

SCIENCE
GRANTING
COUNCILS
INITIATIVE

SGCI



IOSRS

INITIATIVE DES
ORGANISMES
SUBVENTIONNAIRES
DE LA RECHERCHE
SCIENTIFIQUE



TheScinnoventCentre
SCIENCE, INNOVATION AND ENTERPRISE

Towards Effective Public-Private Partnerships in Research and Innovation: A Perspective for African Science Granting Councils

**African Technology Policy Studies Network (ATPS)
TECHNOPOLICY BRIEF NO. 49**

Prof. Banji Oyelaran-Oyeyinka

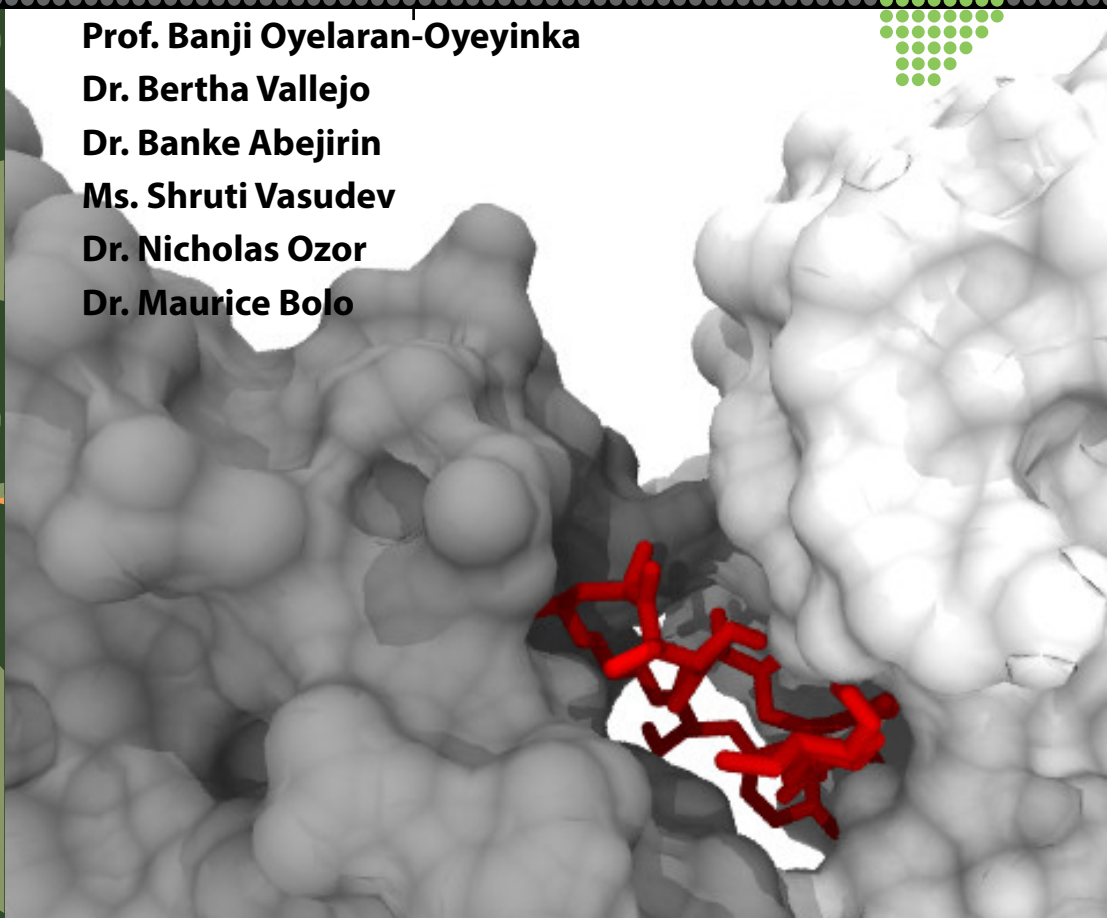
Dr. Bertha Vallejo

Dr. Banke Abejirin

Ms. Shruti Vasudev

Dr. Nicholas Ozor

Dr. Maurice Bolo



Towards Effective Public-Private Partnerships in Research and Innovation: A Perspective for African Science Granting Councils

Prof. Banji Oyeleran-Oyeyinka

Former Director for Africa United Nations Human Settlements Programme
(UN-Habitat)

Dr. Bertha Vallejo

Tilburg University and UNU-MERIT, Netherlands

Dr. Banke Abejirin

The Cerebral Hub, Nigeria

Ms. Shruti Vasudev

European School of Management and Technology, (ESMT), Germany

Dr. Nicholas Ozor

African Technology Policy Studies Network (ATPS)

Dr. Maurice Bolo

The Scinnovent Centre



The African Technology Policy Studies Network (ATPS) is a trans-disciplinary 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.



