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AFRICAN TECHNOLOGY POLICY STUDIES NETWORK

African University of Science and Technology Abuja
Knowledge is Freedom

STRATEGIC PATHWAYS FOR ENHANCING RESEARCH AND INNOVATION FUNDING IN SENEGAL

African Technology Policy Studies Network (ATPS)

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Strategic Pathways for Enhancing Research and Innovation Funding in Senegal

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African Technology Policy Studies Network (ATPS)[1]

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 the 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) like to express our sincere gratitude to the Science Granting Councils Initiative (SGCI) for their financial support, which made this study on research and innovation funding in Senegal possible. We are also thankful to the numerous stakeholders, including government officials, policymakers, researchers, civil society organizations, and private sector representatives, who generously shared their time, expertise, and insights during the data collection process. Their valuable contributions were instrumental in shaping the findings and recommendations presented in this policy brief.

Key Messages

- Research and innovation are critical drivers of socio-economic development, and Senegal recognizes their importance in achieving sustainable growth, addressing societal challenges, and fostering a knowledge-based economy.

- Despite significant progress, Senegal's research and innovation ecosystem faces challenges, including limited funding, inadequate infrastructure, brain drain, and weak collaboration between stakeholders.

- The government of Senegal has established policies and institutions to promote and fund research and innovation activities, but there is a need for better coordination, increased investment, and capacity building.

- Strengthening the national research and innovation funding agencies is crucial for fostering a vibrant and sustainable research and innovation landscape in Senegal, enabling the country to address pressing issues and compete globally.

- Key recommendations include increasing funding allocations for research and innovation, enhancing collaboration and coordination among stakeholders, building capacity and infrastructure, promoting gender equality and inclusivity, and leveraging international partnerships and collaborations.

1. Introduction

Senegal, a dynamic West African nation with a population exceeding 17 million, has achieved notable progress in socio-economic development over the past decade. The country has demonstrated resilience in sectors such as infrastructure, agriculture, and telecommunications, reflecting its commitment to sustainable growth (World Bank, 2019). However, persistent challenges remain, including widespread poverty, food insecurity, environmental degradation, and disparities in access to quality education and healthcare. Addressing these complex issues requires leveraging research and innovation—recognized globally as essential drivers for achieving the United Nations Sustainable Development Goals (SDGs) (UNESCO, 2021).

Despite its modest size, Senegal boasts a robust and growing research and innovation ecosystem. Several universities, research institutions, and governmental bodies actively contribute to advancing scientific knowledge and fostering technological advancements. However, this ecosystem is constrained by several factors: limited funding, insufficient infrastructure, the outflow of skilled professionals (brain drain), and fragmented collaboration among key stakeholders (Casadella & Tahi, 2023; Directorate General for Research and Innovation [DGRI], 2023). Recognizing these obstacles, the Senegalese government has implemented strategic policies and established institutions to promote and support research and innovation initiatives. Key examples include the creation of the DGRI and targeted investments aimed at strengthening national research capabilities.

This policy brief synthesizes the findings from an in-depth study examining Senegal's policy and institutional landscape, stakeholder dynamics, and the state of research and innovation funding. It identifies critical challenges and opportunities, showcases best practices, and provides actionable policy recommendations. Strengthening national research and innovation funding frameworks will be pivotal in fostering scientific and technological advancements that propel Senegal toward equitable socio-economic development.

2. Rationale for Strengthening the National Research and Innovation Funding Agencies

In the rapidly evolving global landscape, driven by technological advancements and the transition toward knowledge-based economies, research and innovation have emerged as critical pillars for achieving SDGs and addressing complex societal challenges. This global shift underscores the need for nations to invest strategically in research and innovation to foster economic resilience, social progress, and environmental sustainability.

Recognizing this imperative, many African countries, including Senegal, have prioritized research and innovation by developing comprehensive policies, establishing dedicated institutions, and creating targeted funding mechanisms. Senegal's proactive approach is exemplified by its active participation in regional and international initiatives such as the Science Granting Councils Initiative (SGCI), which aims to strengthen the capacities of science funding bodies across sub-Saharan Africa (Ndebele et al., 2023). This engagement reflects Senegal's commitment to building a robust research infrastructure that aligns with global best practices and regional development goals.

