of Rwandan and African citizens, as well as foster research culture that promotes required policy, institutional development and professional career development.

Diversity Grand Challenges Rwanda shall ensure that all people are given equal opportunities through respect, fairness and dignity, and shall advance gender equality, and ensure that all people are respected and given equal opportunities regardless of gender, socio-economic status, age and experiences.

2.2. Priority Areas for Rwanda

The 5-year priority areas of Grand Challenges Rwanda are aligned with national priorities as underscored in Rwanda STI Policy.

Through the National Research and Innovation Agenda (NRIA) framework Rwanda focuses on six research and innovation priority areas, namely:

- i) Sustainable energy;
- ii) Food security & modern agriculture;
- iii) Life and health sciences;
- iv) Local production and value addition;
- v) Digital services, products and lifestyles and
- vi) Resilient environment and natural resources.

The goal is to invest in R&D for Rwanda to accumulate value in the form of knowledge, solutions, products, services and high-tech collaborations that are significant inputs to the creation of a knowledge-based economy able to drive national economic transformation and competitiveness. Figure 3 illustrates the six national priority areas.

Figure 3: Priority Areas for Rwanda National Research and Innovation Agenda

Priority Areas for National Research and Innovation in Rwanda Towards Research & Innovation Excellence

1. Sustainable energy

Modern environment-friendly energy sources rather than biomass e.g.: renewable energy, R&D on low carbon, and smart green strategies on the preservation of climate change and healthy environment.

2. Food security & modern agriculture

Agricultural modernization for economic value addition and export to improve economic conditions of citizens; for exports and growing agro-processing industries.

3. Life and health sciences

Disease prevention, control, and treatment; development of new medicines to manage both infectious and non-infectious diseases including neglected diseases; homegrown vaccine and/or advancement of novel vaccine manufacture.

4. Local production and value addition

Improved manufacturing and value addition, entrepreneurship through "Made in Rwanda". Focus on the solidifying mining sector, improved traceability, value addition, and improved exports.

5. Digital services, products and lifestyles

Breaking technological barriers through the application of ICT and emerging technologies; improved digital smart society using robust infrastructures & modern cyberspace security.

6. Resilient environment and natural resources.

R&D and Innovation on green growth and climate resilient strategy and better adaptation to climate change, biodiversity conservation leveraging on big data for better environmental resilience.



2.3. Grand Challenges Rwanda Priorities

During the 5-year period **Grand Challenges Rwanda shall focus mainly on 3 areas** as illustrated in Table 1

Table 1: Grand Challenges Rwanda Priority Areas

Priority Area		Research and Innovation Areas
1.	Food Security and Modern Agriculture	<ul style="list-style-type: none"> - Research on agricultural modernization from subsistent to economic value addition and export to improve living and economic conditions of farmers/citizens - Improved yield increasing exports and growing agro-processing industries - Focus on research and innovation growth that increases the country's food security, while utilizing use of modern & emerging technologies to increase agriculture productivity and efficiency.
2.	Life and Health Sciences	<ul style="list-style-type: none"> - Priority to research and innovation on disease prevention, control and treatment and development of new medicines to prevent and manage both infectious and non-infectious diseases including neglected diseases
		<ul style="list-style-type: none"> - Priority for GC Rwanda in specific areas include home-grown vaccine and/or development and advancement of novel vaccine manufacture as well as development of clinical trials for pharmaceutical discovery. - Global health discovery and emerging climate change and resilient environment studies that mitigate infectious and non-infectious diseases - Studies on African home-grown solutions to resilience to infectious diseases that may lead to epidemics and pandemics - Research and innovation to address child and maternal health - Priority to control of diseases and prevention of epidemics and pandemics through development of vaccines and pharmaceutical infrastructure and capabilities.

3.	Resilient Environment and Natural resources	<ul style="list-style-type: none"> - R&D and innovation supporting green growth and climate resilient strategy as well as low carbon emissions and better adaptation to climate change - Focus on biodiversity conservation and technology as well as atmospheric and climate science that leverages big data for better environmental resilience and understanding prediction of climate change for better preparedness. - Research on determinants of natural hazards that cause agronomic impacts, and recurrent droughts and risks that result in mad and landslides. - Improved climate and environmentally friendly society through use of technology to tackle and address natural hazards
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A cross-cutting priority shall focus on emerging technologies for improved digital smart society using robust infrastructures enabled by firm & modern cyberspace security that is more productive and safer for both lifestyle, industrial solutions. This includes research focusing on big data and data analytics for improved digital consumer market, financial technology (Fintech) ensuring data privacy, security and use and application of advanced emerging technologies.

Research on the 3 GC priorities using emerging technology such as artificial intelligence (AI), robotics, biotechnology, 5G, data science and analytics, nanotechnology, gene editing, 3D printing is encouraged. This contributes tremendous potential for sustainable development through improved innovation and digitalisation that is increasingly optimized to play important role in virtually all sectors.

This GC Rwanda strategy will underscore programs that use of digital frontier technologies to foster technological and R&D excellence in the 3 GC priority areas. This is important to develop technology and innovation resulting in product and services that will transform national economy and modernize the lives of Rwandans and African citizens. Application and diffusion of these technologies are critical pillars for industrial growth and national development.

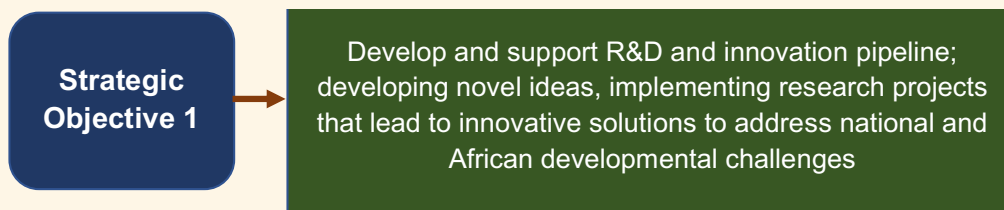
They lead to job creation, urbanization, industrialization, export promotion, environment protection, improved agricultural productivity, ensuring a healthy population, natural resource exploitation, promoting research and development

(R&D), stimulating innovation, as well as developing competitive and capable Rwandans.

2.4. Strategic Objectives and Targets

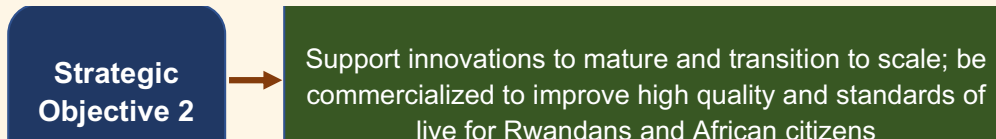
The strategic objectives, priorities and strategic interventions are described below and illustrated in Table 2 on logic framework.

