FINAL TECHNICAL REPORT / RAPPORT TECHNIQUE FINAL

TANZANIA PE2 CASE STUDY - MAY 2020

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Updating the Case studies of the Political Economy of Science Granting Councils in Sub-Saharan Africa

National Case Study Report of

Tanzania

Science Granting Council

To the International Development Research Centre (IDRC)

Science Policy Research Unit (SPRU), University of Sussex, United Kingdom

African Centre for Technology Studies (ACTS), Kenya

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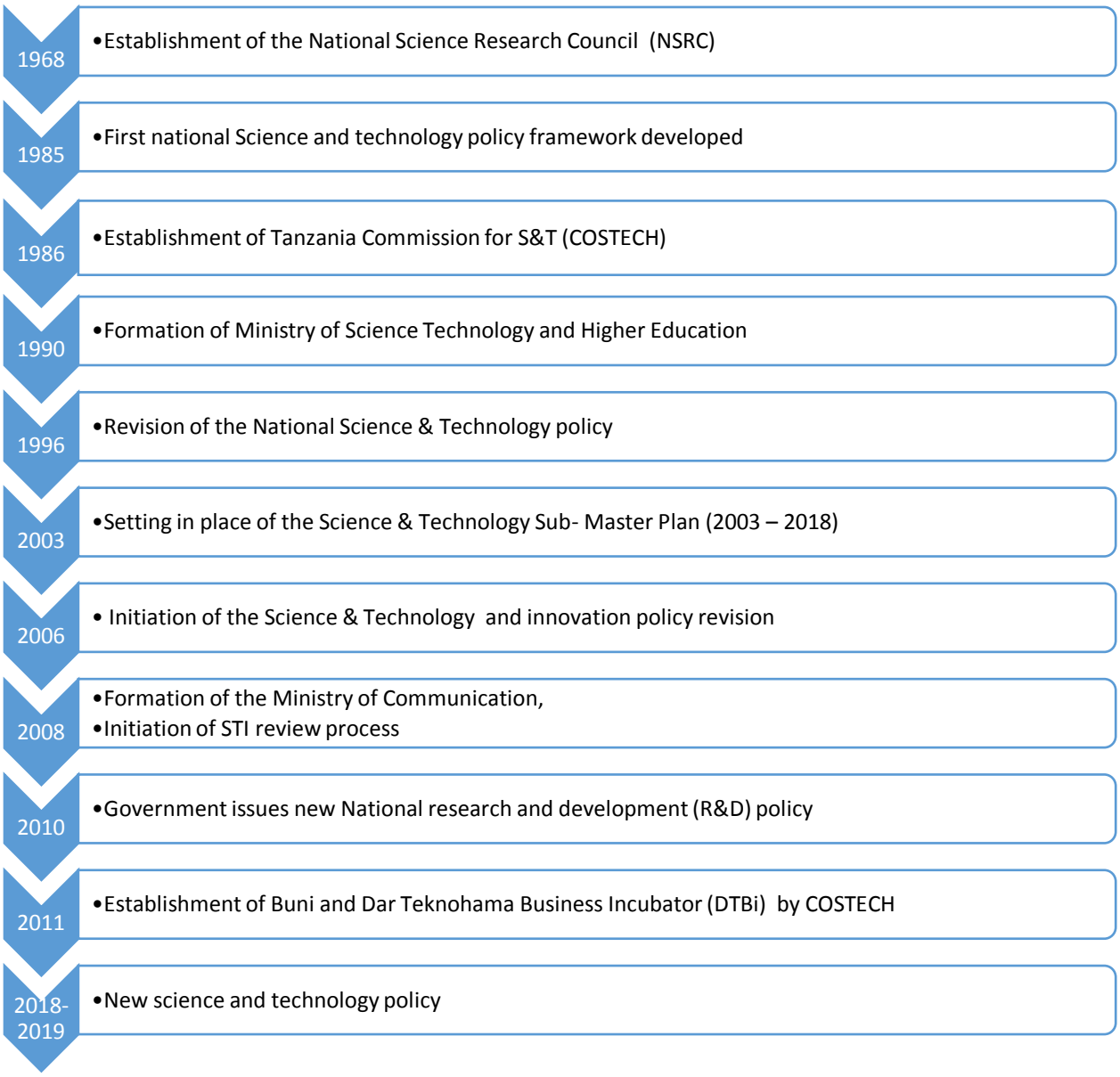
1 Context of Tanzania's STI System

Figure 1: Historical milestones that have influenced the STI system in Tanzania.