Strengthening national research and innovation funding agencies is crucial for Senegal to harness its rich intellectual capital and foster a dynamic culture of innovation. Enhancing these structures in the country can address pressing national and regional challenges more effectively. Well-coordinated funding mechanisms, coupled with collaborative stakeholder engagement, will drive cutting-edge research, nurture homegrown talent, and facilitate the translation of innovative ideas into practical solutions. These advancements have the potential to significantly improve the quality of life for Senegalese citizens by addressing key issues such as poverty alleviation, healthcare improvement, and environmental sustainability.

Furthermore, a thriving research and innovation ecosystem will contribute to Senegal's broader development objectives by promoting economic diversification, creating high-value jobs, and enhancing global competitiveness. These outcomes align closely with Senegal's strategic development frameworks, such as the Plan for an Emerging Senegal (PSE), which envisions the country as a hub for innovation-driven growth in West Africa (Republic of Senegal, 2019). Investing in research and fostering innovation positions Senegal not only to meet its immediate development needs but also to secure a sustainable and prosperous future.

3. Methodology

This policy brief was derived from a comprehensive study of the policy and institutional landscape, stakeholder mapping, and needs assessment of research and innovation funding in Senegal. The study employed a mixed-methods approach, combining both qualitative and quantitative data collection techniques to ensure a comprehensive and nuanced understanding of the research and innovation funding ecosystem. The methodology employed for this policy brief encompasses a multi-faceted approach to data collection and analysis. Desk studies involved comprehensive literature reviews spanning policy documents, reports, academic publications, and secondary sources, providing a foundational understanding of the subject matter.

Structured online surveys were administered to a diverse range of stakeholders, including government officials, policymakers, researchers, civil society organizations, and private sector representatives. These surveys aimed to quantitatively capture perceptions, experiences, and challenges related to research and innovation funding.

Key informant interviews complemented the quantitative data by offering nuanced insights from key stakeholders such as government officials, research institution leaders, and industry experts. Additionally, focus group discussions provided a platform for open dialogue among diverse stakeholder groups, ensuring that a range of perspectives on research and innovation funding were considered. Adopting a participatory and inclusive approach, the study prioritized gender balance and representation of marginalized groups, ensuring that the voices and perspectives of all stakeholders were incorporated into the findings and recommendations. The collected data underwent rigorous analysis, triangulation, and synthesis to identify key themes, patterns, and insights related to policies, stakeholders, capacity needs, challenges, opportunities, and best practices in research and innovation funding in Senegal.

4. Major Findings

The key findings of the study are presented in the following sections, highlighting the policy and institutional landscape, stakeholder mapping, capacity needs assessment, challenges and opportunities, and best practices related to research and innovation funding in Senegal.

4.1 Policy and Institutional Landscape for Research and Innovation Funding in Senegal

Senegal has recognized the importance of research and innovation in driving socio-economic development and has established several policies and institutional frameworks to promote and fund these activities. Table 1 summarizes the key policies and their impact on research and innovation funding in the country.

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

No.	Policy	Aims and Objectives	Impact on Research and Innovation Funding	Remarks
1.	The Plan for an Emerging Senegal (PSE), launched in 2015	-Prioritizes research and innovation as fundamental drivers of the country's economic and social transformation. Its objectives include increasing the number of researchers from 2,000 to 10,000 by 2035, strengthening research institutions through increased funding and resources, promoting public-private partnerships in research and innovation, and facilitating the commercialization of research results (Republic of Senegal, 2019).	-Promoting public-private partnerships and facilitating the commercialization of research results will contribute to the creation of innovative products and services, driving economic growth and job creation.	-Focus on research and innovation reflects a forward-thinking approach to development, recognizing the critical role of knowledge and technology in driving progress. However, achieving the ambitious targets set forth in the plan will require sustained commitment from both government and private sector stakeholders, as well as effective coordination and collaboration among various actors in the research and innovation ecosystem.