To-date, several R&D projects are funded through various Sectors and line



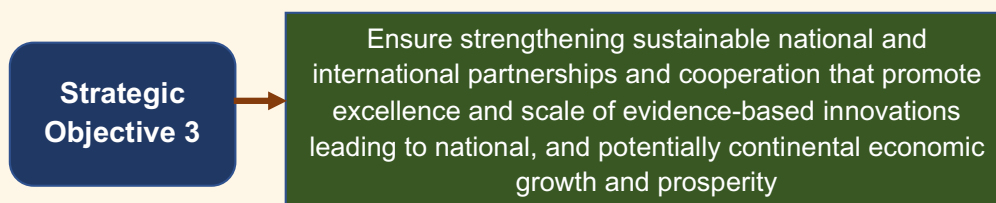
Ministries. In addition, 106 research and innovation projects are funded through National Research and innovation (NRIF) at NCST with over Rwanda Franks 4.5 billion funding commitment. Grand Challenges Rwanda will leverage on Government of Rwanda and development partners funding opportunities and high potential of existing R&D skills and infrastructure to develop and support growth of R&D and innovation pipeline in Rwanda leading to innovative solutions that address national and African developmental challenges by:

- Identifying and supporting novel ideas with proof of concept R&D projects that have the potential to utilize innovative solutions to address a specific national and African developmental challenges.
- Support exploration processes of R&D projects creating and using learning pathways that may lead to proven approaches leading to the potential for commercialization.
- Commitment of resources to support new ideas, and to develop R&D skills and infrastructure dedicated for R&D projects.
- Strengthen scientific research capacity through interactions, dedicated time effort to hands-on training for national and African scientists leading to scientific progress and discovery.
- Raising awareness and engaging diverse national and African scientists, funding institutions, and leaders to understand and advocate for supporting novel R&D ideas.



To strengthen academia-industry collaboration and cooperation on R&D and innovation projects “Rwanda Innovation Challenges for Academia-Industry Research and Development Collaboration Grant (RIC-R&D)” grant scheme is jointly co-funded through the National Research and Innovation fund (NRIF) and Industry or private sector collaboration with at least 20% additional resources financial funding. This funding promotes knowledge transfer partnerships among industry/private sector and academia through funding for R&D and innovation projects leading to innovative solutions in key priority areas. Grand Challenges Rwanda will fund innovative projects with preliminary results and feasibility for scaling up, and potential for commercialization to mature by:

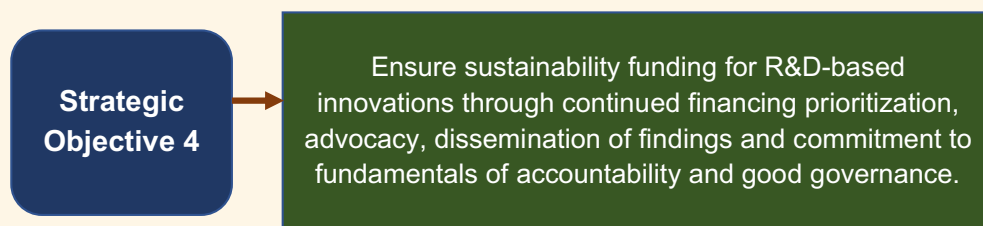
- Providing technical and financial support to projects that demonstrate impactful innovations to continue to transition to scale.
- Create and advocate for pathways that utilize preliminary results as lessons learnt to generate more tangible innovative solutions.
- Provide dedicated resources and skills capacity building to enable improved development, testing of innovations that have commercialization & technology absorption potential.
- Support and strengthen R&D and innovation financing mechanisms to ensure development of novel products transitioned to scale as products (*new goods designed to satisfy the demand of a target audience*) and services and experiences (*such as education, software, and other digital products*).



The global status of science and technology suggests that developed countries and high-income countries (HIC) have advanced scientific outputs, and have greater technology adoption in society, which has resulted in greater economic growth than in low- and middle- income-countries (LMICs). The fourth (4th) Industrial Revolution is shaping global economic development, and technology advancement identified as a key ingredient of growth and economic transformation. The UN Sustainable Development Goals (SGDs) Agenda 2030, specifically SGD #9 underscore the need for development of industrialization,

innovation, and infrastructure. The SDG #9.5 further highlight the need to enhance scientific research and advance the technological capabilities of industrial sectors in all countries. An emphasis is put on developing countries that need to develop, strengthen and encourage innovation growth, and substantially increase the number of research and development (R&D) personnel per one (1) million population. The Government of Rwanda has broad collaborations through bilateral and multi-lateral agreements. Grand Challenges Rwanda will ensure strengthening sustainable national and international partnerships that promote excellence and scale of evidence-based innovations leading to national, and potentially continental economic growth and prosperity by:

- Leveraging on existing bilateral and multi-lateral partnerships to fund projects that utilize R&D-based innovations to enhance value addition, industrialization, and stimulate social- economic growth.
- Developing and strengthening rapid growth of innovation networks nationally, and internationally with development partners and funders to support innovation.
- Supporting specifically R&D based innovative projects using frontier technologies such as artificial intelligence (AI), robotics and gene-editing, 3D printing, 5G internet, Internet of Things (IoT), Data Science and others that will more contribute to economic growth in 2030 and beyond.
- Develop and scale cooperation that enable Grand Challenges Rwanda to thrive in global for more impactful economic opportunities.
- Develop and strengthen collaborations to support R&D based innovations on a) social perspective, digital healthcare and adoption of technology in educational systems b) Smart cities, clean energy and climate-friendly transport are offering alternative models for protecting the environment and c) digital trade and financial technology.



There is a positive association between the Government of Rwanda national development goals and attainment of Grand Challenges Rwanda overall goals. The purpose of Grand Challenges Rwanda is increased R&D funding and innovation, improved research and innovation excellence and industrial development. This is associated with national development goals to nurture best talents of experienced scientists and innovators and leaders that solidify national development agenda.

A sustainable R&D and innovation funding model for Grand Challenges Rwanda is anticipated from the Government of Rwanda funding for R&D and innovation through national funding instruments, as well as through regional and global partner contributions to provide resources for sustainable R&D and innovation development. In addition, it is anticipated that the experienced scientists and innovators will gain competences and skills from collaborating global and African partners to generate R&D funding from grants obtained from international funding sources.

Establishment of Grand Challenges Rwanda will be sustainable as the program will strengthen national R&D and innovation excellence through scaling efforts through linkage with African researchers and Rwandan Diaspora, and to mobilize renown experts in various scientific fields to implement research in Rwanda. Additionally, this will attract different partners in the field of research and academia, philanthropists funding for R&D and innovation, Rwandan Diaspora scientists, global renown scientists and chairs to collaborate and improved R&D excellence in Rwanda. Improved R&D excellence resulting from scaling up collaborations with various partners will contribute to Rwanda becoming an African and global hub for innovation and economic growth.

The Government of Rwanda promotes good governance and accountability, transparency, efficiency in management of government and developmental partners funding. This has resulted in improved service delivery, zero tolerance to corruption and citizens participation in policy and decision-making processes. Grand Challenges Rwanda will ensure sustainability funding for R&D-based innovations through continued financing prioritization, advocacy and commitment to fundamentals of accountability and good governance by:

- Strengthening and advocating for diverse funding incentive mechanisms from public sector, private sector, non-for-profit and from higher learning institutions to fund innovation growth.
- Promoting policies and strategies that enhance private sector and industry contribution to R&D and innovations funding to ensure feasibility, profitability and sustainability of novel innovations to scale.
- Creating home-grown R&D and innovation funding models that ensure sustainability of innovation funding leading to industrial development and resilient economic growth.
- Developing scientific capacity of scientists and innovators, and providing an enabling environment and infrastructure to enable grant funding for R&D and innovation from global funding opportunities.
- Strengthening mechanisms for extensive dissemination of R&D and innovations developed through outreach and community engagement and proactive strategic initiatives with development partners.