Published by the African Technology Policy Studies
Network (ATPS)

P O Box 10081, 00100 GPO Nairobi Kenya

© 2018

ISBN: 978-9966-030-97-9

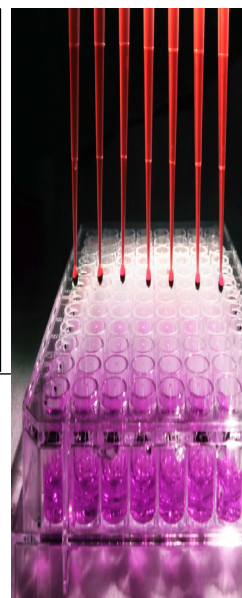


Table of Contents

About the Science Granting Councils Initiative.....3

About African Technology Policy Studies Network (ATPS).....4

About Scinnovent Centre.....4

Acknowledgement.....5

1.0 Introduction.....6

2.0 Methodology.....9

3.0 Major Findings.....10

4.0 Policy Recommendations for Strengthening SGCs.....15

5.0 References.....17

6.0 ATPS TechnoPolicy Brief Series.....18

About Science Granting Councils Initiative

The Science Granting Councils Initiative in Sub-Saharan Africa (SGCI) seeks to strengthen capacities of Science Granting Councils (SGCs) in Eastern, Southern, Central and West Africa in order to support research and evidence-based policies that will contribute to economic and social development. It is jointly funded by the United Kingdom's Department for International Development (DFID), Canada's International Development Research Centre (IDRC), and South Africa's National Research Foundation (NRF).

The objectives of SGCI are to strengthen the ability of participating SGCs to 1) manage research; 2) design and monitor research programmes, and to formulate and implement policies based on the use of robust science, technology and innovation (STI) indicators; 3) support knowledge transfer to the private sector; and; 4) establish partnerships with one another, and with other science system actors. The implementation of these objectives is achieved through regional training courses, individualised on-site training sessions, on-line training, webinars and, collaborative research. The SGCI works with 15 councils in Kenya, Rwanda, Uganda, Tanzania, Ethiopia, Cote d'Ivoire, Burkina Faso, Senegal, Ghana, Zambia, Mozambique, Botswana, Malawi, Namibia and Zimbabwe.

The SGCs principle output include 1) more effective research management practices among Councils, 2) strengthened ability of Councils to design and monitor research programmes, and to formulate and implement policies based on the use of robust science technology and innovation indicators, 3) increased knowledge transfer to the private sector and 4) increasingly coordinated and networked Councils. More effective Councils are expected to strengthen national science systems, and ultimately lead to nationally-led research that contributes to development in participating African countries.

About the African Technology Policy Studies Network (ATPS)

The African Technology Policy Studies Network (ATPS) is a trans-disciplinary 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. ATPS has over 1,300 members and 3000 stakeholders in over 51 countries in 5 continents with institutional partnerships worldwide. We implement our programs through members in national chapters established in 30 countries (27 in Africa and 3 Diaspora chapters in the Australia, United States of America, and United Kingdom). 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.

About Scinnovent Centre

The Scinnovent Centre is a science, technology and innovation (STI) policy think tank registered in Kenya as a not-for-profit company. Their preliminary concern is that despite advancements in science, technology and innovation (STI), poverty levels in Africa are increasing; environment degradation is worsening; the ecosystem has become more fragile; sustainability has been compromised and livelihoods threatened. So they ask three big questions: Why have the developments in science, technology and innovation not made any significant difference in African development? Why have STI policies not translated into practical change on the ground? How come pockets of success piloted across countries have not scaled?

