

## **Final Report**

### **STECS Plus: An analysis of contributions to COVID-19 responses by science granting councils in selected African countries**

A Science Granting Councils Initiative in sub-Saharan Africa (SGCI) Project  
Implemented by

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## List of Abbreviations

ACBF: African Capacity Building Foundation  
ACTS: African Centre for Technology Studies  
ATPS: African Technology Policy Studies Network  
AUC: African Union Commission  
CTAs: Collaborating Technical Agencies (or Clinical Trial Applications)  
DFID: Department for International Development  
EARIMA: East African Research and Innovation Management Association  
EU: European Union  
FNI: Fundo Nacional de Investigaçã (National Research Fund),  
Mozambique  
FONRID: National Fund for Research and Innovation for Development,  
Burkina Faso  
GDP: Gross Domestic Product  
IDRC: International Development Research Centre  
IMT: Initiative Management Team  
LMICs: Low-and-Middle-income Countries  
MBIE: Ministry of business, innovation and employment (New Zealand)  
MEL: Monitoring, evaluation and learning  
MESRI: Ministry of Higher Education, Research and Innovation (Senegal)  
MoU: Memorandum of Understanding  
NCST: National Council for Science and Technology (Malawi and Rwanda)  
NCRST: National Commission on Research, Science and Technology (Namibia)  
NEPAD: New Partnership for Africa's Development  
NIH: National Institutes of Health  
NRF: National Research Foundation (South Africa)  
NRF: National Research Fund (Kenya)  
NSTC: National Science and Technology Council (Zambia)  
PI: Principal Investigator  
PPP: Public-Private Partnership  
R&D: Research and Development  
SADC: Southern African Development Community  
SARIMA: Southern African Research and Innovation Management Association  
SBIR: Small Business Innovation Research programme (USA)  
SDGs: Sustainable Development Goals  
SGC: Science Granting Council  
SGCI: Science Granting Councils Initiative  
Sida: The Swedish International Development Cooperation Agency  
SMEs: Small and Medium Enterprises  
SSA: Sub-Saharan Africa  
STECs: SCGI Training Effectiveness Case Studies project  
STeAPP: Department of Science, Technology, Engineering and Public Policy  
ST&I (STI): Science, Technology and Innovation  
STISA2024: Science, Technology and Innovation Strategy for Africa 2024  
ToC: Theory of Change  
UCL: University College London  
UIS: UNESCO Institute of Statistics  
UK: United Kingdom  
UNCST: Uganda National Council for Science and Technology  
UNECA: United Nations Economic Commission for Africa  
UNESCO: United Nations Educational, Scientific and Cultural Organisation  
UR: University of Rwanda  
USA: United States of America

## 1. Summary

The COVID-19 pandemic has upended many aspects of human life across the globe, through its sudden, pervasive and cascading impact. In pushing back against the virus, countries have deployed multi-pronged mechanisms towards rapid diagnosis, behaviour management through restrictions and social distancing, protecting people through the use of personal protective equipment, deployment of ventilators and other means for oxygen therapy, trying out different therapeutics and rapid progression with vaccine development. At the heart of some of these responses is the role of tools from science, technology and innovation, anchored in the work of national and international science system actors. Science granting councils (SGCs) with funding, regulatory and coordination roles in national science systems, have thus been an integral actor in these responses. To understand these roles more closely, this report draws from a multi-country case study which explored the content and context of interactions between national SGCs in nine (9) selected African countries<sup>1</sup>, and other national stakeholders in shaping and implementing responses to the unravelling pandemic. The SGCs whose responses form the core of this report are part of the on-going Science Granting Councils' Initiative (SGCI) in Sub-Saharan Africa (SSA) which was launched in 2015 as a multi-funder initiative to strengthen SGCs in 15 SSA countries. The question that this study sought to answer and draw lessons from is: **how have SGCs applied capacities and capabilities acquired from the SGCI in responding to the COVID-19 pandemic?**

The study recognised the key positions that SGCs occupy in national science innovation ecosystems, not only as key actors in the system through their funding and regulatory roles, but also as custodians of the systems through coordination and intermediation roles. In particular, focusing on COVID-19 responses as a manifestation of funding, technological and governance capabilities for a national system of innovation, this study adapted Cirera and Maloney (2017)'s conceptualisation of the national innovation system to orient the study and analyse the findings. Within this, we had a particular interest in organisational capabilities and institutional entrepreneurship as key elements of how SGCs contributed to responses to the pandemic.

The research processes informing this report gathered primary over a 4-month period between July and October 2020, using a semi-structured questionnaire administered via email, responses to which were then analysed through theme-based exploration. This thematic exploration was also applied to secondary data from various media, academic, policy and practice sources. The current study builds upon the earlier '[STECS](#)' project conducted by the same research team, on understanding the influence of the SGCI in strengthening SGCs in the study countries, with a specific focus on whether and how skills and tools from SGCI's support had been deployed by SGCs in informing national responses. Our findings in this new phase of research 'STECS-Plus' revealed that the different SGCs had harnessed and deployed, in context-dependent manners, various tools from the SGCI. Prominent among these were tools on grant management, communication and leveraging of inter-SGC networking and partnership opportunities facilitated through SGCI. The SGCs were also able to influence national responses either directly as members of national COVID-19 response taskforces (as was the case in Burkina Faso, Malawi, Namibia and Senegal), or through feeding ideas, evidence and advice into designated response mechanisms (as was the case in Kenya, Mozambique, Rwanda and Uganda). Meanwhile, all the SGCs were involved significantly in one way or another in funding mechanisms for research in response to the pandemic. The different ways in which the SGCs were involved, as detailed in the report, were lobbying for more government funding for science, in partnership with other science system actors; issuing, managing and evaluating calls for research proposals; and soliciting external funding for research. Meanwhile, our findings also showed a number of skills or capability gaps in the form of areas not covered by SGCI such as capacity building in the

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<sup>1</sup>Burkina Faso, Kenya, Malawi, Mozambique, Namibia, Senegal, Rwanda, Uganda and Zambia.

management of short-term result-oriented research; identification of funding partners and resource mobilisation for research; monitoring and evaluation of funded research projects; and digital skills and infrastructure, all of which could be considered for SGCI Phase 2.