- Ensuring accountability, transparency and efficiency, as well as to adherence to rules, regulations, guidelines in management of funding for R&D-based innovations from proof of concept to commercialization and scale of funded projects.

2.5. Activities, Output and Impact

The process of obtaining high impact from Grand Challenges Rwanda will be influenced by several determinants including national political will, and commitment for continuously support R&D funding overtime, development partners contribution, private sector funding for R&D, and cooperation and advocacy from national and international partners. An illustration of impact of GC Rwanda over 5-year period and beyond is in Figure 4.

Figure 4: Impact of Grand Challenges Rwanda over 5-years period and beyond

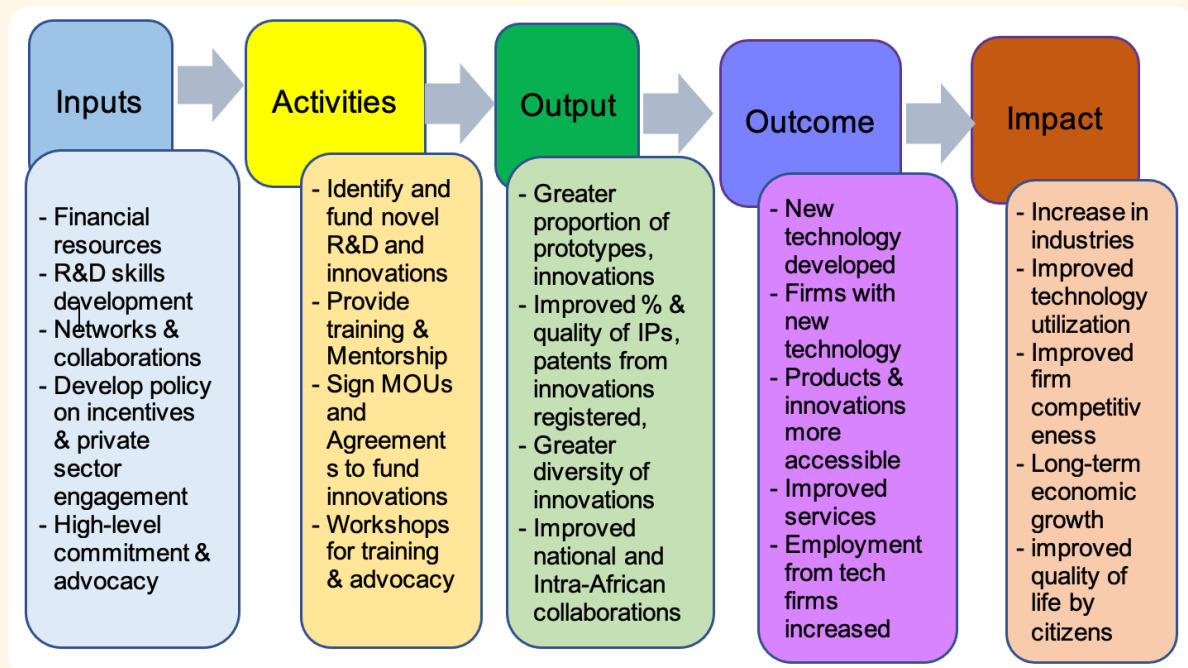


Table 2: Logical Framework

Strategic Objective 1: Develop and support R&D and innovation pipeline; developing novel ideas, implementing research projects that lead to innovative solutions to address national and African developmental challenges.										
Strategic Priority	Expected outcome	Indicators	Strategic Activities	Cost per/ Frw					5-year cost / Frw	
				1	2	3	4	5		
Develop and enhance R&D and Innovation pipeline	New innovation technology developed address national challenges	Firms/industries commercialize new technology	<ul style="list-style-type: none"> Identify and prioritize specific national challenges for funding 	6,000,000		5,000,000				11,000,000
			<ul style="list-style-type: none"> Design programs related to national challenges 	5,000,000	72,000,000	72,000,000	72,000,000	72,000,000	293,000,000	
			<ul style="list-style-type: none"> Fund novel R&D ideas with proof of concept 	6,000,000	200,000,000	200,000,000	5,000,000		411,000,000	
			<ul style="list-style-type: none"> Provide training & Mentorship 		2,000,000				2,000,000	
			<ul style="list-style-type: none"> Sign MOUs and Agreements to fund innovations 	2,000,000					2,000,000	
		Products and services from innovations available								
		Employment from tech firms increased								

Strategic Objective 2: Support innovations to mature and transition to scale; be commercialized to improve high quality and standards of live for Rwandans and African citizens								
Strategic Priority	Expected outcome	Indicators	Strategic Activities	Cost per			5-year cost/Frw	
				1	2	3		4
Support innovations to mature and transition to scale	New products and services available	Firms and industries commercialize new technology	<ul style="list-style-type: none"> Fund innovative projects to mature and scale 	5,000,000	200,000,000	205,000,000	205,000,000	615,000,000
			<ul style="list-style-type: none"> Provide training & Mentorship 	1,500,000				1,500,000
		Employment from tech firms increased						-
Strategic Objective 3: Strengthen sustainable national and international partnerships and cooperation that promote excellence and scale of evidence-based innovations leading to national, and potentially continental economic growth and prosperity								
Strategic Priority	Expected outcome	Indicators	Strategic Activities	Cost per			5-year cost/Frw	
				1	2	3		4
Strengthen sustainable national and international partnerships and cooperation	Sustainable partnerships created to lead to regional continental economic growth and prosperity	Joint collaborative projects funded result address national and African developmental challenges.	<ul style="list-style-type: none"> Fund collaborative national and intra-African R&D projects 	5,000,000	200,000,000	200,000,000	200,000,000	605,000,000
			<ul style="list-style-type: none"> Leverage on existing regional economic communities such as EASTECO to broaden networks to scale of evidence-based innovations 		5,000,000			5,000,000

Strategic Objective 4: Ensure sustainability funding for R&D-based innovations through continued financing, advocacy, dissemination of findings and commitment to fundamentals of accountability and good governance.