2.	The National Science, Technology, and Innovation Strategy (NSTIS)	-Serves as a roadmap for advancing Senegal's scientific and technological landscape. Launched to align with the country's development vision, NSTIS aims to leverage STI to drive economic growth, improve social well-being, and enhance global competitiveness. Its objectives include fostering a culture of innovation, strengthening STI institutions, promoting collaboration between academia, industry, and government, and enhancing human capital development in STI fields.	-NSTIS is expected to yield significant impacts on Senegal's development trajectory by harnessing the power of science, technology, and innovation. By fostering a culture of innovation and strengthening STI institutions, the strategy aims to stimulate entrepreneurship, create new industries, and generate high-quality jobs.	-NSTIS represents a crucial step towards positioning Senegal as a hub for scientific and technological innovation in the region. However, realizing the full potential of the strategy will require sustained commitment from government, private sector stakeholders, and the research community.
3.	Senegal National Strategy for Economic and Social Development (2019-2023)	- Foster economic growth and sustainable development- Promote knowledge-based economy and innovation	- Prioritizes investment in research, innovation, and human capital development- Calls for increased funding for research and development (R&D)	- Implementation has been hindered by limited resources and coordination challenges
4.	National Strategy for Higher Education (2013-2022)	- Improve quality and relevance of higher education- Strengthen research and innovation capacity	- Emphasizes research as a core function of higher education institutions- Encourages collaboration between universities and industry	- Limited funding has constrained the implementation of research initiatives

5.	National Policy for the Promotion of Science, Technology, and Innovation (2017)	- Promote science, technology, and innovation for sustainable development- Strengthen institutional and regulatory frameworks	- Calls for increased funding for research and innovation- Encourages public-private partnerships in R&D	- Implementation has been slow due to lack of coordination and resources

The policy landscape in Senegal reflects a strong commitment to promoting research and innovation as drivers of socio-economic development. However, the study findings indicate that while these policies are well-intentioned, their implementation has been hindered by limited resources, weak coordination among stakeholders, and inadequate institutional capacities.

In terms of institutional frameworks, Senegal has established several agencies and organizations dedicated to research and innovation funding, such as DGRI under the Ministry of Higher Education, Research, and Innovation (MESRI), and the National Fund for Scientific and Technical Research (FNRST) (Casadella & Tahi, 2023). These institutions play a crucial role in setting research priorities, allocating funding, and facilitating collaboration among stakeholders.

4.2 Stakeholders in Research and Innovation Funding in Senegal

The research and innovation funding ecosystem in Senegal involves a diverse range of stakeholders, each playing a unique role and exerting varying levels of influence. In Senegal, the landscape of research and innovation funding involves various stakeholders with distinct roles and challenges. Government ministries and agencies, such as the Ministry of Higher Education, Research, and Innovation, and the Ministry of Economy, Planning, and Cooperation, play a pivotal role in developing policies and managing public funding for research and innovation. Their influence is significant as they control funding allocations and set research priorities, but there's a recognized need for increased funding allocations and streamlined processes, highlighting potential challenges in inter-ministerial coordination.

Research institutions and universities, like Cheikh Anta Diop University and Gaston Berger University, serve as direct recipients of research funding and are essential in conducting research, generating new knowledge, and training future researchers and innovators. However, they face capacity constraints, including

infrastructure and human resources, and there's a recognized need for stronger industry-academia collaborations to enhance innovation (Casadella & Liu, 2019). The private sector and industry associations are key drivers of economic growth and innovation, with potential as a source of funding for applied research and facilitators of technology transfer and commercialization. Nonetheless, their limited involvement in research funding calls for stronger partnerships with academia. NGOs and CSOs advocate for social and environmental causes and can potentially fund research in specific domains, influencing research agendas through advocacy. However, they face limitations in funding capacity and require stronger collaboration with research institutions. Finally, international development partners and donors, such as the World Bank and USAID, provide significant funding for research and innovation projects, albeit with the need for better alignment with national research priorities and sustainability concerns after project completion.

