SCIENCE GRANTING COUNCILS INITIATIVE SGCI IOSRS INITIATIVE DES ORGANISMES SUBVENTIONNAIRES DE LA RECHERCHE SCIENTIFIQUE

EMPOWERING GHANA'S RESEARCH AND INNOVATION THROUGH SUSTAINABLE FUNDING ECOSYSTEM

African Technology Policy Studies Network (ATPS)

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Empowering Ghana's Research and Innovation Through Sustainable Funding Ecosystem

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The African Technology Policy Studies Network (ATPS) is a transdisciplinary network of researchers, policymakers, private sector actors and the civil society promoting the generation, dissemination, use and mastery of Science, Technology and Innovations (STI) for African development, environmental sustainability and global inclusion. In collaboration with like-minded institutions, ATPS provides platforms for regional and international research and knowledge sharing in order to build Africa's capabilities in STI policy research, policymaking and implementation for sustainable development.

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About SRIFA Project

The Science Granting Councils (the Councils) play critical and strategic roles in supporting research and innovation that contribute to the social and economic development of any country. As a creation of the law, the Councils are charged with the responsibility of research funding, quality assurance, policy and decision-making, knowledge exchange, and training/capacity building of the science system actors to ensure that outputs from the research and innovation endeavours are used to inform policy and practice. Given this important role, and in view of the dynamic nature of research and innovation developments, their capacity to perform these responsibilities to achieve desired goals needs to be continuously strengthened. In recognition of this need, the Science Granting Councils Initiative (SGCI) in sub-Saharan Africa (SSA) is providing support that will strengthen the national research and innovation funding agencies in West Africa.

Compared to other regions in Africa, only a few countries in West Africa have established agencies responsible for research and innovation funding. There is now a deliberate effort by the SGCI to strengthen the national research and innovation funding agencies where they already exist (Burkina Faso, Senegal and Côte d'Ivoire) to improve their performances as well as support the development of institutional frameworks/mechanisms for the development of new research and innovation funding agencies in countries where they do not currently exist (Ghana, Nigeria and Sierra Leone). It is based on this timely opportunity provided by the SGCI, that the African Technology Policy Studies Network (ATPS) and its partner, the African University of Science and Technology (AUST) proposed to work together in a joined-up approach with other Collaborating Technical Agencies (CTAs) to deliver on the project titled: ***"Strengthening the National Research and Innovation Funding Agencies in West Africa (SRIFA)".*** The aim is to provide the requisite training and technical support to strengthen the national research and innovation funding agencies or their equivalents in the six participating West African countries. The project goal is to strengthen the agencies where they already exist to efficiently deliver on their mandates and support the development of institutional frameworks/mechanisms for establishing new research funding agencies where they do not exist. With support from the Science Granting Councils Initiative (SGCI), the UK's Foreign Commonwealth Development Office (FCDO), the South Africa's National Research Foundation (NRF), the Swedish International Development Cooperation Agency (SIDA), the German Research Foundation (DFG), and the Norwegian Agency for

Development Cooperation (Norad), the SRIFA Project, therefore, aims to provide training and technical support to strengthen these national agencies to achieve their mandates, especially in areas such as monitoring research projects; financial reporting; institutional risk assessment; institutional communications capacity; mainstreaming gender in granting, Council internal processes; and using research results to inform government policy and private sector practice.

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Acknowledgement

The African Technology Policy Studies Network (ATPS) and its partner, the African University of Science and Technology (AUST) wish to specially thank the International Development Research Centre (IDRC) for partnering with us in this research project titled: "Strengthening the National Research and Innovation Funding Agencies in West Africa (SRIFA)" under the Science Granting Councils Initiative (SGCI). We are particularly grateful to the Cote d'Ivoire's National Fund for Science, Technology, and Innovation (FONSTI) and other stakeholders for their active participation in the project.

Key Messages

- Ghana has established a National Research Fund and committed to allocating 1% of its GDP to research and development. However, actual expenditure falls short of this target. There is a critical need to operationalize and adequately resource the Science, Technology and Research Fund (STREFUND) to drive Ghana's innovation ecosystem.

