

Policy Brief

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Political economy insights for science system transformations in sub-Saharan Africa



OVERVIEW

Building and strengthening transformative science (and research, technology and innovation, collectively, STI) systems in sub-Saharan Africa (SSA) is as much a political and economic challenge as it is technical. Current political economy contexts – whether national, regional or global – condition the ways STI systems in SSA evolve, the goals they prioritise, and which STI system actors secure economic benefits and power.

We summarise a political economy analysis of the STI systems in five SSA countries – Ethiopia, Kenya, Rwanda, Senegal and Tanzania – and provide recommendations relevant to each national case, especially for each national Science Granting Council (SGC). We also highlight common themes that emerge from the cases and give recommendations for action across SSA more generally. Important cross-cutting issues are that (1) **gender and inclusivity** do not seem to be receiving the active attention they need if they are to be addressed sufficiently in line with sustainability goals, and (2) **human resource constraints** continue to hamper efforts to strengthen STI systems.

Key messages

- **Research Excellence (RE)** remains an important goal to sub-Saharan Africa (SSA) STI stakeholders, for whom RE means research that achieves academic and societal or developmental impacts. Evidence from interviewees provides the basis for three categories of RE: (1) research focus, (2) research process and incentives, and (3) research support. The consensus position is that RE must include a focus on addressing societal challenges and national development goals (impact) in addition to achieving academic objectives, such as publishing in high quality journals.
- Across the SSA region, the **narratives** STI stakeholders are using imply the concept of innovation is widely understood to mean only marketable products, and innovation processes are understood in linear science-push terms.
- References to the **Private Sector** imply it is an undifferentiated group of actors, but the reality in SSA is more complex. This has implications for: (a) how data are collected and analysed, (b) how discussions around levels of funding from “the private sector” are influenced or shaped by current narratives, and (c) how research and development investments by private sector actors are handled.
- **Governance Structures** that allow science or, more broadly, STI systems to be better coordinated in ways that enable effective performance of Science Granting Councils are important. Yet, there is no one ‘best’ structure apparent, whether at the national, sectoral, sub-system or organisational level.
- **Governance and policymaking** are characterised by a silo mentality and fragmentation. To break down the silo mentality and to reduce fragmentation, better coordination of actors is needed across government agencies and the science systems, and with the links to implementation of policies (where such policies exist).

FINDINGS

The political economy framework and methodology applied to the five national case studies are sketched below. Findings from the cases are summarised in Table 1, but, looking across the case studies, five common themes emerge.

Governance and development strategies

STI is cross-cutting and needs to be considered by all government ministries in the coordination of development strategies. However, governance remains largely rhetorical. Although it is recognised in policy and political discourse, it is lacking in implementation.

Human resources

Capacity constraints – including university access and the quality of university education, STI courses offered, skills training needed – salaries and working conditions in the STI field (that create a brain drain), and skills gaps are widely identified as typical political economy issues.

Funding

Funding for research and STI remains low across the case study countries. The reasons suggested for this situation are many. Low levels of funding from the domestic private sector are explained by it being (a) dominated by SMEs with weak financial capacity to invest in R&D/STI activities, (b) too small to be concerned with research, (c) unable to see the business value in research, (d) distrustful of

government research organisations, thereby making it difficult to establish linkages between the private sector and research institutions, (e) lacking in R&D/STI expertise, and (f) unincentivized. As for research institutions, some university researchers fear that conducting R&D for private firms will constrain their academic freedom and autonomy. Despite these numerous challenges, there is widespread hope and emphasis on increasing private sector funds for R&D and STI activities.

Research excellence

There was unanimous belief among the interviewees that research excellence should mean having developmental impact, and many maintain that the more traditional notion of publication in high impact journals should be included – along with developmental impact – as an indicator of excellence. Realising research excellence requires action in terms of incentivising academics to focus on research, provision of strong research support, and support in networking with other likeminded researchers.