This study reveals a number of key lessons with respect to deployment of organisational capabilities and institutional entrepreneurship among the SGCs in response to the COVID-19. Firstly, context does indeed carry a high premium, and we draw from here that the pandemic taught the SGCs to look for 'best fit', and not necessarily 'best practice'. Secondly, this study reveals the importance of, and interplay between tacit and codified knowledge in deployment of SGC capabilities, and in the emergence of institutional adjustments to enhance the capabilities. The SGCs were able to rapidly harness both tacit and codified knowledge on collaboration and networking with other SGCs to form partnerships and issue joint calls. The third and related lesson linked to this is the imitable and complementary nature of the tools and skills from SGCI which allowed the SGCs to deploy incremental innovations in response to a challenge which was sudden and potentially competence-destroying in its manifestation. Being active in their national science ecosystems allowed the SGCs to build and accumulate progressive architectural knowledge, which placed them in a good position to contribute to responses to the pandemic. Finally, while locally-relevant routines and procedures remain important, the pandemic highlighted the importance of building resilience, not just into techno-social solutions, but also into policy and organisational capabilities as an important centre-piece for timely and effective decisions in times of fast-paced and pervasive societal challenges.

## 2. Introduction: STECS-Plus Project

How do science systems rapidly mobilise, harness and deploy financing and coordination capabilities in the face of a pandemic? What happens when the trends, assumptions and usual trajectories for decision-making are upended by global and local events? Some phenomena can alter the broad dynamics between anything from social norms and behaviours, interactions within and between economies to relationships between science system actors. The COVID-19 pandemic is no doubt such a phenomenon and this multi-country case study explored the content and context of interactions between national science granting councils (SGCs) in nine selected African countries and other national stakeholders in shaping and implementing responses to the unravelling pandemic. The SGCs whose responses form the core of this work are part of the ongoing Science Granting Councils' Initiative (SGCI)<sup>2</sup> which was launched in 2015 as a multi-funder initiative to strengthen SGCs in 15 sub-Saharan African countries. The question that this study sought to answer and draw lessons from is:

*How have SGCs applied capacities and capabilities acquired from SGCI in responding to the COVID-19 pandemic?*

The research project underpinning this report, called STECS-Plus, is an extension to the [SGCI Training Effectiveness Case Studies \(STECS\) Project](#) which sought to understand the specific capacities and capabilities acquired by SGCs through the SGCI programme and the role and activities of SGCs within the programme more broadly. By seeking to collect, analyse and document exactly how SGCs have contributed to responses to the COVID-19 pandemic in selected countries which are part of the SGCI, the STECS-Plus project relates directly to the 3rd dimension of SGCI's Theory of Change which focuses on 'application' of acquired capabilities. At a broader level, the findings of this study draw lessons for and from decision-making in the face of a pandemic for application in the case study countries and other economies globally.

## 3. Background and Literature review

The COVID-19 global pandemic which, as of 8<sup>th</sup> December 2020, stands at more than 67 million people infected globally, and more than 1.5 million deaths (Johns Hopkins Coronavirus Resource Center), has exposed frailties in our health care systems. The STECS-Plus project team argued in a [blog early in the pandemic \(May 2020\)](#) that the outbreak has simultaneously tested various aspects of our deeply interconnected societies, resulting in delayed, sluggish, inadequate and at times impotent responses to the pandemic. If there is a silver lining that has visibly emerged from the pandemic, it is in highlighting the important, yet often hidden role that knowledge and practice from different disciplines of science play in generating and providing tools for dealing with societal challenges. Science systems are pervasive as pillars of knowledge and guidance in societal responses to health challenges like COVID-19, but can only go so far in supporting situations which are inherently complex and multifaceted. SGCs are a foundational pillar and coalition point for promoting and shaping the role of science in different countries for challenges such as COVID-19, hence the strength, focus and relevance of a country's science ecosystem are important considerations for if, how, when and where the system contributes to responses to societal challenges.

SGCI is an ongoing programme that has been implemented in 15 sub-Saharan African countries since 2015, with the overall aim of strengthening the capacities of SGCs to support research and evidence-based policies that will contribute to economic and social development. It is against this backdrop of SGCI's role - not just as an agent in strengthening the capacities of publicly funded SGCs, but as a driver of systemic approaches to building coalitions of sectoral, national and regional agents and actors in science ecosystems- that the [STECS project](#) was undertaken. The SGCI has contributed to SGCs in Africa emerging as a strong coalition point for promoting and lobbying for more funding for research and innovation, and championing numerous socio-

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<sup>2</sup><https://sgciafrica.org/en-za/home> (accessed 30 November, 2020)

technical imaginaries from technological leapfrogging to homegrown economic development through generation of new knowledge, technologies and innovations.

The final activities of the STECS project took place concurrently with the emergence of the COVID-19 pandemic and our preliminary analysis showed that responses by SGCs highlighted the importance, not just of the availability of different tools from science, but their timeliness and relevance to contexts of application. In short, they were influenced and shaped by, and illustrative of the wider national-level science and innovation ecosystems within which they were operating. The STECS Plus project was, therefore, commissioned to understand if and how the interventions to date by SGCI had assisted the SGCs in their contribution to the national COVID response. It naturally also elucidated further insights as to the mandate and activities of the SGCs within their own national science and innovation ecosystems. The conceptual basis of the latter part of the study is described below.

### **Science Granting Councils in Science and Innovation Ecosystems**

STECS-Plus draws on findings from the STECS project and recognises the key positions that SGCs occupy in national science innovation ecosystems, not only as key actors in the system through their funding and regulatory roles, but also as custodians of the systems through coordination and intermediation roles. These multiple roles bring different challenges and opportunities for the SGCs, some of which we explore here from a conceptual point of view, and later, through the findings of the study. In particular, focusing on COVID-19 responses as a manifestation of funding, technological and governance capabilities for a national system of innovation, the framework of the National Innovation System adapted from Cirera and Maloney (2017<sup>3</sup>) was used to conceptually orient the study and analyse the findings. STECS-Plus focusses particularly on how the oversight roles of SGCs, through the capabilities drawn from their participation in SGCI, have enabled an efficient interplay between the demand and supply sides of tools and mechanisms for responding to the pandemic. In some cases, this has entailed harnessing different physical, financial, human and knowledge assets already available, while in others it has entailed a significant expansion of these assets.