- There is a weak coordination among various actors in Ghana's research and innovation ecosystem, leading to inefficiencies. The Ghana Research & Innovation Support Programmes Coordinating Office (GRISPCO) should harmonize research programs and promote collaboration among stakeholders.

- There is a low private sector involvement in research and innovation due to various factors. It is important to create a supportive ecosystem that empowers start-ups and SMEs with resources, guidance, incentives, and recognition to foster a culture of entrepreneurship and innovation.

- Ghana has benefited from participating in regional and international initiatives to strengthen its Science Technology and Innovation (STI) system. Continuous engagement with development partners, civil society organizations, and media to enhance research capacity, awareness, and impact is critical.

- There is limited human capital and infrastructure for research and innovation in Ghana. The policy brief should underscore the need for investment in qualified researchers, modern equipment, and reliable data systems to build a robust foundation for research and innovation.

1. Introduction

Ghana, as a lower-middle-income country in West Africa, is navigating a complex landscape of socio-economic challenges including poverty, unemployment, and environmental degradation. To address these issues and achieve the Sustainable Development Goals (SDGs), the nation is increasingly relying on the potential of science, technology, and innovation (STI) as key drivers of economic transformation and growth. However, the effectiveness of STI in contributing to national development is heavily contingent on the strength and efficiency of the research and innovation funding ecosystem. In Ghana, this ecosystem comprises a network of government agencies, private sector actors, academic institutions, civil society organizations, and international partners, each playing a role in the generation, dissemination, and commercialization of knowledge and technologies. Despite the establishment of several policies and institutions aimed at fostering innovation, significant gaps remain. These include inadequate funding mechanisms, limited private sector investment, and insufficient coordination among stakeholders, all of which constrain the ecosystem's ability to fully support long-term, high-impact research projects. The ongoing efforts to enhance this ecosystem, such as the establishment of the Ghana Innovation and Research Centre (GIRC) with assistance from the Science Granting Councils Initiative (SGCI) highlight the country's commitment to improving the governance and funding of research and innovation. However, to realize its ambitious development goals, Ghana must address the existing challenges by optimizing its research and innovation funding mechanisms, aligning them more closely with national and global priorities.

2. Rationale for strengthening the national research and innovation funding agency

Ghana aspires to become a high-income country by 2057 and recognizes research and innovation as crucial enablers for achieving its national development goals and the Sustainable Development Goals (SDGs). However, despite establishing policies and frameworks to support STI, Ghana faces significant challenges in research and innovation funding. The country's Gross Domestic Expenditure on Research and Development (GERD) remains low at 0.4% of GDP (Azuh et al., 2020); which is far below the African Union's target of 1%. This underinvestment, coupled with weak coordination among stakeholders, limited private sector involvement, and inadequate human capital and infrastructure hinders Ghana's ability to leverage STI for socio-economic development. Addressing these challenges is critical for Ghana to harness its potential in research and innovation, drive economic growth, and achieve its vision of "Ghana Beyond Aid."

This policy brief aims to highlight key issues and provide recommendations to strengthen Ghana's research and innovation funding ecosystem; thereby accelerating the country's progress towards its development objectives and positioning Ghana as a leader in STI on the African continent.

3. Methodology

This policy brief was derived from a study on policy and institutional landscape, stakeholder mapping, and needs assessment of research and innovation funding in Ghana. Both qualitative and quantitative data were collected through desk studies, online surveys, key informant interviews, as well as focus group discussions. The respondents were drawn from five stakeholder categories (Government/Policy makers, Nongovernmental organizations/Civil society, Private sector/industry, Research institutions and universities, the Media). The respondents were selected carefully to foster inclusivity and gender balance to ensure that the voice of women and other marginalised groups were heard.

4. Major Findings

Ghana's research and innovation funding ecosystem is shaped by a complex interplay of policies and institutions aimed at harnessing STI for national development.