Innovation Systems

There is a continuing need to address weak linkages across innovation ecosystems. However, the understanding of what constitutes an innovation system is predominately limited to university-industry linkages and the support (e.g. financing) needed to promote such linkages. And the predominant understanding of innovations is limited to technological products that can be sold in markets.

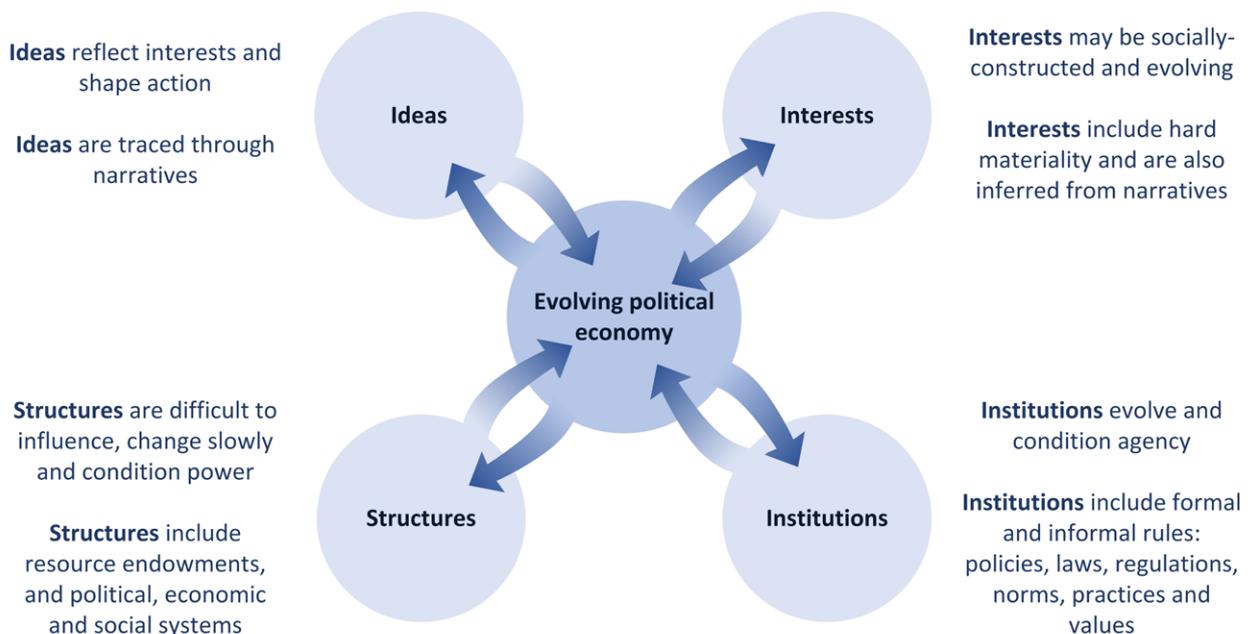


POLITICAL ECONOMY FRAMEWORK

- **Ideas** – often conveyed in narratives – are deployed by actors who construct and seek to further their own interests.
- **Actors** construct their **interests** by participating in discourses and assessing the opportunities for action emerging from structural conditions and institutional arrangements.
- **Agency** is enabled or constrained by formal and informal **institutions** or “rules of the game”.
- **Structures** are long-term contextual factors that are not easily influenced but condition what development is possible. They derive from many different sources: geographic, economic, political, organisational, social and ideological.

FIGURE 1: FOUR CO-PRODUCTIVE CATEGORIES OF AN EVOLVING POLITICAL ECONOMY

To understand the evolution of the political economy of an STI system (represented by the central circle), we analyse the co-evolution of ideas, interests, institutions and structures (represented by the outer circles and the two-way arrows) relevant to that system.



Source: Daniels et al (2020)

ABOUT THE RESEARCH

Drawing on mixed methods, the study methodology involved: (a) review of academic and grey literatures, data, agents and actors; (b) semi-structured interviews with 42 actors working in the science ecosystems in SSA; and (c) five national case studies – Ethiopia, Kenya, Rwanda, Senegal and Tanzania. All the research was conducted during 2019, and the analysis was completed by May 2020.