Over the years, the Tanzanian government has made strides to ensure the growth and development of the national STI system, as shown in Figure 1. In 1986, COSTECH was established as a successor of the Tanzania National Scientific Research Council (NSRC) better known as "UTAFITI" (COSTECH, 2019). COSTECH was established with the main mandate of coordination and promotion of research and technology development activities in the country. The aim of this case study is to identify the different political, economic and social aspects affecting the performance of STI in Tanzania. Key informants from different sectors were interviewed either via Skype/phone or in person (see the Annex for interview

information). Additional information was collected from secondary sources during a thorough literature review. This study was carried out between May and November 2019.

1.1 Contextual factors arising between 2017 and 2019

1.1.1 Political overview

Since the first study (Chataway et al., 2017; see also Chataway et al., 2019), there have been few political changes that have influenced the STI landscape in Tanzania. The country is still presided over by the 5th President of the United Republic of Tanzania, John Pombe Magufuli. Improved management of public resources, public administration and eradication of corruption have been priorities in Magufuli's government since his appointment in 2015. Notably, he has taken a strong stance on corruption, which has been curbed during this period (World Bank, 2019).

1.1.2 Economic overview

In 2018, Tanzania's GDP growth rate decreased to 6.7% from 7.1% (AfDB, 2019). The increased volume of imports in 2018 due to importation of equipment and construction material for large government projects – e.g. Standard Gauge Railway – and depreciation of the Tanzanian shilling may have contributed to a decrease in the GDP growth rate. However, the level of inflation decreased to 3.5% due to a surplus in food supply (AfDB, 2019). According to the Bank of Tanzania, the government contributed USD 271,005,000 out of USD 271,048,000 for development activities. Only a small portion was received from donors (USD 43,353) (Karashani, 2019). The main contributor to GDP was the service sector (39.3%).

There was seen to be more flexibility in the monetary policy in 2018 compared to 2017. This reduced the borrowing rate resulting in increased private credit supply (AfDB, 2019). Dependency on donor funding has slightly reduced due to increased domestic revenue (partially from taxes) and economic growth. Nevertheless, up to a third of government expenditure is financed by donor funds[1]. Tanzania's reliance on donor funding may significantly decrease in the near future due to increased revenue from natural gas and economic growth (AfDB, 2019).

Tanzania did not receive any external funding for its 2018/19 budget due to governance issues. In 2018, the government only received 0.016% of the funds required for government projects. The government had to fund the projects through alternative funding sources (Karashani, 2019). The majority of development partners are withdrawing financial aid due to the government's strict stance on issues like gay rights. However, the government claims that there are contributing factors to donor support including strict conditions, delayed implementation of projects and prolonged negotiation periods. Only 54% (USD 315.5 million) of the pledged amount (USD 1.157 billion) of funds was received from development partners in 2018 (Karashani, 2019).

Despite the decrease in poverty in Tanzania, a large portion of the population remains poor. This may be due to the growth rate of the population (World Bank, 2019). Approximately 47% of the population is living below the poverty line. The latest World Bank report (2019) ranks Tanzania at 144 out of 190 economies at ease of doing business. This shows a decrease in ranking from the previous 137/190 in 2018 (Trading

[1] Note that this is direct to projects as opposed to the USD 43 thousand, which is direct to government support and only that which was captured by reporting.

Economics, 2019). According to the Ministry of Industry, Trade and Investment, the decrease in rank is due to enforcement of new regulations aimed at curbing misconduct in business. These regulations are aimed at improving the business sector in the future. The new rules include mandatory vehicle checks to reduce arms/human trafficking and permit fees for all businesses including those in the informal sector (Brewin, 2019).