	Expected outcome	Indicators	Strategic Activities	Cost per					5-year cost/Frw
				1	2	3	4	5	
Ensure sustainability funding for R&D-based innovations	Increased source of diverse funding for R&D and innovations	Improved number and quality of new technology and innovations available	<ul style="list-style-type: none"> Implement resources mobilization strategies Engage new and broaden collaborations with partners for fund mobilizations 	10,000,000	-	-	-	-	10,000,000
Develop and strengthen dissemination and outreach efforts	New technology and innovation are available and utilized	Increased proportion of awareness activities conducted	<ul style="list-style-type: none"> Develop and implement communication & dissemination strategic activities Link researchers and innovators with relevant institutions for technology adoption and utilization	8,000,000			10,000,000	6,500,000	16,500,000
			TOTAL PER YEAR	48,500,000	679,000,000	682,000,000	502,000,000	88,500,000	2,000,000,000

3. IMPLEMENTATION, COORDINATION AND COLLABORATION

3.1. Governance

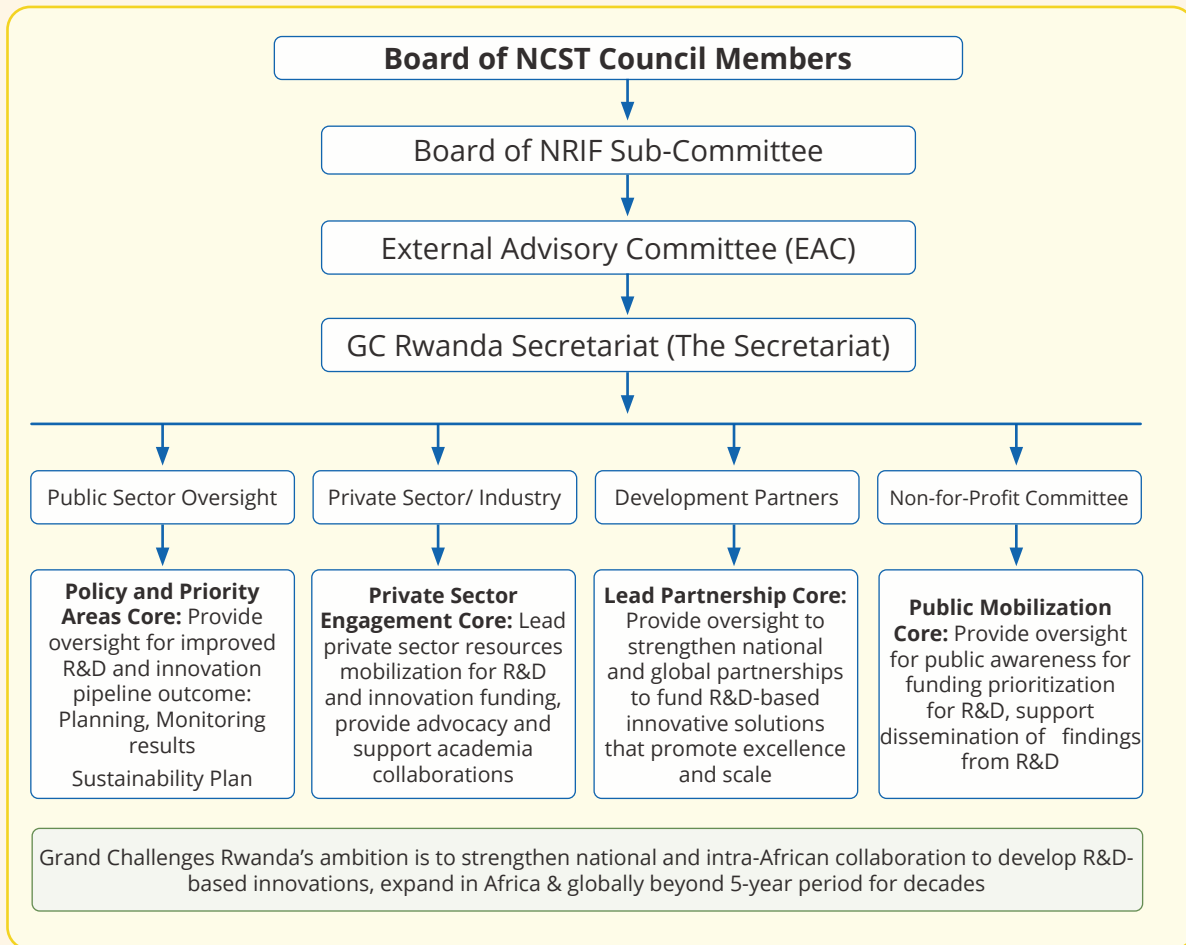
Grand Challenges Rwanda program will be implemented by the NCST with facilitation and implementation of projects by a dedicated team from the Secretariat of the Grand Challenges Rwanda. The Board of NCST Council Members will oversee the overall implementation providing advisory and overall oversight to ensure that GC Rwanda complies with the requisite impact-based outcome as well as accountability, good governance and sustainability of the program. Three Board of NRIF sub-committee that is instituted to provide technical and scientific guidance on research and innovation funded will advise the GC Secretariat on research call priorities, and after technical reviews of the applications, approve recommended research projects for final funding based on budget and national and international prioritization. An external advisory committee comprising of five members from national and global partners, representatives from SFA and AUDA-NEPAD will provide guidance after review of applications. This is a governance committee that will provide technical support from the time of priority areas decisions, formulating the request for applications (RFA), advise on reviewers, and final advisory information to Board of NRIF Sub-committee for final decisions on awards. The external advisory committee will provide technical support throughout implementation for grants awarded.

3.2. Oversight

The Grand Challenges Rwanda shall have a Secretariat for independent and synergic governance and operational processes to accommodate the degree of oversight required by funding and other partners. The Secretariat will implement day-to-day activities of GC Rwanda and will ensure that GC Rwanda complies with all financial procedures, procurement and audit requirements as provided for by national regulations. **The Secretariat will ensure that external advisory committee members provide technical and governance oversight through various meetings on the following:**

- Strategic plan for Grand Challenges Rwanda
- Annual technical plan and budget for the coming year
- Review of the technical report and actual spend of the previous year
- Participate in final funding decision after the formal review process of proposals
- Proposal and review of governance and oversight

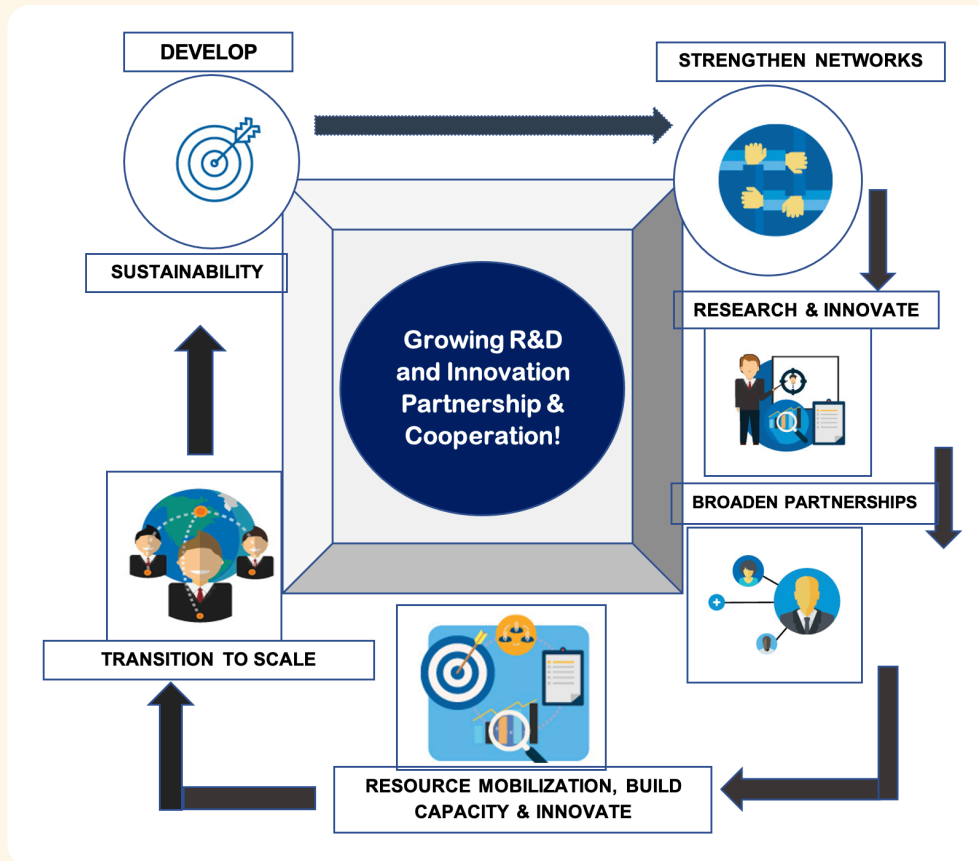
Figure 5: Organizational Structure of Grand Challenges Rwanda