4.1 Policies and institutions for research and innovation funding

The key policies in Ghana's research and innovation funding ecosystem include a range of initiatives aimed at fostering scientific and technological development to support national growth and sustainable development goals. These policies are central to Ghana's vision of becoming a high-income country by 2057 and achieving the "Ghana Beyond Aid" agenda. These policies and frameworks collectively aim to build a robust STI ecosystem that can drive Ghana's socio-economic development, industrialization, and progress toward achieving its long-term development goals. The National Science Technology and Innovation Policy (NSTIP) of 2012 is the cornerstone framework for research and innovation funding in Ghana. This comprehensive policy emphasizes integrating STI into national planning and developing human capital to address socio-economic challenges. Supporting this framework, the National Research Fund Act of 2021 established funding mechanisms for research projects aligned with national priorities, and is managed by the Council for Scientific and Industrial Research. The implementation of these policies is facilitated through various programs, notably the Science Technology and Innovation Development Programme (STIDEP I), which focuses on technological innovations and skill development for economic growth. This is complemented by the National Entrepreneurship and Innovation Plan (NEIP), launched in 2017, which provides crucial support services and funding for start-ups and small businesses, with particular attention to youth and women entrepreneurs.

The country's industrial development is guided by Ghana's Industrial Policy of 2011, which works in tandem with the National Intellectual Property Policy and Strategy of 2016 to promote innovation, technology transfer, and IP commercialization. The Ghana Research & Innovation Support Programmes Coordinating Office (GRISPCO) plays a vital role in harmonizing these various initiatives and facilitating access to funding. With a strong focus on sustainable development, Ghana has developed the STI for SDGs Roadmap, which specifically targets solutions in agriculture, health, education, and job creation. Education and skills development are further supported through the Ghana Education Service Strategic Plan (2018-2022) and the Ghana Skills and Technology Development

Fund, established in 2011. These initiatives collectively work to enhance technical skills, support vocational training, and improve the employability of Ghanaian youth while fostering the growth of small and medium enterprises.
Some key institutions play critical roles in Ghana's research and innovation funding landscape, with the Ministry of Environment, Science, Technology, and Innovation (MESTI) serving as the primary governmental authority. MESTI plays a crucial role in formulating and implementing STI policies while ensuring their integration into national development plans. The ministry also manages bilateral funding calls and collaborates with other governmental bodies to establish research and innovation funding mechanisms, including the Science Technology and Research Fund. Working alongside MESTI, the Council for Scientific and Industrial Research (CSIR) stands as Ghana's largest public research institution. CSIR manages the National Research Fund and conducts research across multiple sectors, making it a central pillar in the country's innovation system. The coordination of research and innovation support programs is further enhanced by the GRISPCO, an independent entity that harmonizes various initiatives and facilitates funding access while monitoring research impacts. The financial backbone of research and innovation development in Ghana is strengthened by the Ghana Education Trust Fund (GETFund), which dedicates a portion of its resources to support STI programmes and scientific human resource development. This includes funding for educational infrastructure and research initiatives. Adding to this institutional framework is the Ghana Academy of Arts and Sciences (GAAS), which promotes excellence in STI through recognition of outstanding achievements while serving as both a thought leader and advocate for research and innovation policies.

Other institutions include the National Development Planning Commission (NDPC) which is responsible for integrating STI into national development planning, the NDPC ensures alignment with broader national goals such as "Ghana Beyond Aid" and Agenda 2057. The Ghana Atomic Energy Commission (GAEC). GAEC Oversees research and innovation related to nuclear energy, focusing on the safe application of nuclear technology in Ghana. Key players in the research ecosystem include the University of Ghana, Kwame Nkrumah University of Science and Technology (KNUST), and GIMPA, which conduct research, train STI professionals, and collaborate on national and international research projects. The Council for Technical and Vocational Education and Training (CTVET) manages funds from donors to support technical and vocational education, contributing to skill development and entrepreneurship. International organizations like UNESCO and the World Bank provide financial and technical support, facilitating partnerships and the implementation of STI policies in Ghana.

Despite these policies and initiatives, the research and innovation funding ecosystem of Ghana faces challenges such as inadequate budgetary allocation, low private sector involvement, weak coordination among stakeholders, and limited human capital and infrastructure. However, opportunities exist through strengthening institutional capacities, enhancing private sector participation, and fostering collaboration with international partners and civil society organizations.