TABLE 1: SUMMARY OF NATIONAL CASE STUDIES

Country	Overview of the policy environment	Political economy issues raised	Recommendations for STI actors
Ethiopia	The organisational structure of the National STI System governance has four functional levels: <ol style="list-style-type: none"> 1. National STI Council (NSTIC) 2. Technical Advisory Committee of the NSTIC 3. Ethiopian Science and Technology Agency 4. S&T operational Institutes and Centres 	<ul style="list-style-type: none"> • Fragmentation of the STI ecosystem and poor policies • Limited capacity building, human resource and infrastructure • Limited funding for implementing STI activities • Low technology transfer 	<ol style="list-style-type: none"> i. SGC (MInT): the Ministry of Innovation and Technology must ensure that the STI Policy revisions are completed and implemented ii. Private sector actors: must see value in research and innovation and be incentivised to work, for example, with universities iii. Policymakers: must improve policy implementation, reduce staff turnover, and provide clearer guidance for foreign investors who might participate in STI activities
Kenya	Through the 2013 STI Act, three organizations were established to coordinate national STI activities. These are: <ol style="list-style-type: none"> 1. National Commission for Science, Technology and Innovation (NACOSTI) 2. the Kenya National Innovation Agency (KeNIA) and 3. the National Research Fund (NRF) 	<ul style="list-style-type: none"> • Low funding for research; weak linkages between research and STI • Levels and mismatch of STI skills and capacity • Unclear mechanisms for policy implementation, monitoring and evaluation • Need for improved clarity on the relevance of STI research for business or societal benefit • Recognition of gaps in STI policy implementation 	<ol style="list-style-type: none"> i. SGC (NRF): improve data availability (e.g. on funding) for STI research ii. Private sector actors: increase innovation in SMEs and Research and Development outside of “the lab” iii. Policymakers: maintain the renewed efforts to align Kenya’s STI activities with different agendas (Big Four, Vision 2030 and the SDGs)
Rwanda	In 2013, the National Commission for S&T (NCST) was established with a mandate to regulate national science, technology, research and innovation activities and advise government on policy and legislation in STI. Its establishment was part of a national focus placed on using STI as a catalyst for the country’s development	<ul style="list-style-type: none"> • Lack of capacity of staff in STI organisations • Reliance on external actors for funding • Limited interactions between STI stakeholders • Improving research quality starting with the school curriculum and Technical and Vocational Education and Training 	<ol style="list-style-type: none"> i. SGC (NCST): update website, provide information on funding and grants, and incentives to researchers to apply for grants, enable effective tracking ii. Education providers: review a) decision to consolidate research in one university and b) indicators for STI iii. Private sector actors: argue for increased investments and attention to R&D and STI iv. Policymakers: ratify and implement STI policy
Senegal	Organisational and institutional reforms within the Ministry for Higher Education, Research and Innovation (MESRI) have led to the creation of a dedicated directorate to lead on STI activities. In the absence of a dedicated STI policy, sectoral measures relate to higher education reforms, Plan for an Emerging Senegal, R&D, and MESRI’s activities on STI	<ul style="list-style-type: none"> • Challenges in implementing STI activities • Need for high-level policy support for STI • Low research funding, capacity building, and investment in equipment and infrastructure, • Need for greater efforts to promote STI and vocational training 	<ol style="list-style-type: none"> i. SGC (MESRI): help to ensure support for STI from the executive and legislative ii. Education: foster better articulation of the role of education in delivering skills for STI iii. Private sector actors: increase spending (public and private) for research, STI and R&D iv. Policymakers: redirect STI and public policies to focus on overcoming silos and reducing fragmentation
Tanzania	The Commission for S&T (COSTECH) remains the organisation with the mandate to oversee STI and research. COSTECH has set priority research areas in STI to enhance national socio-economic transformation, mainly through industrialization, in line with the Development Vision 2025, to promote technology transfer and innovation	<ul style="list-style-type: none"> • Low expertise and motivation – resulting from lack of skilled human resources (PhDs and technical) • Inadequate research funding leading to low quality of research • Nascent national innovation system and policy environment 	<ol style="list-style-type: none"> i. SGC (COSTECH): needs to cement its place within the STI system in Tanzania and become the “go-to” place for anything relating to research and STI ii. Private sector actors: increase their support for R&D and STI through funding iii. Policymakers: enhance capacity building to ensure that the policies developed can be easily implemented, starting with the revised STI policy