On the economic front, overreliance on hydropower for electricity production has been seen to be one of the bottlenecks to sustainable economic development in the country. Low rainfall and depletion of water reservoirs are the main contributing factors to insufficient electricity production in Tanzania. This rainfall deficit has also had a tremendous toll on the agriculture sector, thus also having a negative impact on economic development (Ministry of Foreign Affairs of Denmark, 2019). Tanzania has recorded an increased efficiency of resource use. Targeted funding from donors has been seen to have a major impact, especially in the service sector. The government has used donor funds, alongside use of its own resources, to improve vital sectors in the SDGs. The Tanzania Development Vision 2025 promotes the use of ICTs and suitable capabilities to encourage sustainable development (Barakabitze, 2019).

1.2 Science and Technology System overview of Tanzania

In late 2017, Amos Nungu was appointed the new Director General for COSTECH. He was previously the Assistant Director – Directorate of Science, Technology and Innovation at the Ministry of Education, Science and Technology. COSTECH is the main regulatory body for all STI related activities in Tanzania. The responsibilities of the commission include coordination and monitoring of scientific research, innovation and technology development related activities; registration of research institutions within the country; provision of advice to the government in regard to STI related issues, allocation of research and development (R&D) funds; generation and dissemination of research output; preparation and review of national STI programmes; and enhancement of technology transfer (COSTECH, 2018).

Despite the magnitude of its mandates, it has been noted that COSTECH does not have enough resources to efficiently execute its duties. At the same time, coordination of COSTECH with other government bodies has been frustrated by the insufficient resources (Salam et al., 2018).

COSTECH has set priority research areas in STI to enhance national socio-economic transformation, mainly through industrialization. This is in line with the Tanzania Development Vision 2025 (TDV 2025) to promote technology transfer and innovation. The main aim of the vision is to shift the country from agrarian-led growth into an industrial and service-led economy. STI will play a crucial role in this transformation through the embedding of research in all sectors of the economy (Tawiri, 2016).

Tanzania has experienced tremendous growth in the innovation system over the past 5 years. This has been evident from the increased number of individuals and institutions actively involved in innovation activities. In 2018, the country's ranking in the Global Innovation Index 4 improved, moving up 27 positions to 92 from the previous recorded rank of 123 in 2013. This rise in rank is commendable due to the favourable innovation environment in the country. An increased awareness of the importance of innovation as a tool to address societal issues has been noted. Despite this, innovation in Tanzania is still in its infant stages due to limited resources and support (HDIF, 2018).

1.3 Policies governing the Science Granting Council and R&D in Tanzania

The National R&D Policy issued by the government in 2010 emphasizes the need for establishment and regular review of priority areas in research. The policy also emphasized the importance of identifying research areas that contribute to economic development and address societal needs (de Haan, 2015). During the 6th national annual STI conference and exhibition held in 2018, the Deputy Permanent Secretary in the of the Ministry of Education, Science, Technology and Vocational Training, Prof Mdoe, spoke on the drawbacks of the current STI policy. He pointed out that the existing policy does not have the capacity to address the issues within the current STI system. Preparation of a new STI policy is in progress and the policy was supposed to be published between 2018/2019. The new policy will be formulated to address the current issues within STI. Prof Mdoe further emphasized the role the new policy will play in attaining national economic growth through STI (Abdu, 2018).

2 STI system

In the first Political Economy Study, PE1, it was observed that Tanzania was doing well relative to other countries in terms of gaining funding from the private sector but that changes in policy and emphasis by donors and the government were negatively impacting the STI system (Chataway et al., 2017). The issues facing COSTECH and other stakeholders highlighted in the PE1 study were:

- Changes in policy towards industrialisation
- Overlaps in roles/responsibilities and lack of autonomy of certain actors
- Changes in donor support and priorities
- Private sector funding for STI which was ring-fenced
- Increased focus on impact of funding

Very few of these issues were raised during interviews and the literature review in this round of analysis, with the exception of the influence of funders' priorities in research undertaken. The issues raised during this second political economy study are outlined below.