4.2 Stakeholders in the research and innovation funding ecosystem

The research and innovation funding ecosystem of Ghana involves a diverse array of stakeholders, each playing a crucial role in supporting, conducting, regulating, facilitating, and benefiting from research and innovation activities. These stakeholders include government bodies, development partners, academic institutions, the private sector, civil society, and end-users. The government of Ghana is a central player in the research and innovation ecosystem. It promotes policies, provides funding, and establishes institutions that support research and innovation. Key government entities include: MESTI which oversees the formulation and implementation of STI policies. The Ministry of Finance plays a crucial role in budget allocation and financial planning for research and innovation while the NDPC integrates STI into national development plans. The Ministry of Food and Agriculture is also involved in research funding, especially in the agriculture sector. These government stakeholders work assiduously to ensure an efficient ecosystem for research and innovation in Ghana. MESTI wields a high influence in the ecosystem, setting out research priorities and engaging with other stakeholders to promote research and innovation.

Some development partners provide financial and technical assistance to support Ghana's research and innovation ecosystem. They are instrumental in funding large-scale projects and supporting capacity building. Prominent among development partners is the World Bank which provides substantial funding for digital transformation and innovation initiatives. UNICEF supports digital public goods and initiatives aimed at achieving the SDGs while African Development Bank (AfDB) provides funds for projects related to agricultural research and innovation. Academic and research institutions in Ghana conduct a significant amount of research and innovation activities, often collaborating with government agencies, the private sector, and international organizations. Key research institutions include the University of Ghana, KNUST, University of Cape Coast, CSIR. Institutions like KNUST and CSIR have high power and influence, being at the forefront of research and innovation that contributes to sustainable development.

The private sector is involved in providing funding, developing innovative products, offering support services, and acting as intermediaries and end-users. Examples of private sector actors is the Venture Capital Trust Fund (VCTF) which provides financial resources for research and innovation activities. Ghana Innovation Hub facilitates collaborations among research and innovation actors. Some Civil Society Organizations in Ghana are engaged in identifying research needs, conducting research, disseminating findings, and advocating for policy changes. They play a crucial role in ensuring that research and innovation address the needs of various communities and sectors. While not as powerful as government or large development partners, CSOs contribute significantly to the inclusivity and relevance of research and innovation in Ghana, particularly in aligning projects with community needs and sustainable development goals. End-users, including farmers, students, and health workers, are the beneficiaries of research and innovation outputs. Their feedback and needs are critical in shaping research priorities and the development of innovations that address real-world challenges.

The stakeholders in Ghana's research and innovation funding ecosystem are interconnected, each with distinct roles and levels of influence. The government provides the policy framework and financial resources, while development partners and the private sector offer additional funding and technical support. Academic institutions are key to conducting research and generating knowledge, whereas CSOs ensure that research and innovation meet societal needs. End-users are the ultimate beneficiaries, driving demand for relevant and impactful innovations. Together, these stakeholders form a complex but collaborative network that aims to advance Ghana's development through science, technology, and innovation.

4.3 Capacity needs of the research and innovation funding agency

The training needs identified for strengthening Ghana's research and innovation funding agencies focus on several key areas. The highest priority is fundraising and grantsmanship, as these skills are essential for staff to fulfil the core mandate of securing and managing funds. Grant administration, including online management and equitable disbursement, is the second priority, emphasizing efficient coordination. Training in quality assurance and research ethics ensures adherence to standards, while financial reporting systems training promotes transparency and accountability. Monitoring and evaluation, gender-responsive data collection, and safeguarding intellectual property rights are also critical to ensure inclusiveness, proper implementation, and commercialization of research outputs.

The technical supports identified for strengthening Ghana's research and innovation funding agencies prioritize several key areas. Benchmarking and learning visit to successful Councils in Africa is ranked highest to ensure staff adopt best practices. Advocacy for increased research and innovation funding from policymakers and parliamentarians is the second priority, essential for securing sustainable funding. High-level stakeholder engagement workshops are also needed to develop institutional frameworks for the Ghana Council.