In seeking to unpack content and contexts surrounding the contribution of SGCs to the national responses, this study recognises that the coming together (application) of capabilities acquired by the SGCs from a multi-country knowledge source, i.e. SGCI would be contained within and conditioned, not just by the pandemic, but by broader national contextual realities. A national systems of innovation approach not only helps us to understand the background, content and context of responses that would make a meaningful contribution, but also reveals individual and organisational actors, the interactions and dynamics between these actors. The study is informed by numerous previous studies<sup>4</sup> and contributes to empirical and conceptual understandings of how national, regional and sectoral innovation systems work and evolve, by demonstrating that relationships, power dynamics and incentive systems, in addition to societal challenges, are key to understanding how innovation occurs differently in different contexts<sup>5</sup>.

Given an early recognition in the STECS project (described in the following section) that many SGC responses were framed in terms of their contribution to larger national efforts against COVID-19, we have focussed particular attention on SGCI Theme 5 (SGCs in the national science ecosystem), linking this to the SGCI Theory of Change (acquire, adapt and apply).

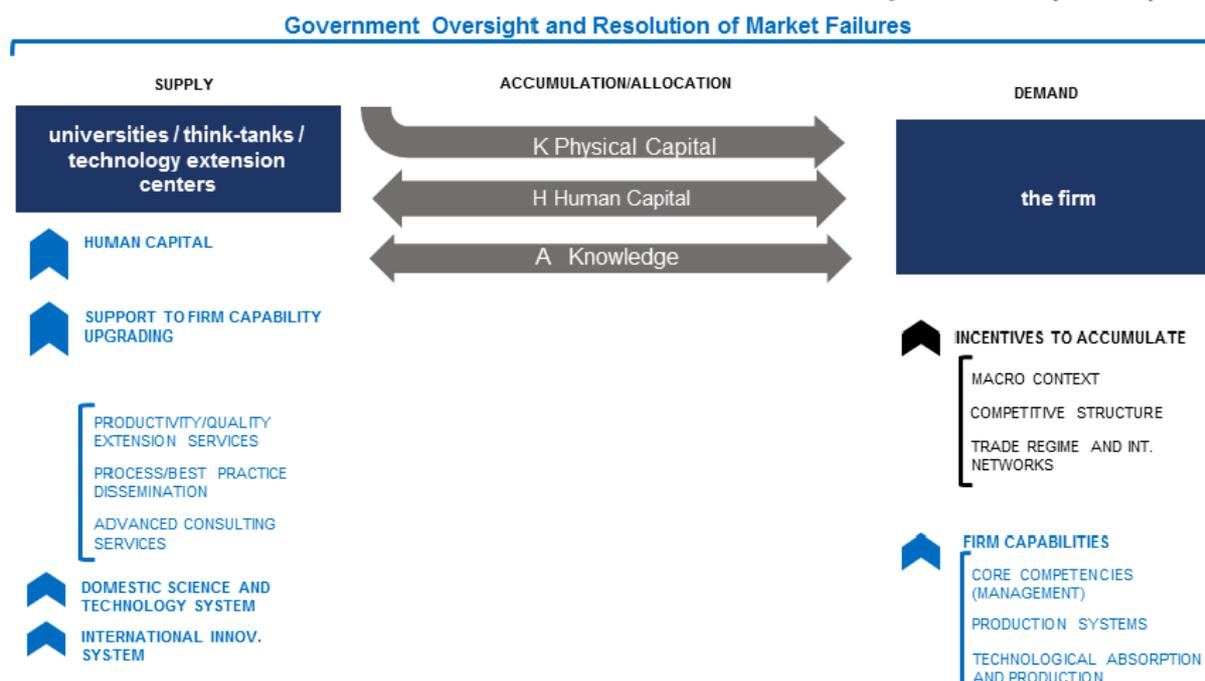
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Cirera X and Maloney W (2017). The Innovation Paradox: Developing-Country Capabilities and the Unrealized Promise of Technological Catch-Up. Washington D.C. World Bank

Consoli, D. and Mina, A. (2009), "An evolutionary perspective on health innovation systems", *Journal of Evolutionary Economics*, Vol. 19 No. 2, pp. 297-319.

Bleda, M. and Del Río, P. (2013), "The market failure and the systemic failure rationales in technological innovation systems", *Research Policy*, Vol. 42 No. 5, pp. 1039-1052

# The Greater National Innovation System (NIS)



Source: Cirera and Maloney (2017)

**Figure 1: Conceptualisation of the Greater National Innovation System (NIS) contextualising SGCs as oversight actors in national science ecosystems.**

This framework allows us to explore how SGCs could engender much-needed openness of exchange in the national innovation system, for example by reducing the presence and impact of barriers to knowledge accumulation, significantly increasing the innovative capabilities and technological learning of an expanded range of actors entering the arena in response to the pandemic. In many countries globally, the pandemic has resulted in a transformation of the usual boundaries to innovating, as was the case in the UK with respect to development of ventilators, which diminished innovation externalities for firms participating in the country's Ventilator challenge and cushioning the innovation system from failures (Gov.uk, 2020<sup>6</sup>). The incentives to accumulate in the macroeconomic context emerged through government funding of the sourcing of parts and purchasing the ventilators directly, creating an enormous demand which broadened the possibilities for capability accumulation. This framework allows an exploration of such intermediation roles in an African context through the roles of SGCs in the COVID-19 response.