3.3. Partnerships

Grand Challenge Rwanda is committed to sustainable partnership with wide range of partners to develop, accelerate and sustain innovations in order improve the quality and standard of living for national and African citizens. The goal is to ensure that R&D and innovative solutions address national and continental challenges leading to economic growth and prosperity. Therefore, GC Rwanda will continue to explore far-reaching partnerships and cooperation with all relevant stakeholders. Strong and well thoughtful partnerships will be solidified with national and global research institutions, universities, business sectors, funders, philanthropists and other stakeholders to address national challenges under research priorities areas, to create demand for relevancy for innovations pipeline. Figure 6: Illustrates R&D and Innovation partnership and cooperation to support sustainability.

Figure 6: Growing R&D and Innovation Partnerships and Cooperation for Sustainability



Grand Challenges Rwanda will ensure mutual win-win partnerships with the following approach to success:

- i) **Cooperate with existing partners and beneficiaries:** GC Rwanda shall maximize cooperation with existing partners in Rwandan and African institutions through win-win approach so that all partners benefit from cooperation. These include but not limited to those working at various Universities, business sectors, policy institutions and researchers, scientists, innovators and others.
- ii) **Leverage cooperation and collaborations with existing partners from public, private and non-for-profit organizations:** GC Rwanda will always endeavor to engage and cooperate with partners across all sectors and countries in Africa and globally. The goal shall be to leverage on existing efforts, success, research output and innovations attained to scale up results through wide dissemination of findings as well as engaging in novel ideas that potentially have public impact for national development.
- iii) **Share resources and expertise for better and broader impact:** We will utilize and leverage on existing resources through the Government of Rwanda funding to national innovation system i.e., institutions, human resource expertise, policy and frameworks that support R&D

and innovation growth. For instance, through NRIF, over 4.5 billion Rwandan Francs have been committed to funding various types of research, and through Rwanda Innovation Fund (RIF) managed by Rwanda Development Board (RDB) where innovations are funded to be business ventures by providing them with resources and guarantee funds.

- iv) **Growing reputation through results-based performance:** GC Rwanda aims at excellence and rapid growth, as well as good governance and accountability practices. GC Rwanda shall grow reputation. This shall support our collaborative advantage to **build and maintain partnerships and broaden networks for impact.**
- v) **Leverage on Rwanda’s Home-grown solutions:** Rwanda has attained some development and continues to work hard due to prioritization of home-grown solutions such as (a) **Girinka** – “one cow per poor family” since 2006 with more than 183,614 cows distributed; (b) **Gacaca** – “traditional Gacaca courts that were revived as a way to prosecute millions of criminal cases that arose following the 1994 Genocide against the Tutsi”. Gacaca refers to the small community traditional gathering to discuss pertinent issues. Over 1,958,634 cases were handled in 6 years; (c) **Mutuelles de Sante** – “community-based health insurance scheme” > 90% covered; (d) **Imihigo** – “an ancestral cultural practice relating to performance contracts; (e) **Agaciro Development Fund** – “Rwanda’s sovereign wealth fund” set up to build up public savings to achieve: self-reliance; maintain stability in national economic shocks; accelerate socio-economic development Goals; RWF 20.3 bn (23M USD) mobilised per year. GC Rwanda will leverage on existing approach to capitalize on home-grown solutions to use R&D that addresses key national challenges.
- vi) **Unique investment to support R&D and innovation:** GC Rwanda shall build on strong partnerships developed through unique investment in R&D and innovation ecosystem. Several Centers of Excellence at University of Rwanda as well as support from renown Universities and R&D institutions have been established. These institutions in addition to strong STI Policy and other policy frameworks, provide unique environment for innovations to flourish nationally, and also partner with colleagues globally to forge solutions to Africa’s challenges.

3.4. Implementation process

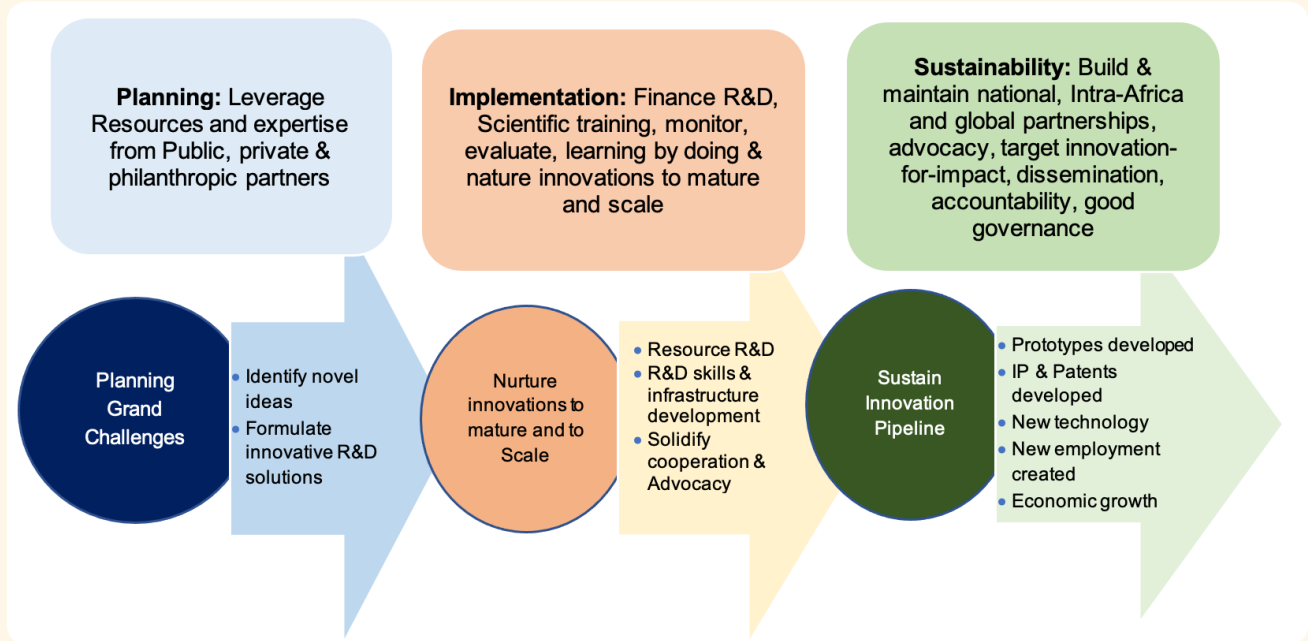
Grand Challenges Rwanda will require financial and human resources, as well as appropriate and concerted collaboration between all national and global stakeholders. For effective and efficient mobilization of resources, the Ministry of Finance and Economic Planning (MINECOFIN) and other national institutions will be required to be brought on board to mobilize and allocate increasing funding for R&D in Rwanda.