Acknowledgement

This policy brief was produced by the African Technology Policy Studies Network (ATPS) in partnership with the Scinnovent Centre under the Science Granting Councils Initiative Project. The ATPS and Scinnovent Centre acknowledge the funding support received from United Kingdom's Department for International Development (DFID), Canada's International Development Research Centre (IDRC), and South Africa's National Research Foundation (NRF).

1.0 Introduction

Overview

In order to enhance the role of public-private partnerships in socio-economic development and in support of regional development agenda such as the STISA 2024, issues of public-private partnerships in research and innovation have been carefully explored to uncover the trends, characteristics and current needs. Based on these and good practices from around the world, policy recommendations to strengthen the African Science Granting Councils emerge.

Background

The centrality of Science, Technology and Innovation (STI) as a driver of economic growth and development has long been recognised in academic and policy literature. Studies have shown how STI enhances countries' industrial competitiveness and increases the efficiency of production routines and systems (J. Chataway et al., 2009; NACETEM, 2010; NEPAD, 2006).

Going by several Regional Declarations, African countries are committed to development led by Science, Technology and Innovation (STI). This is evidenced by the adoption of the 10-year Science, Technology, and Innovation Strategy for Africa (STISA-2024). STISA is aimed at accelerating and developing human capital, innovation, industrialisation, entrepreneurship and value addition to facilitate social transformation and enhance the economic development and thus the competitiveness of the continent (African Union, 2014).

Currently, over two-thirds of African countries have STI policies and strategies (The African Capacity Building Foundation, 2017), while the last decade has seen an increase in research fund commitments from national governments, the emergence of new organizations funding STI, increased rates of scientific production and innovation activities, and cross-regional research collaboration (African Technology Policy Studies Network (ATPS) & The Scinnovent Centre, 2017).

Many African countries, however, lack the requisite capacity to optimize the potential of STI to enhance structural transformation of their economies. Majority are characterized by "underdeveloped STI institutions and fail to effectively generate and deploy knowledge and technological innovations for socioeconomic growth (The African Capacity Building Foundation, 2017, p. viii)."

Alongside the recognition of the need for STI in order to achieve sustainable growth and development, global leaders are increasingly articulating the need to form public private partnerships (PPPs) to achieve STI goals. African governments have reiterated the role of PPPs and the desire to strengthen collaborations with public and private sector partnerships through various policy initiatives and forums, including the New Partnership for Africa's Development agenda (NEPAD, 2013) and the Second Ministerial Forum on Science, Technology, and Innovation in Rabat on 17 October 2014. The Sustainable Development Goals that were agreed upon by the United Nations have also placed public-private partnerships as central to achieving inclusive and sustainable growth.

PPPs in Research & Innovation (RI) have become key elements in the mix of tools deployed in research and innovation policies of many countries around the world. Although this is an instrument whose application dates from the 1980s; in recent years there has been a renewed interest and discourse on PPPs for RI. The PPP model has found its way back into policy discussions not only in Europe and the US, but also in many developing countries, particularly countries in Africa.

The idea of PPPs in RI is by its nature a systemic one shaped by national and regional interests. Operationalizing the concept involves several system actors and impacts the productive engine of nations such as industries and firms. This tool is regarded as a mechanism for addressing market failures and coordinating of complex activities involving a diverse set of actors including national science system actors, such as universities and research centres.

Science Granting Councils and the Science Granting Council Initiative

Science Granting Councils (SGCs) are key players in enhancing PPPs around RI within a country's national system of innovation. The role of SGCs and associated proxies in different settings is ideally the provision of financial support for STI-led development in the respective countries. SGCs are also taking on functions such as valorisation, dissemination and promotion of scientific findings, as well as data management and policy advice. Most importantly, these councils act as government agents in representing the interests of the country's scientific community. They become crucial "intermediaries" in the flow of international financial and technical support to R&D performing institutions in a country (Mouton, Gaillard & van Lill, 2014)."