2.1 Evolution of STI system 2017 to 2019

2.1.1 Low expertise and motivation

Lack of skilled/highly knowledgeable human resources in innovation and development was noted by one respondent from the research sector. The respondent pointed out that the low number of senior researchers with PhDs in research institutions has been strenuous in the resource mobilization activities. She further added that, in the past, co-grants ensured that the private research organizations had enough funds to sustain themselves. Co-grants no longer exist, and the organizations have to ensure that the money raised from projects covers all expenses. In addition, other respondents noted that university research staff are not exclusivity engaged in research/product development on a full time basis. They are also obligated to be involved in teaching, administration and other community services (often while also working on paid research projects). Thus, the research output may be compromised in terms of quality and quantity. The result is a lack of incentives to motivate researchers in Tanzania to be fully focussed on research. Instead, they often end up searching for alternative sources of income rather than focussing on research.

The skills issue was also raised with regard to other areas of academia. Several respondents interviewed during the study pointed out that there are few people equipped with the technical skills required by industry. The majority of technical colleges have been upgraded to universities. It was noted by one respondent that "the job market is flooded with experts and engineers and very few technicians who are the major sources of innovation". It was argued that there needs to be a balance between highly trained personnel with university degrees and artisans and technicians from polytechnics. The rate of unemployment among Tanzanian youth remains high, mostly because the graduates are not equipped with skills required by employers (HDIF, 2018).

2.1.2 Research funding priorities

Funding is crucial in sustaining researchers and research activities. Insufficient funding reduces the quality of the research output. According to one of the researchers we interviewed, available donor funding can

only be accessed through competitive calls. These funds can only be used in line with the research to which it is attached, thus researchers are not able to implement research projects of their choice. Interviewees also noted that investments in research require long-term horizons but that the government and private sector expect investments with immediate returns. One interviewee stated that priority areas for funding in the Ministry of Education, Science, Technology and Innovation can, at times, be politically influenced and gave the example of school infrastructure funding. A key respondent from one of the local universities pointed out that the majority of the research funded by COSTECH is in public research institutions. Private research institutions rarely receive any funding from COSTECH. However, they argued that the government needs to support research activities in private institutions even if it is in the form of subsidies.

2.1.3 Poor policy implementation

A respondent pointed out that the weaknesses in formulation of policies have serious implications for implementation, and that policy formulation can be politically influenced and non-objective. It was also noted that knowledge of the STI field was often limited as most policy makers have limited understanding of the STI concept. A related argument made by respondents concerns the limited awareness of the general public with regard to organisations like COSTECH. It was noted that the fact that COSTECH only has one office in the capital, lacking regional/zonal offices, limits its ability to serve the entire country.

2.1.4 The quality of the national innovation system

A respondent from academia mentioned that the national innovation system (NIS) is still at its infant stage and is not well developed, noting that challenges to the NIS include difficulties with infrastructure and poor linkages between key actors. It was pointed that there are often silo operations among the different sectors and associated ministries. Another respondent from the private sector pointed out that there are several ministries dealing with STI in the country but that they often operate independently from each other. He stressed the importance for sectors/ministries working together to enhance knowledge and skills sharing.

3 Progress against indicators

3.1 Science funding

	2017	2019	Notes
R&D expenditure as % of GDP	0.53%	No data	UNESCO, 2015: Tanzania 2013 data
- Distance to national target of 1%	0.47%	No data	
- Distance to regional target of 1%	0.47%	No data	
- % from government	57.53%	No data	UNESCO, 2015: Tanzania 2013 data
- % from business enterprise	0.08%	No data	UNESCO, 2015: Tanzania 2013 data
Role of foreign funders over the past five years	↑	↓	

↑↑↑ high and increasingly; ↑ low; --- no change; ↓ decreasing

The main national funding organ for STI remains the National Fund for the Advancement of Science and Technology (NFAST), as outlined in the first round of this study. The majority of the funding received by NFAST is from donor organizations. The major drawback of this is that most of the research projects funded by donor organizations have to be in line with the donor's agenda. Another drawback, as noted by interviewees and by other writers (see for example, Atela et al., 2018) is that researchers do not have the flexibility to address their own research interest or national development/social needs. Insufficient resources are a major hindrance to the progress of R&D in Tanzania. R&D funding is primarily dependent on government and foreign donor organisations, as noted above, and donor funding has been reducing.