The stakeholder mapping exercise revealed a complex web of actors with varying levels of influence, resources, and interests in research and innovation funding. While the government plays a central role in setting policies, allocating funds, and coordinating efforts, the study findings highlight the need for stronger collaboration and coordination among stakeholders to leverage their respective strengths and resources effectively.

4.3 Capacity Needs for the National Research and Innovation Funding Agency in Senegal

Strengthening the capacity of the national research and innovation funding agencies is crucial for ensuring effective management, coordination, and distribution of resources within the research and innovation ecosystem. To strengthen research and innovation funding in Senegal, a multifaceted approach encompassing various capacities is imperative. Human resource capacity is foundational, requiring strategies for recruitment and retention of skilled personnel in research management, grant administration, and project evaluation. Additionally, investing in training and professional development opportunities for existing staff is vital for enhancing technical and managerial skills. Measures to address brain drain and attract diaspora researchers further contribute to bolstering expertise within the sector.

Institutional and organizational capacity play pivotal roles in facilitating transparent and efficient grant management processes. This necessitates the development of robust institutional frameworks and policies, alongside the

establishment of monitoring and evaluation systems to track project impact. Moreover, enhancing organizational structures and governance mechanisms ensures accountability and effective decision-making.

Financial management capacity is crucial for sustainable funding mechanisms. Strengthening financial systems, exploring diversified funding sources such as public-private partnerships and international collaborations, and establishing predictable funding streams are essential components.

Stakeholder engagement and communication capacity are vital for fostering collaboration and knowledge sharing within the research ecosystem. Building strong engagement mechanisms and enhancing communication strategies facilitate awareness of funding opportunities and promote the impact of research projects.

Investment in infrastructure and technology is imperative to support cutting-edge research activities. This includes the development of research facilities, digital infrastructure, and the adoption of emerging technologies to streamline processes and foster knowledge exchange.

Research priority setting and alignment ensure that efforts are directed towards addressing societal challenges. Developing mechanisms for setting research priorities, fostering collaboration with stakeholders, and promoting interdisciplinary approaches are key strategies to drive impactful research and innovation initiatives aligned with national development goals.

Addressing these capacity needs through targeted capacity-building initiatives, resource allocation, and strategic partnerships will enable the National Research and Innovation Funding Agency to effectively manage and distribute resources, foster collaboration, and drive impactful research and innovation activities in Senegal.

4.4 Challenges and Opportunities for Research and Innovation Funding in Senegal

While Senegal has made progress in promoting research and innovation, the study identified several challenges that hinder the effective funding and development of this sector. These challenges include:

-Limited Funding and Resource Constraints: Insufficient financial backing allocated to research and innovation endeavours poses a significant hurdle,

thwarting the execution of large-scale and long-term projects. Moreover, the dearth of investment in research infrastructure, equipment, and facilities constrains the capacity for pioneering research initiatives. Compounded by a reliance on external funding sources that may not align with national priorities, this situation presents sustainability challenges for the research and innovation landscape in Senegal.

-Brain Drain and Capacity Gaps: A prevalent issue is the emigration of talented researchers to other countries or sectors, primarily driven by limited career prospects and funding opportunities domestically. This brain drain exacerbates the shortage of skilled human resources, particularly in emerging fields, where training programs are inadequate to meet demand. Moreover, the absence of structured capacity-building initiatives for early-career researchers and support staff further compounds this challenge, hindering the growth of indigenous research capabilities.

-Weak Collaboration and Coordination: The lack of robust collaboration between research institutions and industry stakeholders impedes the seamless translation of research findings into tangible innovations. This deficiency is compounded by insufficient coordination among diverse stakeholders, resulting in fragmented efforts and redundant initiatives. Moreover, the absence of effective platforms for multi-stakeholder engagement exacerbates the difficulty in aligning research priorities with national development agendas, thereby limiting the impact of research and innovation efforts.

-Limited Commercialization and Technology Transfer: A critical bottleneck lies in the inadequate support for commercializing research outputs and transferring technology from academia to the private sector. This gap is further widened by weak linkages between academic institutions and private enterprises, hindering the development and scaling of market-ready products and services. Additionally, the lack of robust intellectual property protection frameworks and low awareness among researchers regarding the importance of patenting and commercialization exacerbates this challenge, stifling innovation and economic growth.