As the number of SGCs in Africa grow and as their potential to strengthen PPPs for scientific research and innovation increases, it is important to facilitate discussions about partnerships for RI, their design, management and impact, to shape their roles within national systems of innovation (ATPS & The Scinnovent Centre, 2017). Accordingly, the Science Granting Councils Initiative commissioned this report to facilitate this discussion. The Science Granting Councils Initiative in SSA is a five-year initiative, jointly funded by the United Kingdom's Department for International Development (DFID), Canada's International Development Research Centre (IDRC) and South Africa's National Research Foundation. The initiative works to strengthen the capacity of SGCs in SSA to support research and evidence-based policies that will contribute to economic and social development. The objectives of the Science Granting Councils Initiative include strengthening the ability of science granting councils to: (i) manage research; (ii) design and monitor research programmes based on the use of robust ST&I indicators; (iii) support knowledge exchange with the private sector; and (iv) establish partnerships between councils and other science system actors (African Technology Policy Studies Network (ATPS) & The Scinnovent Centre, 2017).

The Science Granting Councils Initiative has commissioned this report to facilitate this very discussion. Therefore, this policy brief provides an overview of the issues of PPPs in RI and draws recommendations on practices for adopting them within the SGCs and other science system actors in different countries in sub-Saharan Africa (SSA).

2.0 Methodology

The study was designed to understand how the countries involved in the SGCI, namely Botswana, Burkina-Faso, Cote d'Ivoire, Ethiopia, Ghana, Kenya, Malawi, Mozambique, Namibia, Rwanda, Senegal, Tanzania, Uganda, Zambia and Zimbabwe are engaging into PPPs in RI and share best practices for adoption.

Extensive desk review of secondary case studies in which PPPs in RI were implemented in the sample were analyzed, and when possible, the authors of these investigations were contacted for information on details that could enrich the research. In the course of the desk research, several key reports were identified on PPPs in RI under the SGCI, and interviews with the corresponding authors were scheduled with the aim of including their reflections. Case studies beyond SSA were also analyzed to understand the role and best practices for implementing PPPs in RI outside the sample.

Skype and phone interviews with SGCs representatives from the SSA countries were conducted along with personal interviews. In addition, phone interviews with several directors of technology transfer offices, university-industry linkage and technology offices at main universities of our SSA sample and directors of industry associations were also conducted. This has helped in understanding the current practices around PPPs and the respondents' personal impressions based on their experiences.

3.0 Major Findings

The research methodology described above led to the following findings and insights on PPPs for RI in SSA:

Main Actors and Domains Identified

It was found that government agencies and regional authorities whose mandates do not explicitly cover science, technology and innovation collaborate with other actors to pursue projects in research and innovation to solve key problems in their geographical areas. From interviews held with SGCs representatives, it is clear that the adoption of PPPs in RI, in both developed and SSA regions, largely started as a measure to counter-balance the large public funding cuts for science. The private sector is implicitly seen as the provider of the financial means cut by national governments.

The Private Sector

For many of the SGC members interviewed, this association is not straight forward when discussing the practical implementation of PPPs in RI, particularly in countries in which the private sector is mostly composed by retail and a very narrow manufacturing body mostly formed by SMEs. This is supported by Oyelaran-Oyeyinka and Kaushalesh (2016) who highlight how the service sector has taken the conventional position of industrial manufacturing in Africa in the process of structural transformation. This might well be one of the reasons why progress in PPP in RI that leads to an innovation-driven knowledge economy in Africa has been slow because the region is basically “skipping” the industrial phase and moving right into low-productivity service sectors namely: finance, transportation, trade and low-level ICT sub-sectors in the process of structural transformation.

However, economic growth in African countries including all the countries in this study is being driven not by innovation-led manufacturing which fosters PPP in RI but low-productivity services. It is precisely because of these local conditions, that under the umbrella of the top sectors policy and in their programs regarding low and middle-income countries, NWO-WOTRO (The Netherlands) adopts a broader definition of the private sector, including not only the business sector, but also farmers, non-profit organizations (i.e., foundations, NGOs) and any other relevant partner according to the

program in question. This broader and unconventional definition of private sector has favoured the implementation of PPPs in RI in these regions.

Knowledge Centres

When discussing the main actors in a PPP in RI, universities were highlighted as the major players in these associations. Although it is true that an increasing number of African universities are making efforts to institutionalize linkages with the private [productive] sector by incorporating different varieties of outreach offices in their structure, not all of them have built strong capacities, particularly regarding the management of IPRs, entrepreneurialism and market studies. This research also found that very few of the universities interviewed have experience in incubation and science and technological parks.