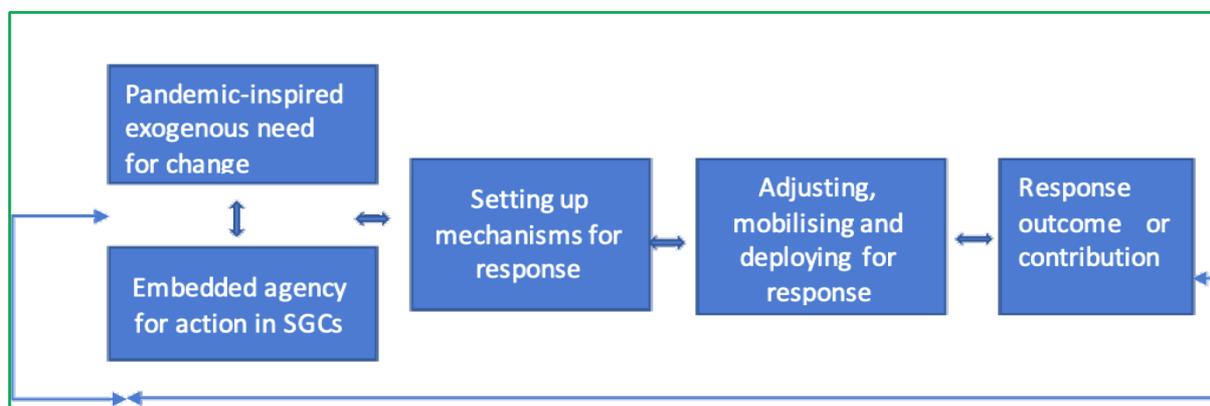
Besides “embracing existing units,” adapting them for rapid production and “harnessing the manufacturing muscle of big companies,” such as UK car manufacturers, to rapidly upscale production capacity (Davies, 2020<sup>7</sup>), the UK government was able to assist universities to mobilise their human and physical capital and knowledge systems in response to the challenge. Similarly, through their funding, regulatory and policy oversight roles, SGCs would be envisaged to play a key role in the provision of capital which allows for increased interactions among public research institutes to upscale or innovate for complementary technologies and products, processes or approaches that can mitigate any prevailing inadequacies. From a conceptual level, the cases explored in this report present an opportunity to test out the utility of different conceptualisations and functions of innovation systems, in this case the governance capabilities of SGCs as key

UK Government. Call for businesses to help make NHS ventilators. 2020. <https://www.gov.uk/government/news/production-and-supply-of-ventilators-and-ventilator-components> (accessed 23 November 2020).

<sup>7</sup> Sabbagh D, Davies R. UK scrambles for foreign-made ventilators ahead of coronavirus peak. The Guardian. 2020. <https://www.theguardian.com/world/2020/apr/08/uk-scrambles-for-foreign-made-ventilators-ahead-of-coronavirus-peak> (accessed 26 Nov 2020).

players in the interactions among actors coming together in response to the pandemic. Exploration of governance capabilities is of particular interest in this report, in part because the pandemic has revealed the historical and context-contingent nature of the capabilities that are required in any setting (c.f. Lyall, 2007<sup>8</sup>), and also the fact that the capabilities that may have been useful for certain countries or sectors at some point in history may not necessarily be the important capabilities for the countries in the midst of a crisis. The precise set of capabilities required is varied and contextual, and it is the intention of this work to illustrate, among others, that science system governance capabilities put countries in a better position to make the most of technological, financial, social, innovation and political system capabilities in times of a societal emergency.

Conceptually, and empirically, we also see this as opportunity for and manifestation of institutional entrepreneurship<sup>9</sup> (Garud et al, 2007<sup>10</sup>) in response to a challenge. Working within and drawing from the national system of innovation, and moving from the common understanding that peripheral actors who are disadvantaged by the existing system rules are the ones motivated to take entrepreneurial action (Afuah, 2003<sup>11</sup>), this study explored how SGCs and complementary incumbent actors broke any habits, routines or procedures they had in place, and went on unencumbered to build and deploy capabilities relevant and effective for, in this case, the pandemic. Ordinarily, peripheral actors are more likely to become institutional entrepreneurs because they stand to gain more, while risking less (e.g. Kraatz & Zajac, 1996<sup>12</sup>; Rao, Morrill, & Zald, 2000<sup>13</sup>), but in this instance the pandemic created urgency for central and embedded actors such as SGCs to initiate change in the institutional status quo. Sitting at the interface of multiple, pandemic-induced endogenous and exogenous factors, the SGCs have had to create new systems of ‘meaning that tie the functioning of disparate sets of institutions together’ not merely ‘as an opportunity to realize interests that they value highly’ (DiMaggio 1988:14<sup>14</sup>), but in recognition of the existential imperative posed by the pandemic, and the promise embedded in their institutional agency and power. The methodology and empirical focus of this study sought to untangle some of these issues, guided by the conceptual framework shown in Figure 2 below:



**Figure 2: Conceptual framework for the STECS-Plus study**

<sup>8</sup> Lyall, C., (2007). Changing boundaries: the role of policy networks in the multi-level governance of science and innovation in Scotland. *Science and Public Policy*, 34(1). Pp 3-14.

<sup>9</sup> We use institutional entrepreneurship here to refer to the ‘activities of actors who have an interest in particular institutional arrangements and who leverage resources to create new institutions or to transform existing ones’ (Maguire, Hardy and Lawrence, 2004: 657).

<sup>10</sup> Raghu Garud, Cynthia Hardy and Steve Maguire (2007). Institutional Entrepreneurship as Embedded Agency: An Introduction to the Special Issue, *Organization Studies* 28(07): 957–969

Afuah, A (2003). *Innovation management: strategies, implementation and profits* (2- Ed), Oxford University Press, New York.

<sup>12</sup> Kraatz, M.S. and Zajac, E.J. 1996. Exploring the limits of the new institutionalism: The causes and consequences of illegitimate organizational change. *American Sociological Review*, 61(5): 812–836.

<sup>13</sup> Rao, H., Morrill, C. and Zald, M.N. 2000. “Power plays: How social movements and collective action create new organizational forms”. In *Research in organizational behaviour*, Edited by: Staw, B. and Sutton, R.I. Vol. 22, 239–282. New York: JAI Press

<sup>14</sup> DiMaggio, P.J. 1988. “Interest and agency in institutional theory”. In *Institutional patterns and organizations*, Edited by: Zucker, L. 3–22. Cambridge, MA: Ballinger

Figure 2: (Adapted from Battilana et al, 2009<sup>15</sup>): Conceptual model and analytical framework exploring conditions and arenas for African SGC institutional responses to the COVID-19 pandemic. This framework allowed a close analysis of the processes, content and context of contributions by different SGCs to national responses.

#### 4. Methodology

The STECS Plus project had a timescale of 4 months and built directly on the case study work conducted across the same nine (9) case study countries conducted during the STECS project viz Burkina Faso, Kenya, Malawi, Mozambique, Namibia, Senegal, Rwanda, Uganda, Zambia. These countries fed back insights on their day to day operation and the benefits that they had derived from SGCI engagement in the STECS project. As noted above, this follow up study aimed to determine any specific insights related to their operations during the COVID-19 pandemic, and this research was therefore seen as an extension of the original analytical and descriptive case study approach.