Global Grand challenges was formulated to address global challenges in each specific countries, and these developmental problems can be plausibly addressed through coordinated and collaborative efforts. This developed framework will guide future research to provide systematic empirical evidence on the formulation, articulation, and implementation of Grand Challenges Rwanda program. In Africa, there are seven identified challenges that Grand Challenges for Africa is prioritizing. These include Urbanization, Education, Healthcare, Infrastructure, Job Creation, Governance and Climate Change. Implementation of the principal objectives of Grand Challenges Rwanda shall be guided by key principals:

- i) Stimulating the creation, appraisal, promotion and scale up of R&D-based and innovative ideas that solve the critical development challenges, and contribute to achieve Sustainable Development Goals (SDGs) in priority areas. The STI Policy in Rwanda prioritizes six priority areas, namely Sustainable Energy, Food Security and Modern Agriculture, Life and Health Sciences, Local Production and Value Addition, Digital Services products and lifestyle, and Resilient Environment and Natural resources.
- ii) Establish funding for big ideas Bold Minds on research that shall result in technology development and innovation.

The framework in the field of implementing Grand Challenges Rwanda through research and innovations is critical. There is a need to support the implementers, managers, leaders to think more comprehensively about the requirements for change in order to achieve the desired objectives.

Figure 7: Schematic flow for planning and implementing Grand Challenges Rwanda



The financial implications of the Rwanda Grand Challenges will depend on various factors, including the size and scope of the grant programs, the eligibility criteria for applicants, the duration of the program, and the funding sources available to support it.

The following are some potential financial implications:

- i) **Funding:** The most obvious financial implication is the cost of funding it. The program may require significant resources to support it, including staff salaries, administrative costs, and direct costs of the grants themselves. The source of funding may come from government, foundations, corporations, or private donors.
- ii) **Opportunity costs:** The funds allocated to this program may come at the expense of other programs or initiatives. Organizations may need to consider the opportunity cost of investing in the grant program versus other potential areas of investment.
- iii) **Competition for funding:** If the new program offers funding for projects similar to those funded by existing programs, it could reduce the available funding for existing programs.
- iv) **Synergies and complementarities:** If the new grant programs is not designed to complement existing programs, there is a risk of duplication.
- v) **Financial sustainability:** The Grand Challenges Rwanda sustainability shall depend on sustainable financing from all stakeholders, and whose roles may be affected by several factors depending on source of funding, economic crises which may be caused by the different economic actors, and others all are factors which may lead to financial implications of Grand Challenges Rwanda.

- vi) Limitation of grant investing in the specific areas which need to be improved via innovation and developed products.
- vii) The GDP rate in R&D is still low as the social-economic development continue to grow while the NDP emphasis on economic transformation, the private sector needs to invest more in R&D so that the socio-economic development drives by the enablers resulted from the new technologies.
- viii) The donors sometimes grant /financing in socioeconomic development which is not sustainable to the community, the Government need to mobilize the donors for funding in global national problems tackling the community towards sustainable development (Economy based on transformation of local products).

3.5. Resource mobilization

3.5.1. Introduction

The success of the strategy for Grand Challenges Rwanda relies on the availability of adequate resources and funding to implement its various programs and initiatives. Therefore, resource mobilization is a critical aspect of the Strategy for Grand Challenges Rwanda 2023-2028.

In the context of the Grand Challenges Rwanda, resource mobilization involves sourcing, building partnerships, and creating networks to support the implementation of the strategy.

3.5.2. Objectives

The overall objective of the Grand Challenges Rwanda Resource Mobilization is to ensure sustainable resource availability for implementation of the Grand Challenges Rwanda programs.

The specific objectives of the GC Rwanda resource mobilization are to:

- i) Ensure that Grand Challenges Rwanda has a clear, coordinated approach to soliciting and acquiring financial inflows and development cooperation support.
- ii) Enhance the effectiveness of development partners support for GC Rwanda
- iii) Secure funding from diverse sources to support the program's activities and initiatives.

- iv) Identify and engage with potential partners to contribute to the program's mission and objectives.
- v) Build a sustainable funding model for the program's long-term success for 5-years and beyond

3.5.3. Sources of Funding

The Strategy for Grand Challenges Rwanda 2023-2028 should focus on diversifying its resource base to reduce dependence on a single source of funding. Therefore, the Grand Challenges Rwanda program will seek funding from a range of sources, including:

Government: The GCR will seek funding from the Rwandan government. In turn, the government can provide an annual budget or leverage its existing partnerships with development partners, such as the World Bank and other international organizations, to secure funding for the strategy.

Public-Private Partnerships: GC Rwanda will ensure development of innovative financial mechanisms to mobilize private finance through Public-Private Partnerships (PPPs) for shared development goals.

Philanthropic organizations: GC Rwanda will approach philanthropic organizations that support innovative solutions to social and economic challenges.

International development agencies: The program will seek funding from international development agencies that support innovation and entrepreneurship in developing countries.

3.5.4. Resource Mobilization Strategies

The following fundraising strategies will be used to mobilize resources for the program

Grant proposals: The program will develop grant proposals to secure funding from government agencies, philanthropic organizations, and international development agencies.

Corporate partnerships: The program will seek partnerships with private sector organizations that share its mission and vision. These partnerships may involve financial support, in-kind contributions, or employee volunteerism.

Individual donations: The program will seek individual donations through crowdfunding campaigns, online donation portals, and other fundraising initiatives and events.

Event sponsorships: The program will seek sponsorships from companies and organizations for its events, such as workshops and conferences.

3.6. Risk Analysis and Mitigation measures

The Grand Challenges Rwanda will support big and bold research ideas that have high potential for impact, scale, and sustainability and the new research and innovation program will build and leverage on existing strengths and achievements.

The Government of Rwanda through leadership of GC Rwanda is cognizant that in order deliver impact, management of risk to reduce the possibility of failure and ensure that the objectives are accomplished is critical. It is very important to quantify those risks that correlate strongly with higher levels of impact and those that are weakly correlated with impact. The risks can be analyzed and managed at both program and institutional levels.

Table 3: Types of risks and mitigation measures

Program and Projects level		
Type of Risks	Level of impact	Mitigation Measures
Execution Risks	Medium	<ul style="list-style-type: none"> • Proper planning and implementation • Monitoring and control measures • Effective communication for leaders and partners
Innovation Risks	High	<ul style="list-style-type: none"> • Strategic Program structuring if required • Improve capacities, competencies and excellence • Improve collaborations and partnerships
External Risks	Medium	<ul style="list-style-type: none"> • Risk assessment to identify potential hazards that could impact the project. • Develop a contingency plan to manage potential external hazards and ensure all stakeholders are aware of the plan.