The interviews with the national universities reveal that although the objectives of the implementation of PPPs in RI are oriented to solve a market failure, mostly related to value chains, the reasoning for actively looking for these type of partnerships is the large amounts of external revenue that they bring to their centres and to the university. Sometimes due to national budget cuts, these types of associations are a way for the university to compensate for those cuts.

From the fieldwork, it is clear that although most universities have already established an outreach office, most of them focus largely on facilitating the administrative tasks needed to support partnerships with international donors rather than with national SGCs. Outreach centres' directors indicate that their relationship with the private sector is mostly established with SMEs in the region. As in the case of Europe, close location seems to be an important characteristic for engaging in formal partnerships with African universities. Survey results indicate that on average the university initiates and leads the discussions regarding the implementation of PPPs in RI. From the interviews, it was clear that the universities do not have a structured strategy for approaching the private sector. The platforms used to approach the private sector are mostly through conferences where their research findings are presented, industrial internships and grant writing.

In the case of South Africa, for example, the main means of communication for grants and partnership opportunities was through the portal of the National Research Foundation and its emails to the grants support office of the South African universities.

Main Sectors Approached

According to the SGCs, most of the PPPs in RI in developing countries address issues within the agricultural, food, water and health sectors. The need for harnessing local funds to undertake RI in sectors of national interest was constantly highlighted.

Intellectual Property Rights and Related Items

There is an important presence of IPR and patent offices at universities, but this is not yet a strong area of expertise in many of these organizations. Not all the universities have a clear and firm IPR policy. In many cases it was reported that the researcher owns the patents and trademarks. The registration of patents is made at the national level.

Governance Perceptions of the SGCs and System Actors

A clear difference was identified among the actors – ministries/councils related to STI (e.g., education, industries or STI), public national universities and national research foundations or national research programme agencies on PPPs in RI – regarding the main function of PPPs in RI. While for the universities and national research foundations/programmes, PPPs in RI should address issues related to market failures (such as the integration and strengthening of the value chain for a local producer, as well as the development of SMEs), for the ministries this instrument should produce lessons that should be used in the development of effective STI policies, as well as act as a bridge in the production of knowledge and its exchange between universities and the private sector.

Funding and Monitoring Mechanisms

Although the incorporation of linkage or outreach offices at national universities has increased in recent years, the budget allocated by the university to these offices is meagre and their few staff members do not always have the appropriate set of expertise or skills.

When partnerships are established between a university and the private sector, it is the latter that mostly funds the intervention. The main source of funding for the universities (through the linkage offices) are international NGOs or donors, such as SIDA, USAID, has

become a strategic tool to compete for external funds. Most of these grants cover projects with a length from three to five years and require the partnerships to be formalized by Memoranda of Understanding (MoUs) or collaboration agreements and not necessarily through formal contracts.

SGCs and their Linkages with Universities

It was found that the role of the SGCs or related agencies is not often explicitly recognized. The perception of the universities is that SGCs are largely rule-setting and regulation-making entities: that these agencies provide legal frameworks, enforce mandates and create the environment for the establishment of PPPs in RI. However, when asked about the role of SGCs in project implementation, there was no clear delineation of roles from the interviewees.

An interesting observation regarding the adoption of PPPs in RI was found; a direct relationship between SSA universities and the private sector exists when an international NGO or donor is involved. When an SGC is involved, the relationship is not always straightforward.

In countries like Kenya and Ghana, the role of the SGCs is more proactive. Although the organizations are established, their budgets across the sample of countries differ greatly, and consequently they have limited capability to actively engage in direct financing of PPPs in RI activities.

Regional Participation of SGCs in the PPPs in RI in SSA

International development agencies are fundamental players in funding the RI efforts in SSA. From the interviews we identified the different mechanisms implemented globally by SGCs regarding funding and involving a wide variety of industry-science systems actors partnerships in order to compare their platforms of interaction, areas of attention and monitoring mechanisms. The main elements identified are those interactions through websites, national [mostly annual] meetings and email communications, which are well established. Although there are pre-discussions on the establishment of priority areas, these are in line with national or regional pre-established strategic points. The most successful mechanism to the promotion of PPPs in RI has been through grants of 5-7 years projects.