Primary data was collected through a questionnaire, which was self-completed by interviewees or completed by the research team using the questionnaire questions as the basis for structured interviews with respondents as illustrated in Table 1 below. Responses were received from Burkina Faso, Kenya, Malawi, Mozambique, Namibia, Rwanda and Senegal. Informed consent was sought from interviewees and anonymity preserved in accordance with UCL and UR Ethics requirements and similar requirements in the SGCI as well as case study countries and organisations. Secondary data insights were drawn from desk research comprising a review of news and social media, academic, policy and practice sources complemented our insights into the activities conducted by each of the SGCs in response to the COVID-19 pandemic. Secondary data only was collected for Uganda and Zambia mainly through reviewing online institutional webpages, official reports and media. Qualitative data was analysed inductively for emergent themes within and across the SGCs. Secondary research was also extended to other SGCI countries beyond the nine case study countries (Ethiopia and South Africa) and other countries from outside African continent (Australia, UK and New Zealand) to broaden the understanding on funding and governance responses to the pandemic from the national, regional and global perspectives.

**Table 1: Breakdown of respondents**

Case Study Country	Responding Agency
Burkina Faso	FONRID
Kenya	NRF
Malawi	NCST
Mozambique	FNI
Namibia	NCRST
Rwanda	NCST
Senegal	MESRI
Uganda*	UNCST
Zambia**	NSTC

\*, \*\*: Data collected through secondary research.

## 5. Analysis and discussion of findings

In this section, we present a narrative of findings from the SGCs with respect to the six (6) themes that inductively emerged from primary and secondary data collection:

- COVID-19 response coordination,
- Research collaboration and partnership,
- Funding for science,
- Use of skills and (or) tools acquired from SGCI,
- Skills/Capabilities not covered by SGCI but needed by SGCs for COVID-19 response, and
- Adjustment in national science ecosystem.

The following sections elaborate on these findings.

### 5.1 COVID-19 response coordination

Four (4) out of the seven (7) SGCs which responded reported being directly involved as part of **COVID-19 response coordination mechanisms at national level**, with three (3) SGCs being indirectly involved or not involved in such mechanisms. In Burkina Faso, FONRID is a member of the anti-COVID-19 Commission which is implemented by the Higher Council of Research. As part of this organisation, FONRID's main responsibility is to coordinate the national research strategy on COVID-19 and fundraising. In Namibia, the NCRST was a member of the Higher Level Research Coordination Taskforce on COVID-19. Likewise, in Senegal, the SGC i.e. ministry of higher education, research and innovation (MESRI) was part of the national coordination structure. Particularly, MESRI has initiated the creation of the National Observatory of Sciences, Technologies and Innovation on COVID-19 (O-Covid-19), illustrated further below Box 1 below. In a converse scenario to the aforementioned, the NRF in Kenya and FNI in Mozambique have not been part of the mechanisms that directly coordinate COVID-19 response at national level, despite their vital role in funding and (or) fund mobilisation for research and innovation in response to COVID-19 in their respective countries. Similarly, the NCST in Rwanda reported that they were not part of the national response coordination mechanism for the pandemic. The SGC itself has however initiated funding calls for research on the pandemic, and also drawn on previously gained knowledge from SGCI to inform the process, as will be discussed later. According to a report<sup>16</sup> by the Tropical Health and Education Trust (THET), Uganda's response to COVID-19 pandemic used a 'whole-of-government' approach based on past experiences of Ebola and Marburg outbreaks, with scientific guidance stemming from collaboration of the Ugandan scientists and researchers from the government, universities and R&D institutions, supported by the WHO and the civil society. Although the COVID-19 response coordination layout<sup>17</sup> in Uganda does not explicitly demonstrate the position of UNCST, the latter developed and spearheaded joint review guidelines partly aimed to optimise research regulatory capability, as will be discussed later, in section 5.2.

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<sup>16</sup> The Partnerships for Global Health <https://www.thet.org/is-uganda-on-track-to-win-the-covid-19-battle/> Accessed 29/11/2020

<sup>17</sup> Uganda COVID-19 response coordination structure <https://covid19.gou.go.ug/coordination.html> Accessed 29/11/2020

Box 1 Senegal's COVID-19 response coordination mechanism

National Observatory of Sciences, Technologies and Innovation on COVID-19 (O-Covid-19), MESRI, Senegal

Unlike other participating countries, research collaboration in Senegal was directed to the creation of the National Observatory for ST&I in response to COVID-19 (O-covid-19). Spearheaded by MESRI, O-Covid-19 was created and funded by the government, with the mission to develop scientific and technical understanding, analyse the multi-dimensional problems caused by COVID-19 pandemic, and propose solutions. Conceptualised as a multi-disciplinary solution to a multi-faced health crisis, O-Covid-19 is constituted of high calibre experts drawn from a range of actors of the national science ecosystem, including government ministries, universities, national research and innovation organisations and the civil society. These experts are organised in 6 thematic groups: (i) clinical; (ii) public health, nutrition, and health governance; (iii) Covid-19 impact to society, family, culture and mental health; (iv) fundamental and applied research in biology, biophysics and biochemistry; (v) engineering (innovation, digital health and modelling); and (vi) economics, management, and judiciary and political sciences. In the framework of O-Covid-19 activities, MESRI has decided to mobilise 205 million CFA; 39 research and innovation projects were initially selected from most of the above thematic groups to receive the available funding. According to MESRI, a number of partners have already expressed interest in providing top-up funding to some of the projects already partly funded by MESRI.

Our findings suggest that the **mandate and situatedness of SGCs within their national science ecosystem** could have contributed to determining whether (or not) a particular SGC could partake in the national mechanisms for COVID-19 response coordination. The four (4) SGCs that have reported to have been part of the national COVID-19 response coordination structure were those that have the responsibility of ST&I policy and governance in addition to research and innovation management, whereas, two (2) SGCs (NRF-Kenya and FNI-Mozambique) that have reported not taking part in the coordination of COVID-19 responses were those **whose core mandate is research and innovation funding and management but not STI policy**. Rwanda's case is peculiar in that while the SGC is also responsible for STI policy, their national role was peripheral. They were still very active in responding to the pandemic through funding calls - one funded by the national government, and another through a collaboration with South Africa's NRF under COVID-19 Africa Rapid Grant Fund, as was the case for NCST (Malawi) and UNCST.