CONCLUSION

Innovation systems and development: STI plays a crucial role in addressing a range of development challenges. However, current understandings of innovation and STI systems remain narrow, partial and linear, a reflection of the ideas and narratives at play. Understanding innovations as products, services and technologies, and STI systems as university-industry linkages, limits what actions are taken to strengthen science systems and promote innovation, and it may diminish STI's contribution to achieving development goals.

Capabilities and skills: Strengthening STI or science systems requires building a wide range of capabilities and skills. At present, approaches to capability strengthening reflect the current understandings of innovation and innovation systems. As such, capability building may not be focussed in the most effective ways.

Gender and Inclusivity: Gender and inclusivity issues are either not (a) considered important, (b) recognised or properly articulated or, further still, (c) considered as priorities.

Research excellence: This not only means publication in high-quality academic journals but also the achievement of societal impact. Realising research excellence will be a significant challenge as it is conditioned by many factors: e.g. research environments (e.g. research cultures, organisational structures), infrastructures (e.g. laboratories and other facilities), and incentives (e.g. funds, prestige, career opportunities, possibility to buy out teaching time).

Structure: In relation to policymaking, structure is an important factor for effective governance, efficiency, and resource (such as human, financial, technological) management. Structure can affect the operations of SGCs and their ability to effectively manage science and research, reduce fragmentation and silo mentality, and actively engage with policy processes and policymaking.

Recommendations

- **Broaden understandings of innovation beyond products, services and technologies, and understandings of STI systems beyond university-industry linkages.** Doing so could help science system actors better articulate the role of science in achieving development goals and could enrich the debates on science funding and STI systems-strengthening in SSA.
- **Focus on capability building that achieves systems-level impact.** All stakeholders will need to work together in the design and delivery of training, adopting a co-learning approach to understand and support STI systems. Complementary to such training is skills development in innovation systems thinking for SGCs and policymakers (including leaders, decision-makers, and parliamentarians). This should be focussed on identifying and evaluating STI systems as opposed to the promotion and implementation of STI by system actors.
- **Design broad training appropriate to individual skills and organisational capacity.** In designing and implementing training and capacity building programmes, science and research system actors must ensure that curriculum designs cover a broader range of innovation studies concepts, and that training addresses the skills of individuals as well as capability needs at organisational level.
- **STI actors need a deeper analysis of what constitutes the private sector in Africa.** This will help improve understanding of the relevant political economy factors influencing the sector. Deeper analysis, and re-categorisation of the private sector to include SMEs and actors in the informal economy, will support work in key areas, such as data and knowledge management, funding, skills and capability building, and policy interventions.
- **Intensify attention to gender and inclusivity issues in SSA's STI systems.** Gaining a deeper understanding of (i) why some actors still do not consider these as priorities, (ii) why current efforts seem to be ineffective in addressing the gaps, and (iii) what further changes – e.g. institutional configurations (structures), capabilities and skills, research, policies and practices – are needed to embed gender equality and inclusivity in SSA's STI systems and ensure adoption by stakeholders.
- **Sustain efforts to embed research excellence across SSA's STI ecosystems.** This needs to be done with both academic and development impact foci and in tandem with broadening understandings of innovation and STI systems.
- **Encourage and support policy experimentation.** Use new and alternative structural and governance configurations and policy approaches at SGCs with a view to improving knowledge of what works best, why, and under what circumstances.

FURTHER READING

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The Science Granting Councils Initiative (SGCI) is a multi-funder initiative that aims to strengthen the capacities of 15 science granting councils in Sub-Saharan Africa in order to support research and evidence-based policies that will contribute to economic and social development. www.sgci-africa.org/en-za/home



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