An important issue identified is that in developing countries this tool is being used as a strategy to promote and strengthen state-of-the-art technologies, seeking to maintain leadership at the technological frontier (and ownership of the technology through patents and intellectual property rights) and addressing pre-established societal challenges. Meanwhile, developing economies are using the tool as an instrument to build or strengthen its industrial base, integrate its SMEs into the global value chain and create employment.

4.0 Policy Recommendations for Strengthening SGCs

Recommendation 1. Strengthen Systemic Cooperation and Learning

SSA's private sector is quantitatively small, and its science and knowledge system relatively weak, both financially and institutionally. Private SMEs tend to engage in atomistic and uncooperative behavior, because of their struggle to deal with daily routines, including non-available public goods, which are taken for granted in advanced societies. These small actors also lack information search capabilities. They need support and to interact with universities to raise their collective productivity. This must be facilitated by instruments of policy, as it will not happen spontaneously.

Therefore, it is recommended that SGCs in Africa engage in the deliberate creation of capacity strengthening for sectoral interaction mapping and learning, as in European initiatives. Both the inter-disciplinary nature of the scientific and knowledge base, as well as the complex processes involved in bringing products from laboratories to firms make a range of knowledge interactions critical to competence building at the sectoral level, including engaging with, promoting, and monitoring and evaluating the knowledge interactions between a variety of different key actors.

Such knowledge interactions are difficult to measure, but can be gauged using a combination of factors, such as: the percentage of funds devoted to research; the percentage of research contracted to and from outside organizations; the level of joint research with other organizations (basic, applied or product development initiatives); the number of scientific publications jointly written with other institutions; the level of co-authorship based on joint research; the exchange of key technical and scientific personnel (numbers and levels of qualification); the involvement in joint R&D programmes organized by the government at the sectoral level; and the amount of consultancy research carried out for other organizations, both local and foreign.

Recommendation 2. Strengthen State Institutions for PPPs in RI

In the developing African environment, research and development institutions and

development institutions and their relationships with firms are weak despite progress made over the last decade with the establishment of organizations and institutions that regulate and coordinate innovation functions. State institutions for PPPs in R&I need to be strengthened to enable them to use PPPs for R&I as strategies for advancing technological change in Africa, in addition to addressing market failures. Therefore, in line with Oyelaran-Oyeyinka (2004), we suggest that developing African countries approach the task of developing their national system of innovation with vigor and devote resources to key sectors.

Recommendation 3. Support Policy-Induced Partnerships

Policy-induced partnerships need to be supported. Our study confirms the significance of network partnerships in promoting innovation in both European initiatives and successful cases in Africa and other regions. PPPs in R&I work to generate inter-agent collaborations. However, this cooperative interaction between economic agents in advanced economies responded largely to inducement tools and mechanisms. In Africa, as in other places, collaboration will not happen naturally and policy inducements and facilitative incentives need to be applied consistently over time.

Recommendation 4. Strengthen the Governance of Systems of Innovation

Finally, the governance of national systems of innovation needs to be strengthened. In addition to weak scientific bureaucratic capacity, there is a general consensus from the findings that fiscal limitations pose serious challenges and set limits on what is possible in research, innovation and technology development in SSA. Overcoming these challenges will require a carefully coordinated approach, which recognizes the need to balance prudent fiscal policy with initiatives aimed at encouraging the private sector to invest substantially in innovation. Frameworks to promote linkages between universities, science, engineering and technology institutions, and the private sector are required to share risks (using partnership innovations). The findings call attention to the severe internal challenges inherent in the STI governance structure generally and the PPP in R&I specifically, as well as the existing lop-sidedness of the STI administrative system.

5.0 References

African Technology Policy Studies Network (ATPS), & The Scinnovent Centre. (2017). *Science Granting Council Initiative in Sub-Saharan Africa (SGCI), Towards Effective Public-Private Partnerships in Research and Innovation, Concept Note and Terms of Reference*. African Technology Policy Studies Network (ATPS) and The Scinnovent Centre. Nairobi, Kenya.

African Union. (2014). *Science, Technology and Innovation Strategy for Africa 2014 (STISA 2024)*. African Union Commission. Addis Ababa, Ethiopia.