-Sociocultural and Gender Barriers: Persistent sociocultural norms act as barriers, discouraging women's participation in STEM fields and impeding their advancement in research and innovation. This gender disparity is exacerbated by limited recognition of women researchers, particularly in leadership roles, perpetuating a skewed representation within the scientific community.Moreover, the absence of gender-sensitive policies further

hampers efforts to promote diversity and inclusion in research and innovation activities, stifling the potential for holistic and equitable development.

-Challenges in Stakeholder Engagement and Coordination: The segmented approach adopted by stakeholders leads to limited communication and collaboration, resulting in fragmented efforts and duplicated resources. Divergent priorities among stakeholders further complicate matters, hindering the alignment of research and innovation initiatives with overarching national development objectives. Moreover, power imbalances within the stakeholder ecosystem marginalize certain actors, undermining their influence in decision-making processes. Additionally, capacity gaps among stakeholders, particularly in terms of resources and expertise, impede their effective engagement in funding activities, hindering the collective progress of the research and innovation ecosystem.

Despite these challenges, several opportunities can be leveraged to strengthen its research and innovation funding ecosystem. They include:

-Strategic Geographic Location and Regional Leadership: Senegal's advantageous positioning in West Africa, coupled with its stable political environment and influential regional presence, positions it as a potential focal point for collaborative research and innovation endeavours within the region. Membership in regional bodies like the Economic Community of West African States (ECOWAS) and the West African Economic and Monetary Union (UEMOA) offers avenues for pooling resources and exchanging knowledge, presenting valuable opportunities for Senegal to bolster its regional leadership in research and innovation.

-Emerging Science and Technology Sectors: The burgeoning strengths in sectors such as agriculture, renewable energy, and biotechnology provide a ripe landscape for targeted research and innovation investment in Senegal. By channelling resources into these areas, the country can drive economic diversification and sustainable development, aligning its efforts with global research priorities on issues like food security, climate change, and environmental sustainability. These endeavours not only attract international funding but also position Senegal as a proactive player in addressing pressing global challenges.

-Diaspora Knowledge Networks and International Collaborations: Senegal's substantial diaspora community, comprising skilled researchers and innovators,presents an invaluable resource for knowledge exchange, capacity building, and international research partnerships. Leveraging existing

collaborations with international research institutions, funding agencies, and bilateral cooperation programs can amplify Senegal's access to global expertise, resources, and funding opportunities, facilitating accelerated progress in research and innovation endeavours.

-Growing Private Sector Engagement: The increasing acknowledgement among Senegalese businesses of the pivotal role of research and innovation in fostering economic competitiveness and growth opens avenues for collaboration and knowledge exchange. Opportunities abound for public-private partnerships, industry-funded research initiatives, and collaborative innovation hubs, fostering synergistic relationships that drive technological advancements and knowledge dissemination within the private sector and beyond.

-Leveraging Digital Technologies and Innovation: Senegal's rapid adoption of digital technologies and the burgeoning start-up and entrepreneurship ecosystem present fertile ground for research and innovation endeavours in sectors such as Fintech, e-commerce, and digital services. Harnessing the potential of digital platforms, online collaboration tools, and open data initiatives can enhance research dissemination, promote knowledge sharing, and foster citizen engagement, propelling Senegal towards the forefront of digital innovation in the region.

To effectively seize these opportunities and address the associated challenges, Senegal must adopt a comprehensive and coordinated approach involving all stakeholders. This entails augmenting funding allocations, fostering multi-stakeholder collaborations, enhancing human and institutional capacities, promoting inclusivity, and leveraging international partnerships and knowledge networks to drive forward its research and innovation agenda.

4.5 Best Practices in Research and Innovation Funding in Senegal

Despite the challenges faced by Senegal's research and innovation funding ecosystem, the study identified several best practices that have leveraged on some of the opportunities identified that are contributing immensely to the advancement of research and innovation in the country. These best practices serve as examples of successful initiatives and strategies that can be replicated, scaled up, or adapted to further strengthen the funding landscape.