Fiduciary Risks	Low	<ul style="list-style-type: none"> Strengthening domestic financial accountability, improve accounting and reporting systems; promote transparency; enhance capacity; mitigate perceived risks Establish and implement Procedures for monitoring performance of an on-going basis
Institutional level		
Type of Risks	Level of impact	Approach to mitigation measures
Reputational	Low	<ul style="list-style-type: none"> Understanding the organization's strategies, initiatives, operations, and risks with the goal of locating risks to reputation Assess risks to reputation from external viewpoints and to gauge baseline reputation
Impact	Low	<ul style="list-style-type: none"> Work in alignment with SDGs, Regional and national strategies, and aim at R&D and innovation excellence and scale to address key developmental challenges (<i>address social-economic, technological and governance challenges</i>)
Governance	Low	<ul style="list-style-type: none"> Implementation and control of institutional processes, practices and rules is key to support success

Measures to risk mitigation: From the inception, Grand Challenges Rwanda will put a strong focus on risk management and mitigation. The approach will be refined and enhanced over the next five years and beyond, under the guidance of various processes. The key elements of the approach to risk management and mitigation will include mainly assessments and reporting. The institution management will analyze the key risks and provides a risk report to the external advisory committee for discussion and immediate action.

GC Rwanda will ensure that mitigation measures within each of the categories of risk are considered. This will involve taking stock of the GC organization's operating environment, and its capacity to deal with significant high-level risks linked to the achievement of objectives at different levels (i.e., institution, program, project). The GC Secretariat will work to review and enhance risk management and mitigation, and provide a report to the external advisory committee.

4. MONITORING, EVALUATION, REPORTING AND LEARNING

4.1. Introduction

Grand Challenges Rwanda underscores the need for effective Monitoring, Evaluation, Reporting and Learning (MERL) system that is critical to the successful implementation of GC Rwanda. During implementation process, Monitoring and Evaluation (M&E) shall be a continuous process that GC Rwanda Secretariat shall use to assess progress made in achieving expected results and key performance indicators (KPIs), as well as assessing challenges encountered during implementation process for informed decision making. The M&E process shall indicate whether planned activities on R&D and innovation projects have been implemented, have had intended impact, and M&E results shall indicate better approach to adjustment of GC Rwanda programs to ensure that the program activities remain on the right trajectory. The processes of planning programs, monitoring and evaluation shall follow results-based approach that shall support improved decision-making towards achieving planned strategic objectives, priorities and strategic interventions. In this strategic for GC Rwanda, regular assessment of the progress made shall be essential to achieve intended results, and shall also include reporting framework, progress report and performance review.

4.2. Monitoring and Evaluation Mechanisms

During implementation, GC Rwanda Secretariat shall use various M&E instruments as mechanisms to assess the extent to which strategic objectives, priorities and planned interventions are on track based on how KPIs are evolving. This shall include the process of implementing action plans, collecting program-specific data on how effective the programs have been implemented based on targets, using verifiable indicators and assessing whether means of verifications have been achieved and/or realized. The assessment shall specifically indicate whether specific outcomes such as improved research outputs, products, inventions or novel technologies have been attained and how many beneficiaries and stakeholders have benefited from the specific strategic objective. The monitoring shall be continuous with results integrated as an essential component of the strategic plan design and strategy. Evaluation shall include assessing specific areas of program implementation and operation (*process evaluation*), as well as assessing the impacts of interventions on outcomes (*impact evaluations*). The GC Rwanda Secretariat shall endeavor that evaluations are carried out by external advisory committee (EAC) as well as independent evaluators to assess what changes in outcomes can be attributed to the planned strategic interventions. Mechanism for M&E have been developed together with key national and international collaborators to enable and encourage participation and increased

ownership of the current 5-year GC Rwanda strategy for 2023-2028 through development of the following structures:

- a) **Performance-based Agreements:** There shall be agreements signed between NCST and institutions of the awardees or principal investigators (PIs) and their Co-PIs from various institutions. These agreements shall have annual work plans based on funded R&D projects. Implementation plans will have well defined activities, annual targets and specific timelines for implementation
- b) **Result Frameworks:** There will be tools developed to organize intended results, i.e.: measurable development changes. Result Frameworks shall inform the development of the M&E plan and both shall be consistent with each results-based monitoring of KPIs;
- c) **M&E Plan:** For all GC Rwanda funded projects, an M&E plan shall be developed as a description of the functions required to gather the relevant data on the indicators and targets, and the required methods and tools to use for evaluation. The M&E plan shall be used to systematically organize the collection of specific data to be assessed, indicating roles and responsibilities of stakeholders on each of the projects based on strategic objectives, priorities and interventions. The M&E shall ensure that relevant progress and performance information is collected processed and analyzed on a regular basis to allow for real-time, evidence-based decision-making;
- d) **Processes and methods for monitoring:** These will include regular input and output data gathering and review, participatory monitoring, process monitoring and for evaluation including impact evaluation and thematic, surveys, analysis of efficiency;
- e) **Data and Information Collection Procedures:** Data and information collection templates and procedures will be developed to measure performance as per the indicators and report to management.
- f) **Management Information System:** There shall be organized data to assist managing key numeric information related to the R&D project funded, and plan and the analysis.
- g) **Supervision:** GC Rwanda Secretariat will carry out supervision of implementation and prepare reports. Findings from the supervision missions will be followed up with appropriate actions taken to improve the specific project.

4.3 Monitoring, Evaluation and Learning Framework

During the 5-year period for GC Rwanda, a monitoring, evaluation and learning (MEL) Framework plan will be developed as a guide for GC Rwanda Projects. The MEL framework will provide mechanism to assess how the objectives are linked to priorities and interventions. At the same time, it will promote learning about R&D innovative and collaborative approaches for GC Rwanda, and all stakeholders' capacity development, including the linkages with African Partners for cross-cutting issues like gender equality in science, as well as scientific approaches to improve projects. **The following are key elements of MEL framework:**

- i) This MEL Framework puts a greater focus on learning, while tracking results and lessons learnt from implementation process to support better and improved approach to planning and optimize implementation, improving monitoring and evaluation (M&E) activities to the next level.
- ii) The MEL Framework consolidates and deepens the GC Rwanda strategic plan focus on results-based management, learning from the experiences of the M&E Framework. Building on the recommendations of the external advisory committee and Board of NCST Council members, more emphasis shall be learning, measuring how results and experiences are shared across GC Rwanda, GC Africa and other stakeholders, and to understanding how the outcomes of the funded projects support Rwanda's vision 2050, other national policies and strategies, as well as alignment with African Agenda 2063.
- iii) The MEL Framework provides a results-based management approach to better manage and support achievements of planned program over the course of the 5-year GC Rwanda Strategic Plan. The M&E learning process strengthens planning, implementation, monitoring, evaluation and reporting, and will also help to identify and integrate lessons learnt into new work plan.
- iv) The MEL Framework undertakes into account: (i) the uniqueness of the GC Secretariat roles and responsibilities, and well as collaborations with national and international partners with similar mandate; and (ii) the relatively unique and moderate demand-driven interventions in national priority areas, and the need to ensure flexibility to address emerging demands for novel R&D projects to be funded.
- v) The MEL Framework aims to achieve a balance between upward accountability and learning. **The key purpose is to:**
 1. *Ensure accountability:* Provide evidence, on a regular basis, on the implementation of this GC Rwanda Strategy, and results and outcomes achieved with the allocated resources.