Chataway, J., Chaturvedi, K., Hanlin, R., Mugwagwa, J., Smith, J., & Wield, D. (2009). Technological Trends and Opportunities to Combat Diseases of the Poor Africa. In F. Kalua, A. Awotedu, L. Kamwanja, & J. Saka (Eds.), *Science, Technology and Innovation for Public Health in Africa*. Johannesburg, Republic of South Africa: NEPAD.

Mouton, J., Gaillard, J., & van Lill, M. (2014). *Science Granting Councils in Sub-Sahara Africa*. Stellenbosch University, CREST, IRD. South Africa.

NACETEM. (2010). *Assessment of innovation capability in the manufacturing sector in Nigeria*. Monograph Series. NACETEM. Ile-Ife.

NEPAD. (2006). *Report on activities of the NEPAD agency in the implementation of the Africa's Science & Technology Consolidated Plan of Action (CPA) in Southern Africa*. NPCA Mission to Southern Africa. Pretoria.

Oyeleran-Oyeyinka, B. (2004a). Learning, Knowledge and Skills: Implications for firm-level performance in African industry. *International Journal of Technology and Sustainable Development*, 3(2).

Oyeleran-Oyeyinka, B., & Kaushalesh, L. (2016). *Structural Transform-ation and Economic Development. Cross Regional Analysis of Industrialization and Urbanization*: Taylor & Francis.

The African Capacity Building Foundation. (2017). *Building Capacity in Science, Technology and Innovation for Africa's Transformation: The Role of Higher Learning and Research Institutions. In Policy Brief*: The African Capacity Building Foundation.

6.0 ATPS Technopolicy Brief Series

Innovative Practices and Policies for Promoting Biodiversity Informatics in Sub Saharan Africa (ATPS TechnoPolicy Brief No. 48)

Improving the Relevance of University Training to Labour Market Demands in Africa (ATPS TechnoPolicy brief No.47)

Developing Policies for Biodiversity Informatics in sub-Saharah Africa (ATPS Technopolicy brief No. 46)

ICTs role in Agricultural Development: Prospects of Land Potential Knowledge System (LandPKS) ((ATPS TechnoPolicy brief No. 45)

Mainstreaming Gender in the National Science, Technology and Innovation (STI) Policy of Kenya (ATPS TechnoPolicy brief No. 44)

Social Innovation: An untapped Resource for Inclusive Green Growth (ATPS TechnoPolicy brief No. 43)

Policy Axes that can uphold Agricultural Innovations for Climate Change Adaptation & Food Security in Central Africa: Case of Cameroon, Equatorial Guinea and Central African Republic (ATPS TechnoPolicy brief No. 42)

Frameworks for Intellectual Property Protection of Traditional Knowledge in Tanzania (ATPS TechnoPolicy brief No. 41)

Assessment of Possible Intellectual Property Protection Options of Traditional Knowledge System in Ethiopia (ATPS TechnoPolicy brief No. 40)

Towards influencing National Legislation, Policies, Strategies and Programmes for appropriate Protection and Benefit-Sharing of Traditional Knowledge (TK) with and by Traditional Herbalists in Uganda. (ATPS TechnoPolicy Brief No 39)

38 Traditional Healers and their provision of Mental Health Services in Cosmopolitan Informal Settlements in Nairobi, Kenya. (ATPS TechnoPolicy Brief No. 38)

Policy Implications for Intellectual Property Systems for Traditional Healers in Lesotho. (ATPS TechnoPolicy Brief No. 37)

Incidence of Indigeneous and Innovative Climate Change Adaptation Practices for Smallholder Framers' Livelihood Security in Chikhwawa District, Southern Malawi. (ATPS TechnoPolicy Brief No.36)

Machobane Farming System and its Relevance to Climate Change Policy in Lesotho. (ATPS TechnoPolicy Brief No. 35)



The African Technology Policy Studies Network (ATPS) is a trans-disciplinary 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.

African Technology Policy Studies Network (ATPS)

Contact the Executive Director at:
executivedirector@atpsnet.org

The Chancery, 8th Floor, Valley Rd,
P.O Box 10081, 00100-Nairobi,
Kenya

Tel: (020) 2714092

www.atpsnet.org

Science, Technology and Innovation for African Development

ISBN: 978-9966-030-76-9