Additionally, strengthening international collaborations and partnerships will provide alternative funding models, while creating physical and online knowledge-sharing platforms is crucial for improving information management. Lastly, developing strategic STI documents, such as policies and implementation strategies, is critical for engaging policymakers and enhancing the effectiveness of projects.

4.4 Challenges and Opportunities for research and innovation funding

The research and innovation funding ecosystem in Ghana faces several challenges that hinder its effectiveness and the broader impact of scientific and technological advancements. Here are five key challenges:

-Inadequate Budgetary Allocation and Disbursement: Despite Ghana's commitment to allocating 1% of its GDP to R&D as part of the African Union's Science, Technology, and Innovation Strategy for Africa (STISA-2024), the actual expenditure remains far below this target. According to the UNESCO Institute for Statistics, Ghana's gross domestic expenditure on R&D (GERD) was only 0.38% of GDP in 2018. This low level of funding severely limits the ability of researchers and institutions to undertake significant research projects, develop new technologies, and contribute to national development goals. Even when funds are allocated, the disbursement process can be slow, further delaying research activities.

-Low Private Sector Involvement and Investment: The private sector in Ghana shows limited involvement in and investment in research and innovation. Contributing factors include the high risk associated with R&D, low expected returns, weak intellectual property rights protection, and limited access to finance and markets. The lack of private sector engagement means that there is less funding available for innovation, particularly in areas where private investment could drive commercialization and the scaling of new technologies. This also results in a missed opportunity for industry-driven research that could have immediate market applications.

-Weak Coordination Among Stakeholders: The research and innovation ecosystem in Ghana suffers from weak coordination among various actors and stakeholders, including government agencies, universities, research institutes, civil society organizations (CSOs), and the private sector. This lack of coordination leads to duplication of efforts, fragmentation of initiatives, and inefficiency in the use of available resources. It also hinders the development of a cohesive national strategy that aligns the goals of different stakeholders, reducing the overall impact of research and innovation activities.

-Limited Human Capital and Infrastructure: Ghana faces a shortage of qualified researchers, technicians, and managers needed to drive research and innovation. This is compounded by inadequate infrastructure, including outdated or insufficient research facilities, equipment, and information systems. The shortage of skilled professionals and modern infrastructure limits the capacity of research institutions to conduct high-quality research, innovate, and produce outputs that can contribute to national development. It also makes it challenging to attract and retain talent within the country.

-Limited Availability and Accessibility of Research Grants: There is a scarcity of domestic sources of funding for research and innovation in Ghana. Existing grants are often limited in scope, and the process of accessing them can be complex and bureaucratic. The limited availability of research grants restricts the number of research projects that can be undertaken. Researchers may also face difficulties in securing funding, which can lead to delays or the abandonment of potentially impactful research. This further exacerbates the gap between research outputs and their application in solving national challenges.

These challenges collectively undermine the potential of Ghana's research and innovation ecosystem to contribute effectively to the country's socio-economic development and its goals of achieving sustainable growth and industrialization. Addressing these issues requires concerted efforts from both the government and private sector, along with enhanced collaboration and investment in STI infrastructure and human capital development.

4.5 Best practices in research and innovation funding in Ghana.

Some best practices have been adopted in Ghana's research and innovation funding ecosystem aimed at strengthening the system and enhancing the impact of research and innovation on national development.

The major best practices include:

-Establishment of a National Research Fund: Ghana has established an NRF to provide financial resources for the promotion and application of STI for national development. The fund is designed to support basic and applied research, innovation, technology transfer, capacity building, research infrastructure, and the protection of intellectual property rights. The creation of a dedicated research fund helps to ensure a stable and consistent source of funding for research activities, aligning them with national priorities and facilitating the growth of a robust STI ecosystem. It also encourages researchers to pursue innovative projects with the potential for significant socio-economic impact.