-Establishment of the National Fund for Agricultural and Agri-Food Research (FNRIA): The FNRIA, established in 2017, is a dedicated funding agency that supports research and innovation projects in the agriculture and agri-food sectors, which are crucial for Senegal's economy and food security. The fund

has implemented a competitive grant-making process, involving rigorous peer review and evaluation, to ensure the allocation of resources to high-quality and impactful research projects. Additionally, the FNRIA has made efforts to involve stakeholders, including farmers, agribusinesses, and research institutions, in the priority-setting process, ensuring the relevance and applicability of funded projects.

-Establishment of the Fund for Expatriate Researchers in Science and Technology (FRSIT): Recognizing the potential of Senegal's diaspora community in advancing scientific research and innovation, the FRSIT was established in 2016 to support collaborative research projects between expatriate Senegalese researchers and local institutions. The fund has facilitated knowledge transfer, capacity building, and the establishment of international research networks, leveraging the expertise and resources of the Senegalese scientific diaspora. This initiative has not only contributed to brain gain but has also fostered cross-cultural exchange and global collaborations.

-Establishment of Cheikh Anta Diop University (UCAD) Innovation and Technology Transfer Office: UCAD, Senegal's flagship university, has established an Innovation and Technology Transfer Office (BITT) to bridge the gap between academic research and practical applications. The BITT provides support and guidance to researchers in areas such as intellectual property protection, technology commercialization, and industry partnerships. It has facilitated the licensing of university-developed technologies to private companies, fostering knowledge transfer and economic impact. Additionally, the BITT organizes entrepreneurship training programs and supports the creation of university-based start-ups, promoting an innovation ecosystem within the academic community.

-Encouraging the Public-Private Partnerships (PPP) in Research and Innovation: Several successful public-private partnerships (PPPs) have emerged in Senegal, particularly in sectors such as agriculture, health, and energy. These PPPs involve collaboration between government agencies, research institutions, and private companies, leveraging the strengths and resources of each partner. Examples include joint research projects, shared infrastructure and facilities, and co-funding arrangements. These partnerships have not only contributedto advancing research and innovation but have also facilitated knowledge exchange, capacity building, and the translation of research outcomes into practical applications and commercialization opportunities.

-Fostering Inclusive and Gender-Sensitive Initiatives: Recognizing the importance of diversity and inclusion in research and innovation, several initiatives in Senegal have focused on promoting the participation and leadership of women and underrepresented groups. These include targeted funding programs, mentorship and capacity-building opportunities, and advocacy efforts to address sociocultural barriers and gender biases. Organizations such as the Association of Women in Science and Technology (AFST) and the Senegalese Association for the Promotion of Women's Entrepreneurship (ADPME) have played crucial roles in supporting and empowering women researchers, innovators, and entrepreneurs.

These best practices demonstrate the potential for innovative and inclusive approaches to research and innovation funding in Senegal. By learning from these successful initiatives and adapting them to address specific challenges and contexts, the country can further strengthen its research and innovation ecosystem, fostering sustainable development and economic growth.

5. Conclusion

Research and innovation are critical drivers of socio-economic development, and Senegal has recognized their importance in achieving its development goals and addressing pressing societal challenges. This policy brief has presented a comprehensive assessment of the policy and institutional landscape, stakeholder mapping, capacity needs, challenges, opportunities, and best practices related to research and innovation funding in Senegal. While the country has made notable progress in establishing policies and institutions to promote research and innovation, several challenges remain, including limited funding, inadequate infrastructure, brain drain, weak collaboration among stakeholders, and limited commercialization and technology transfer. These challenges hinder the effective translation of research outputs into practical solutions and economic benefits. However, Senegal also presents significant opportunities that can be leveraged to strengthen its research and innovation funding ecosystem. These include its strategic geographic location and regional leadership, emerging science and technology sectors, diaspora knowledge networks and international collaborations, growing private sector engagement, and the potential of digital technologies and innovation.