3.2 STI impact

There has been some recognition of the impact of innovation on society in Tanzania since the first study was completed in 2017. HDIF (2018) has noted that innovation has had numerous beneficial effects on society over the years including job creation, access to clean water, and capacity building. One of the innovations that are mentioned is the Gongali Model, which is an affordable water purification system invented by a Tanzanian Chemical Engineer, Dr Askwar Hilonga. It is argued that Dr Hilonga has created numerous job opportunities for underprivileged women and enhanced their skills in entrepreneurship and other life skills. Another example of an innovation that was given is SIGMA, which is a company that constructs efficient biogas systems for schools. SIGMA is also involved in capacity building of local entrepreneurs in construction and maintenance of the systems.

	2017	2019	Notes
Field of science receiving most R&D funds	No data	No data	UNESCO Science report 2015
Place of STI on policy agenda over the past five years	↑	No change	
Importance of applied research over the past five years	↑	No data	
Importance of multidisciplinary research over the past five years	↑	No data	
Importance of user-integrated research over the past five years	No data	No data	

3.3 Science capacity

	2017	2019	Notes
Researchers in R&D (per million people)	18.49	No data	UNESCO, 2015: Tanzania 2013 data
# of staff in SGC	No data	No data	
- Distance to target	No data	No data	
Improvement in science system to absorb funds in terms of researcher quality	No data	No data	
Improvement in science system to absorb funds in terms of fund manager quality	No data	No data	

No data can be found to be able to effectively comment on the issue of science capacity in the period between 2017 and 2019 in Tanzania.

4 Conclusion and recommendations

4.1 Main findings and conclusion of the report

Since the last report, Tanzania's ranking in the Global Innovation Index 4 improved, rising 27 positions to 92 from the previous recorded rank of 123 in 2013. This is despite the findings of this report that highlight a significantly unfavourable environment for research and STI. That being said, the efforts of the country to work towards sustainable industrialization place a focus squarely on the importance of STI and research. The revision of the STI policy that is ongoing at the end of 2019 will be important in this respect. The key finding in this follow-on review is that the successful implementation of any revised STI policy is likely to only be possible if the bottlenecks relating to the policy environment (notably the resourcing of COSTECH and its autonomy) are fully addressed.

4.2 Recommendations for the STI actors in Kenya

Science Granting Council: COSTECH

COSTECH needs to cement its place within the STI system in Tanzania. If it can enhance its position so as to become the effective "go-to" place for anything relating to research and STI, it will be able to leverage increased numbers of collaborations which, in turn, will strengthen the STI system. This may involve moving its location to within the Office of the President, as other countries have done.

There is a need for enhanced collaboration between COSTECH and appropriate ministries in order to work towards industrialization. In addition to this, donor requirements for multi-disciplinary teams could encourage these collaborations.

Private sector

The private sector needs to increase their support for research and development through funding. Those involved in R&D need to continue advocating for the government and private sector to understand the importance of research, and the importance of collaborations between these two groups of actors.

Policymakers

There is a need to enhance capacity building to ensure that the policies developed can be easily implemented, starting with the revised STI policy. An enhanced focus on the influencing factors during the policy formulation, implementation and evaluation processes is essential, together with development of corresponding mitigation strategies.

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Annex: Interview details

Interviewee	**Interview mode**	**Interview date**
Researcher, Science Technology & Innovation Policy Research Organization (STIPRO)	Skype	11 July 2019
Professor, Tanzania Academy of Sciences (TAAS)	Phone call	19 July 2019
Staff member, Confederation of the Tanzanian Industries (CTI)	Phone call	29 July 2019
Lecturer, University of Dar es Salaam (UDSM)	In person	23 October 2019
2 staff members, Tanzania Chamber of Commerce, Industry and Agriculture (TCCIA)	In person	24 October 2019
Staff member, COSTECH	Phone call	18 November 2019
Director, private company	Questionnaire	20 November 2019