-Development of the Science Technology and Innovation for Sustainable Development Goals (STI for SDGs) Roadmap: Ghana has developed an STI for SDGs Roadmap that provides STI solutions for seven prioritized SDGs in areas such as agriculture, health, education, sanitation, industry, and job creation. This roadmap identifies key challenges, opportunities, gaps, stakeholders, actions, indicators, and targets for enhancing the impact of STI on the SDGs. By aligning STI efforts with the SDGs, Ghana ensures that research and innovation contribute directly to addressing pressing social, economic, and environmental challenges, thus enhancing the relevance and impact of STI activities.

-Creation of the Ghana Research & Innovation Support Programmes Coordinating Office (GRISPCO): GRISPCO is an independent entity that coordinates research and innovation support programs across Ghana. It aims to harmonize various research initiatives, facilitate access to funding, monitor and evaluate the impact of research and innovation activities, and promote collaboration among stakeholders. The establishment of GRISPCO as a central coordinating body helps to reduce duplication of efforts, improve the efficiency of resource use, and ensure that research and innovation activities are aligned with national goals. It also enhances collaboration and information sharing among different stakeholders, leading to more cohesive and impactful research outcomes.

-Participation in Regional and International Initiatives and Partnerships. Ghana actively participates in regional and international initiatives and partnerships to strengthen its STI system and address its challenges. For example, Ghana is part of the African Union's Science, Technology, and Innovation Strategy for Africa 2024 (STISA-2024) and the UN Global Pilot Programme on STI for SDGs roadmaps. Engaging in these initiatives allows Ghana to leverage global

expertise, resources, and best practices in STI. It also facilitates knowledge exchange, capacity building, and the adoption of innovative solutions that can be adapted to the local context. Participation in international partnerships enhances Ghana's ability to meet its national development goals and contribute to global scientific and technological advancements.

-Engagement of Civil Society Organizations (CSOs) in the Research and Innovation Process: Ghana has involved civil society organizations (CSOs) in the research and innovation process as partners, beneficiaries, and advocates. CSOs play a role in identifying research needs, conducting research and innovation activities, disseminating research findings, and influencing policy and practice. Engaging CSOs in the STI ecosystem ensures that research and innovation are more inclusive, addressing the needs and priorities of various communities and stakeholders. It also enhances the relevance and impact of research by incorporating diverse perspectives and fostering greater public awareness and involvement in STI activities.

These best practices contribute to the development of a more effective and inclusive research and innovation ecosystem in Ghana, ensuring that STI activities are aligned with national development goals and global standards. By adopting these practices, Ghana is better positioned to leverage its research and innovation capacity to drive sustainable development and economic growth.

Table 1: A Summary of Key Policies in the Research and Innovation Funding Ecosystem in Ghana

Policies in research and innovation funding	Aims and objectives	Impact on research and innovation funding	Remarks
National Science Technology and Innovation Policy (NSTIP)	Promote STI as a driver for national development by integrating STI into planning and human capital development.	Establishes foundational STI strategies for sustainable socio-economic growth.	Focuses on creating an innovation-driven economy.
National Research Fund Act (2021)	Provide financial resources for research projects aligned with national priorities for socio-economic impact.	Strengthens financial support for both basic and applied research.	A critical mechanism for funding high-impact research.
Science Technology and Innovation Development Programme (STIDEP I)	Promote technological innovations and skill development for job creation and economic growth.	Increases capacity for technological and scientific advancements to foster a knowledge-based economy.	Supports job creation through innovation.
National Entrepreneurship and Innovation Plan (NEIP)	Incubate, mentor, and fund start-ups and SMEs to enhance entrepreneurship.	Expands funding opportunities and support structures for business innovations.	Targets the youth and women in business.
Ghana's Industrial Policy (2011)	Enhance industrial production, competitiveness, and employment through technology transfer and SME growth.	Facilitates collaboration between industrial and research sectors for innovation.	Focuses on integrating research with industrial application.