## 5.2 Research collaboration and partnerships

The COVID-19 pandemic has **drawn upon the SGCs' capabilities** of navigating through the national and/or international science and research systems to explore possible collaboration and/or partnerships – including with incumbent and or new actors, which had never been thought of or attempted before the COVID-19 outbreak. As part of its role in the national coordination organ, Burkina Faso's FONRID has (technically) facilitated the **national level collaboration** of activities of the ministries of research, health and finance to give direction and fund research in response to the pandemic. Due to its limited capacity in terms of human resource, the NRF of Kenya has opted to partner with (outsource) the African Centre for Technology Studies (ACTS) to assist in peer review of applications to the national call made by NRF in collaboration with the International Development Research Center (IDRC), specifically on COVID-19. This call included proposals in various domains of science such as, *inter alia*, vaccine development and innovative virus detection techniques. In Malawi, the NCST, in partnership with the ministry of health instituted a health systems operations research grant scheme with COVID-19 being the main area covered by the scheme. In addition to this, the NCST was engaged in **regional and international research programmes** as part of the COVID-19 Africa Rapid Grant Fund. The FNI in Mozambique focused on strengthening collaborations with existing international partners, notably

the Swedish International Development Cooperation Agency (Sida), IDRC and NRF (South Africa) in response to the pandemic for the benefit of the people of Mozambique. For instance, FNI received financial support from Sida to fund a research project aimed at fast responses focusing on the areas of prevention and mitigation of the disease. FNI launched a joint research call with NSTC of Zambia in the domain of public health, funded by IDRC. At the time of primary data collection for this report, the call for proposals had already been closed for further actions towards its implementation. Likewise, the NCRST of Namibia **strengthened its ties with existing and new international research collaboration partners** (donors) including: NRF (South Africa), IDRC, ICGEB and the UN Research Roadmap for COVID-19 Economic Recovery Response Steering Group. In Senegal, according to MESRI, both the technical and financial partners (whether local, regional or international) have financed research in support of research on the COVID-19 response, while in Rwanda, Uganda and Zambia, the SGCs collaborated with NRF (South Africa) in the administration of the COVID-19 Africa Rapid Grant call, targeting researchers, science and health journalists and communicators, and science advisers. Meanwhile, from secondary data reviews we noted that UNCST particularly emphasized the **imperative of strengthening collaboration in research regulation and coordination** to preserve and safeguard ethics and safety amidst a desperate search for a rapid cure or preventive medical solutions to the pandemic. Part of UNCST's joint review guidelines<sup>18</sup> was to set-up a joint review mechanism for clinical trial applications (CTAs) bringing together all regulatory agencies namely: UNCST, Uganda National Health Research Organisation (UNHRO), National Drugs Authority (NDA) and Research Ethics Committee (REC). The purpose of the joint review was partly to optimise the regulatory capability for rapid development of drugs (or vaccines) while observing the domestic and global regulatory frameworks. These guidelines did not only reshape local collaborations on clinical research regulations but also influenced research collaboration with external partners such as the USA's National Institutes for Health (NIH)<sup>19</sup> UNCST has also championed and facilitated dissemination of COVID-19 research findings in Uganda<sup>20</sup>.

Table 2 summarises the various collaborations and partnerships created or facilitated by SGCs with other actors within the national science ecosystem or beyond (including other SGCs) as a result of the COVID-19 pandemic. As illustrated in the table, it transpires that, with the exception of Burkina Faso and Uganda (unknown), **all SGCs have leveraged collaborations with external partners and funding agencies** to create and fund research projects in response to COVID-19. NCRST of Namibia has created new collaborations with new external partners in addition to its existing partners. The COVID-19 pandemic also seems to have contributed to enhancement of research collaboration amongst the SGCs that had already been working together on either bilateral or trilateral research calls in SGCI Phase One. The **inter-SGC collaboration** has partly been enhanced by the COVID-19 Africa Rapid Grant Fund<sup>21</sup> which was launched in May, 2020 by South Africa's NRF, in partnership with the SGCI, South Africa's Department of Science and Innovation (DSI), IDRC, Fonds de Recherche du Quebec (FRQ), Sida, and DFID (through the Newton Fund).

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<sup>18</sup> UNCST to jointly review COVID-19 CTAs in Uganda <https://www.uncst.go.ug/uncst-to-jointly-review-covid-19-ctas/> Accessed 28/11/2020

<sup>19</sup> NIH : National Institute of Allergy and Infectious Diseases [https://www.hptn.org/sites/default/files/inline-files/Uganda\\_UNCST%20Issues%20Guidelines%20for%20Research%20during%20COVID-19%20Pandemic.pdf](https://www.hptn.org/sites/default/files/inline-files/Uganda_UNCST%20Issues%20Guidelines%20for%20Research%20during%20COVID-19%20Pandemic.pdf) Accessed 28/11/2020

<sup>20</sup> COVID-19 Research Results Dissemination Symposium <https://www.uncst.go.ug/covid-19-research-results-dissemination-symposium-18-november-2018/> Accessed 28/11/2020

<sup>21</sup> COVID-19 Africa Rapid Grant Fund <https://www.nrf.ac.za/division/funding/covid-19-africa-rapid-grant-fund> Accessed, 30/10/2020

In Burkina Faso, Malawi, Rwanda and Senegal, emerging research and innovation collaborations have been created between SGCs and the ministries responsible for science, technology and research, health and finance. Lessons and reflections are also emerging among some SGCs to consider developing in-country **multidisciplinary teams for better skills and capabilities** to stem COVID-19, for example, the case of NCST in Rwanda.

**Table 2: Research collaborations and partnerships**

SGC Name	Emerging collaboration with other local actors in national Science ecosystem	Collaboration with other SGCs	Collaboration with existing (or new) external partners (funders)	Partnership with the private sector (and/or) Civil Society actors
FONRID (Burkina Faso)	Yes	No	No	No
NRF (Kenya)	No	No	Yes	Yes
NCST (Malawi)	Yes	Yes	Yes	No
FNI (Mozambique)	No	Yes	Yes	No
NCRST (Namibia)	No	Yes	Yes	No
NCST (Rwanda)	Yes	Yes	Yes	Yes
MESRI (Senegal)	Yes	Unknown	Yes	Yes
UNCST (Uganda)	Yes	Unknown	Unknown	Yes
NSTC( Zambia)	Yes	Yes	Yes	Unknown

All the instances of collaboration narrated were deployed or initiated as SGCs sought to enhance or utilise relevant capabilities for the pandemic. Instances of organisational capability upgrading and institutional entrepreneurship were exhibited by these collaborations. From an innovation perspective, **most of changes can be classified as incremental**, rather than radical innovations, as they built on and enhanced existing approaches (c.f. Afuah, 2003).