To capitalize on these opportunities and address the challenges, a coordinated and inclusive approach involving all stakeholders is essential. This includes increasing funding allocations, fostering multi-stakeholder collaborations, building human and institutional capacities, promoting inclusive and equitable participation, and leveraging international partnerships and knowledge networks. The study has highlighted several best practices in research and innovation funding in Senegal, including dedicated funding agencies like the FNRIA and FRSIT, initiatives to promote academia-industry collaborations and technology transfer, public-private partnerships, and inclusive and gender-sensitive programs. These best practices serve as examples of successful strategies that can be replicated, scaled up, or adapted to further strengthen the funding landscape.

6. Policy Recommendations

Based on the findings of this comprehensive study, the following key policy recommendations are proposed to strengthen the national research and innovation funding agencies and ecosystem in Senegal:

Recommendation 1: Increase domestic funding for research and innovation through government contribution, private sector participation and support from development partners: To bolster research and innovation endeavours, there's a proposal to progressively augment the allocation of public funds towards research and development, aiming to achieve the African Union's suggested benchmark of investing at least 1% of GDP in these areas (African Union, 2014). Additionally, exploring inventive financing mechanisms like research endowments, public-private partnerships, and diaspora bonds could diversify and enhance funding sources. Furthermore, incentivizing private sector investments in research and development through tax incentives could foster collaborations between industry and academia, facilitating technology transfer.

Recommendation 2: Enhance coordination and coherence in research funding in the country by engaging all stakeholders in the ecosystem: To ensure synergy and effectiveness in research funding, a recommendation is made to establish a national coordination body tasked with harmonizing research priorities, funding strategies, and evaluation mechanisms across various governmental ministries, agencies, and stakeholders involved. Developing an integrated national research and innovation agenda aligned with Senegal's development objectives is proposed to ensure coherence among different funding programs. Additionally, implementing standardized policies, procedures, and digital platforms could streamline grant application processes, minimize duplication, and enhance efficiency across funding agencies.

Recommendation 3: Build institutional and Human Resource Capacities among all actors in the research and innovation funding ecosystem: Investing in capacity-building initiatives for research funding agencies, including training programs and knowledge exchange platforms, could enhance staff competencies in areas such as research management, grant administration, and monitoring and evaluation. Collaboration with international partners and leveraging diaspora expertise is suggested to access global best practices and support capacity-building endeavours. Moreover, strategies to attract, retain, and develop local talent in research and innovation, addressing brain drain concerns through improved compensation, career development opportunities, and enhanced research facilities, are recommended.

Recommendation 4: Foster inclusive and equitable participation by providing platforms for engaging and participation of all stakeholders including marginalized groups: Implementing gender-sensitive policies and initiatives is recommended to promote the representation and leadership of women in research and innovation, tackling sociocultural barriers and biases. Designing targeted funding programs and support mechanisms for underrepresented groups, such as ethnic minorities and persons with disabilities, aims to ensure inclusive participation and equitable access to research funding opportunities. Encouraging research projects addressing gender equality, social inclusion, and environmental sustainability aligns with national and global development priorities.

Recommendation 5: Promote Academia-Industry collaborations and commercialization: To facilitate innovation and technology transfer, there is a proposal to establish dedicated funding programs and incentives for collaborative research projects between academia and private sector entities. Strengthening intellectual property protection frameworks and providing training and support services to researchers on patenting and technology transfer processes could foster commercialization efforts. Moreover, developing innovation hubs, incubators, and accelerators aims to encourage cross-sector partnerships and translate research into marketable products and services.

Recommendation 6: Leverage international partnerships and knowledge networks to consolidate capacity and resources support: Active participation in regional and global research and innovation initiatives is recommended to access funding opportunities, expertise, and knowledge-sharing platforms. Strengthening existing partnerships and bilateral agreements with international research institutions and funding agencies could facilitate joint research projects and resource mobilization. Furthermore, engaging and leveraging the expertise and resources of the Senegalese diaspora in scientific and entrepreneurial endeavours could foster brain circulation and knowledge transfer, further enhancing research and innovation capabilities.

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