National Intellectual Property Policy and Strategy (2016)	Promote the protection and commercialization of intellectual property in Ghana.	Enhances protection and incentives for innovative	Encourages research output commercialization.
Ghana Research & Innovation Support Programmes Coordinating Office (GRISPCO)	Coordinate research and innovation programs, facilitate funding access, and promote collaboration.	Centralizes funding efforts and improves efficiency in research activities.	A key entity for enhancing cross-sectoral coordination.
Science Technology and Innovation for Sustainable Development Goals (STI for SDGs) Roadmap	Provide STI solutions for prioritized SDGs in agriculture, health, and education.	Directs research toward sustainable, impactful societal development.	Aligns national STI efforts with global development goals
Ghana Skills and Technology Development Fund (STDF)	Fund skills and technology development to drive job creation and economic growth.	Supports training and innovation to boost SME development and youth employability.	Focused on enhancing technological capacity in key sectors.

5. Conclusion

Ghana's research and innovation funding ecosystem demonstrates a complex landscape of policies, institutions, and stakeholders, all working towards leveraging STI for national development. The country has made significant strides in establishing a framework for research and innovation funding, as evidenced by policies such as the National Science Technology and Innovation Policy, the National Research Fund Act, and the Science Technology and Innovation for Sustainable Development Goals Roadmap. However, despite these efforts, Ghana faces persistent challenges that hinder the full realization of its STI potential. The most pressing issues include inadequate budgetary allocation, with gross domestic expenditure on R&D falling far below the African Union's target of 1% of GDP. Additionally, weak coordination among stakeholders, limited private sector involvement, and insufficient human capital and infrastructure continue to constrain the ecosystem's effectiveness. Nevertheless, Ghana has adopted several best practices that show promise in strengthening its research and innovation funding landscape. These include the establishment of the National Research Fund, the creation of the GRISPCO, and active participation in regional and international STI initiatives. Moving forward, addressing the identified challenges while building upon these best practices will be crucial. Ghana must prioritize increasing its research funding, enhancing coordination among stakeholders, fostering greater private sector involvement, and investing in human capital and infrastructure for research and innovation. By doing so, Ghana can better harness its STI capabilities to drive economic growth, achieve its vision of "Ghana Beyond Aid," and position itself as a leader in research and innovation on the African continent.

6. Policy Recommendations

Based on the findings of the study the following policy recommendations are proposed to address the key challenges and strengthen Ghana's research and innovation funding ecosystem for sustainable national development:

Recommendation 1: Operationalize and Fully Resource the Science, Technology and Research Fund (STREFUND): Ghana has committed to allocating 1% of its GDP to research and development. However, actual expenditure is significantly below this target. The government should operationalize the STREFUND and ensure it is adequately funded. Sustainable funding could be provided by earmarking a given percentage of the country's value added tax for research and innovation annually. Opening up multiple funding streams such as through private sector investments and through support from development partners could provide a stable financial base for research and innovation projects, enabling the country to meet its development goals and foster high-impact research.

Recommendation 2: Enhance Private Sector Engagement in Research and Innovation: The involvement of the private sector in research and innovation is currently low due to perceived risks and limited returns on investment. Incentivizing private sector participation through tax breaks, public-private partnerships, and creating a supportive environment for start-ups and SMEs would foster a culture of innovation and drive the commercialization of research outcomes.

Recommendation 3: Strengthen Coordination Among Research and Innovation Stakeholders: The research ecosystem in Ghana suffers from fragmented efforts and weak coordination between various actors, including government bodies, academic institutions, and civil society. Establishing a national coordinating office like the GRISPCO would harmonize efforts, reduce redundancy, and ensure a more cohesive and efficient approach to funding and implementing research.

Recommendation 4: Invest in Human Capital and Infrastructure for Research: Ghana faces a shortage of qualified researchers and lacks modern research infrastructure. To enhance the country's research capacity, there should be increased investment in training programs for researchers, the provision of state-of-the-art equipment, and the development of robust data systems. This will help retain talent within the country and ensure that research outputs are relevant and impactful.

Recommendation 5: Foster International Partnerships for Research Capacity Building: Ghana has benefited from regional and international partnerships in strengthening its research and innovation system. Expanding engagement with international donors, research institutions, and development partners can provide not only financial resources but also access to global expertise, technologies, and best practices. Collaboration at this level would enhance research capacity, improve the quality of research, and accelerate innovation.

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