### 5.3 Funding for science

It is clear from our findings that, like in other parts of the world, our study countries have seen the need to fund science research in response to the COVID-19 pandemic. In addition to the need for locally available medical and health care related solutions in the immediate, mid-term and long-term, the pandemic has unearthed the importance of locally-relevant scientific evidence to inform and guide national policies and procedures on the wicked social and economic challenges brought to society. However, not just in Africa and not just in this pandemic, **science funding has always had to compete** to be seen as a priority, and the context of pervasive economic challenges and vulnerabilities caused by the pandemic only serve to exacerbate the competition. As one respondent put it:

*“The pandemic has taught us that local research is very important, and government needs to make provision for such as all time. Also confirmed by the pandemic is the important role of PPPs”* (SGC Respondent, Aug 2020)

It is in this backdrop that all the SGCs which responded have played roles in contributing to the COVID-19 response, particularly with respect to managing research funding and/or advocating for research funds from the national budget or mobilizing funds from partner organisations. Some SGCs managed to successfully convince their governments to increase the budget for science

research while others have leveraged external funding to support research projects while persuading their respective governments to increase the budget for research. In Burkina Faso, the government allocated 2 Billion CFA (West African CFA francs, around 3.7 Million USD / 2.8 Million GBP) to FONRID specifically to support research and innovation from both formal and tacit knowledge production systems in response to COVID-19 pandemic. This funding particularly targeted a diversified range of projects from researchers, innovators and the pharmaceutical industry to caregivers and indigenous (traditional) practitioners. Relatedly, FONRID is working in collaboration with other government entities to implement the 'Pharmaceutical Technology Hub'. Likewise, in addition to the **Africa Research Grant Fund** to which researchers and innovators from Mozambique and Senegal were eligible to apply, the SGCs in these two countries received a **government budget** dedicated to research and innovation in response to the pandemic. FNI in Mozambique was allocated government funding to make a call specifically targeting projects on the COVID-19 pandemic, with seven (7) being approved for funding. MESRI in Senegal has made a decision to mobilise 205 Million CFA to fund research and innovation projects as part of O-COVID-19 framework activities, while the NRF has been engaging the Government of Kenya to enhance funding for science, technology and innovation. In Rwanda, while no new funding sources had been established at the time of this study, respondents indicated that **NCST had established a special grant** aimed at addressing COVID-19 and that there was a 'plan to increase funds for research in areas that have been highly affected'. Increased government funding from Rwanda benefited a wide range of beneficiaries, including researchers, innovators, and scientists from public and private higher learning and research institutions. This is in line with plans to expand existing capabilities within the science ecosystem, along the same lines as deployment of multidisciplinary perspectives highlighted by the same respondents. In Zambia, funding for COVID-19 response in the area of health was **integrated into the prevailing R&I funding mechanisms**. The Science, Technology and Innovation Youth Fund (STIYF) call 2020-2021 - targeting innovations with the aim to address the national development priority areas – emphasised COVID-19-related innovations under the animal and human health thematic areas. STIYF is implemented by NCST, Zambia's SGC, with funding from the Government of Zambia through the ministry of higher education (MoHE)<sup>22</sup>.

#### 5.4 Use of skills and (or) tools from SGCI

The nine (9) SGCs which participated in this study have all taken part in the SGCI phase one. The aim of that 5-year Initiative (2015-2019) was to strengthen the ability of the Councils across 4 objectives: (i) Research management; (ii) Designing and monitoring of research programmes based on the use of robust ST&I indicators; (iii) Supporting knowledge exchange with the private sector; and (iv) Establishing partnerships between SGCs and other science system actors. Our analysis of the influence of SGCI on SGCs through the STECS Project ([Sept 2019 – June 2020](#)) revealed that **'the SGCI has contributed to SGCs in the study countries, emerging as an important academic, policy and practice coalition point through which, among others, a combination of trainings, masterclass papers, peer-to-peer and learning visits have enabled the Councils to improve their funding and governance roles in national science ecosystems'** (STECS Project Report, Sept 2020: 3<sup>23</sup>). The COVID-19 outbreak, which arose immediately after the completion of that SGCI phase one, appeared to be a great opportunity for the Councils to apply the skills and tools acquired from SGCI's training and technical support.

Our study respondents revealed that most of the skills and tools gained from SGCI phase one have been used to shape and enable the Councils' contribution to COVID-19 responses in their respective countries. **Research management and communication** were notably the major skills used. Research management skills and tools obtained from trainings by SGCI partner SARIMA,

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<sup>22</sup> 2020-2021 Science and Technology Innovation Youth Fund, Zambia  
<https://nstc.org.zm/index.php/2020/08/07/call-for-scientific-and-or-technological-innovation-project-proposals-for-funding-under-the-2020-2021-science-and-technology-innovation-youth-fund-stiyf/> Accessed 27/11/2020

<sup>23</sup> <https://idl-bnc-idrc.dspacedirect.org/bitstream/handle/10625/59543/59695.pdf?sequence=1> (accessed 01 Dec, 2020)

imparted **grant management skills** and capabilities as well as **good practice guidelines** on quality of research competitions. The trainings also covered preparation of calls for applications, reviewing and assessing applications, contracting and awarding the winners including ethics and intellectual property issues, and monitoring and evaluation. All these have come in handy in the research calls and allied activities that SGCs have carried out in response to the pandemic. **Communication capabilities**, derived from the ACTS Consortium's framework on communication with the private sector, were also being harnessed in the responses. Meanwhile, due to the pandemic, most of the SGCs have had to expedite their migration from physical to **online grant application processes**, including streamlining of funding call procedures and reduction of project evaluation period. These activities were all part of the capacity strengthening aims of SGCI phase 1 (STECS Project Report, 2020).

Similar to the **context dependent manner in which the SGCI has influenced the different SGCs**, the pandemic has also seen the different SGCs using skills and tools depending on institutional and national context. For instance, FONRID leveraged its knowledge of 'results-oriented research' to manage research projects on the COVID-19 pandemic. NCST-Malawi and NCRST used the acquired skills in **research management** to run the calls. FNI leveraged the acquired skills in both **grant management and communication**, while in addition to research management skills, MESRI has adapted its capabilities on grants mobilisation and organisation of researchers into multi-disciplinary research teams or research working groups, which are related to but have not necessarily been gained directly from SGCI trainings.