2. *Compliance with Budget:* Actual results will continually be checked against planned results. If necessary, action plans will be changed so that they are brought in line with the budgeted results or the budget will be amended to take into account new developments that require action.
 3. *Increase learning:* Expand knowledge and improve learning about how the GC Rwanda Secretariat work coordinates all R&D projects and supports intra-Africa collaborations. This includes increased understanding about innovative and cross-cutting approaches to improve R&D and innovation excellence, capacity of relevance to Rwanda's development agenda, aligned to Africa Agenda 2063.
- iv)** In addition, the MEL Framework supports improvement of operations by monitoring the delivery and effectiveness of GC Rwanda Secretariat strategic interventions on an ongoing basis, in areas such as enhancing R&D performance and enhancing collaborations and cooperation with national and international partners to support technology development leading products and services and/or technology adoption. This will support achievement of the accountability and learning objectives, and encourage improvements on reporting and transparency, identification of innovations, and support better decision-making.

4.4. Progress Reports

During implementation of this GC Rwanda strategic plan, reporting on the progress shall be essential M&E process to ensure that timely adjustment to strategic objectives and priorities is done in time. All reporting shall be through Research and Innovation Grant Management System (RIGMS). During reporting an emphasis shall be made to ensuring that M&E assesses achievements of set targets against strategic priorities and specific indicators using agreed upon verification methods. Reporting shall be regularly done on monthly, quarterly and annual basis. After approximately 2.5 years, a mid-term review of the Strategic Plan will be carried out to determine the required adjustments. This report shall guide the implementation of programs during the remaining duration of the Plan. At the end of the implementation process, a terminal or end-term review will be carried out to assess the overall implementation rate and provide critical learning points for the next strategic plan. Reporting on progress of implementation will be done by Planning, M&E Specialist at the Secretariat, with support from other appointed staff. The GC Secretariat shall coordinate reporting to External Advisory Committee as well as the Board of NCST NRIF sub-committee, who will in return provide a report to NCST Council on a regular bi-annual and annual basis. Reports shall be done according to the following schedules:

Table 4: Reporting Schedule

S/N	Report	Responsible person	Submitted to
1	Monthly Report	Program Manager	NCST Senior Management Committee
2	Quarterly Reports	Program Manager	External Advisory Committee (EAC)
3	Bi-annual	Chair, EAC	NCST NRIF Council sub-committee
4	Annual	Chair, EAC	NCST Council
5	Mid-term	Independent reviewer	All Stakeholders
6	End-term	Independent reviewer	All stakeholders

Progress reports shall be prepared and reported to all stakeholders regarding the implementation of funded R&D programs in accordance with the GC Rwanda Secretariat roles. The feedback obtained shall be important to support policy guidance and decision-making as required. Based on strategic objectives and priorities the following are essential determinants of the success of this strategic plan:

- i) Alignment of implemented R&D projects and other related policies and strategies
- ii) Alignment of strategic objectives, strategies, and activities to planned budgets
- iii) Prioritization of R&D programs development and innovation output
- iv) Cooperation and collaborations with national innovation system stakeholders
- v) Effective management and mobilization of funding for GC Rwanda
- vi) Effective community Outreach & dissemination of implemented R&D activities
- vii) Promoting monitoring of R&D performance (adherence to targets/ indicators)
- viii) Effective R&D partnerships to maximize improved National Innovation System (NIS)
- ix) Utilization of R&D data analytics for better decision-making
- x) Improved R&D foresight analyses and reporting
- xi) Solid planning and use of available resources (financial, human and infrastructure)

4.5. Performance Review

Performance reviews shall be done on annual, mid-term and end-term basis. Two different bodies/programs (internal and external) will be involved in performance review. Specifically, the external performance review will be undertaken by external subject matter specialists contracted by independent experts.

- **Annual Review:** At the end of each fiscal year an annual review shall be done on performance against the targets to measure success. An implementation report shall be submitted to both stakeholders for review and feedback and to NCST Council for review and guidance. Performance measures shall include inputs (resources used), outputs (program activities), efficiency measures (relationship of inputs to outputs), and outcomes (the actual results of R&D programs).
- **Mid-term Review:** After approximately two and half years (2.5 years) of implementation of this Plan, a mid-term evaluation (MTEs) shall be carried by an independent assessor/reviewer. A report on status of implementation shall be presented to all stakeholders, presented to stakeholders for review and validation and to the Council and the community. The reviews shall be learning opportunity to inform planned programs to support improved progress going forward. **The following are important questions to support better MTEs outcome:**
 - What objectives have been accomplished so far?
 - How has performance related to objectives measured against the success criteria at the start of each FY?
 - What challenges emerged that had an impact on performance and accomplishment of activities planned?
 - What projects activities still need to be accomplished?
 - Which objectives that are no longer relevant or of high priority? Should they be revised or removed from the priorities list?
 - What new strategic priorities or projects that may be included as new goals?
 - What resources and support will be required to accomplish the goals that remain for the rest of FY?
 - What challenges might hamper performance going forward?
 - What new knowledge, skills, and capabilities shall be required?
 - How can the leadership of the Secretariat support and ensure success?

- **End-term Review:** The end-term evaluation of this strategic plan will be in June 2028 to determine a number of factors related to long-term plans, conclusions and lessons learnt so that the report supports future decision-making. **Although details of the terms of references (ToRs) will be developed the evaluation shall focus on the following overall assessment:**
 - Achievement of programs and activities against set objectives
 - Assess challenges faced
 - Lessons learnt
 - Mitigation factors and measures
 - Determinants of the subsequent Plan
- **Audit Requirement:** For the purpose of accountability, GC Rwanda Secretariat will be audited by internal auditors as well as national external auditors for all programs and activities in general and may also conduct field visit at institutions implementing research projects to monitor the implementation compliance. In addition to that the Office of the auditor General conduct audit according to Rwandan law and agreement signed by funding partners in case it is a funder's a requirement.

5. SUSTAINABILITY

There is a positive association between the Government of Rwanda national development goals and attainment of Grand Challenges overall goals i.e. the purpose of Grand Challenges is increased R&D funding and innovation, improved research and innovation excellence and industrial development. This is associated with national development goals to nurture best talents of experienced scientists and innovators and leaders that solidify national development agenda.

In parallel with the establishment of Grand Challenges Rwanda, and in addition to Government of funding for R&D and Innovation through NRIF, regional and global partner institutions will continue to mobilize resources for R&D funding to contribute directly or indirectly towards establishment of a sustainable R&D funding model. The experienced scientists and innovators will gain competences and skills from collaborating global and African partners to generate R&D funding from grants obtained from international funding sources.

Establishment of Grand Challenges Rwanda will be sustainable as the program will strengthen national R&D and innovation Excellence through scaling efforts through linkage with African researchers and Rwandan Diaspora, and to mobilize renown experts in various scientific fields to implement research in Rwanda. Additionally, the will attract different partners in the field of research and academia, philanthropists funding R&D and innovation, Rwandan Diaspora scientists, global renown scientists and chairs to collaborate and improved R&D excellence in Rwanda. Improved R&D excellence resulting from scaling up collaborations with various partners will contribute to Rwanda becoming an African and global hub for innovation and economic growth.