#### 5.5 Skills/Capabilities not covered by SGCI but needed for COVID-19 response

While the SGCI has gone a long way in engendering capabilities in SGCs, a number of which have been deployed for the pandemic as discussed in the sections above, some gaps in capabilities important for responses to the pandemic were noted by respondents. These include the following in Box 2 below:

##### **Box 2: Capability gaps**

- capacity building in the management of short-term result-oriented research
- identification of funding partners and resource mobilisation for research
- monitoring and evaluation of the funded research projects
- digital (ICT) skills and infrastructure
- coordination and validation of information

The need for the efficient and effective use of ICT for communication and M&E was particularly found to be desperately needed. One respondent stated: '*COVID-19 brought the big challenge of efficient use of ICT platforms in all aspects, especially on monitoring and evaluation of progress and research results*'. Regarding the need of ICT skills and infrastructure to improve on communication, the respondent went on to say: '*ICT platforms became crucial these days and should be considered as a strong issue on communication skills for the Councils to contribute to COVID-19 response*'. The NCST (Malawi) and FNI (Mozambique) have adopted the use of ICT platforms to conduct meetings with researchers and partners. In particular, FNI has leveraged its ICT infrastructure capabilities to undertake training of researchers, monitoring and evaluation of their activities. In Rwanda, there has been an emphasis on data collection, which draws tangentially from some of the SGCI themes. For example, there is NCST-supported work on development of a software portal for collecting real-time data through artificial intelligence and other data science tools. A dedicated site or portal for harmonizing COVID-19 datasets is also being set up to inform policy and practice. The need for harmonization and coordination of information mechanisms, including its validation is perhaps one of the biggest lessons from the pandemic. Given that COVID-19, and its aftermath, will form both the background and foreground of SGCI phase two, it is hoped that tackling some of these capability gaps will be considered.

### 5.6 Adjustments in SGCs for better influence in National Science Ecosystems

The COVID-19 pandemic has unsurprisingly caused or influenced adjustments to SGCs in their efforts to better influence the national science ecosystems across the participating countries. This has happened at varied scales as conditioned by the pandemic and diverse country specific contexts. Concerning the influence of SGCs in advocating for government support to science for example, there have been some levels of flexibility and prioritisation of research as part of governments 'core interventions'. The prominent role for science in this time has seen governments putting more resources into SGCs to strengthen their operations. As such, some countries such as Burkina Faso, Rwanda and Senegal, have increased budgets for research to that effect, while others are moving towards similar agreements as a result of advocacy by respective Councils.

As highlighted earlier, SGCs have also sought to facilitate the work and contribution of science system actors in response to the pandemic by, among other activities, expediting research proposal submission and approval processes. New partnerships have been initiated, while existing ones have been expanded in some cases (see Table 1) to address some capability gaps or create opportunities for better science system readiness to respond to the pandemic. Identification, harnessing and upgrading of the capacities of science system actors have arisen from these partners, in addition to capacity enhancement which has emerged from expansion of disciplines involved in generating and providing evidence to inform decision making (e.g. in the case of Rwanda) or the upgrading and conversion of GMO Labs into COVID-19 testing centres (in the case of Namibia). Meanwhile, one of the main adjustments in terms of the day to day operations of the SGCs has been remote working and virtual interactions with stakeholders due to travel restrictions. As one respondent put it, *'we are having to use virtual platforms for meetings; limit sizes of face to face meetings as allowable by COVID-19 rules and regulations; and soliciting stakeholder input remotely'*

From all the respondents, there was a positive expectation of possible increase of budgets in support to national science as short and medium term adjustments which would benefit national science ecosystems and societies broadly. According to respondents, this expectation was based on the premise that local scientific research capability and advice had proven to be highly important for successful responses to the pandemic globally. Pursuing this line of argument, the next section will look at lessons from science ecosystems in a few other countries beyond the case study countries, focusing particularly on system coordination and funding mechanisms.

### 5.6 What can be learned from other countries?

With reference to other SGCI member countries not included in the original STECS project or STECS Plus follow-up, there are some equally informative observations to be made regarding the role of their science funding councils in responses to COVID-19. The sections below briefly explore the experiences of Ethiopia and South Africa.

The Ministry of Science and Technology in Ethiopia [website](#) currently hosts a message from the minister (Dr Abraham Belay Berhe) which states that "... countries are seen to exert relentless effort to harmonize to execute their technology and innovation policies and plans with their prevailing situations" and reflects on the Ministry's role in "leading the technology capacity building and innovation system." A media article on 28<sup>th</sup> September 2020 in [New Business Ethiopia](#), reflects specifically on the benefits that Ethiopia has received in participating in the Science Granting Councils Initiative (SGCI) which "enables Ethiopia boost its sustainable research management competence and experts". It directly references Ethiopia's participation in the 'COVID-19 Africa Rapid Grant Fund', led by NRF in South Africa and including SGCI participating countries. The article cites the benefits of participating in SGCI in enabling "the participants to manage, design and monitor research programs effectively" and assisting those working in research funding to "see other [non-government] alternatives of funding and capacity building through its trainings and networking." The references to COVID-19 within this article are mostly oblique, but it seems to claim that the training, capacity building and networking acquired through

engagement with SGCI are seen by the Ministry as valuable both in longer term planning for the country and in the short and medium-term response to COVID-19.

Some examples of other national research body responses to COVID-19 in Sub-Saharan Africa were also investigated through secondary research only (reviewing online institutional webpages and media). The National Research Foundation in South Africa has been a crucial partner in a number of SGCI activities over Phase 1. Recent developments around the role of NRF have started to reshape its activities and may have influenced its response to COVID-19. The NRF Amendment Act 2018 ([commencement](#) April 2020) gives the National Research Foundation (NRF) a renewed mandate to [support national development](#) by “supporting and promoting public awareness of, and engagement with, science”. A [media article](#) in the Conversation, April 2020, claims that the “current pandemic has seen the South African government and scientists, researchers and clinicians working jointly to engage the public with robust scientific evidence guiding key decisions around national health and safety.” The NRF is the central point for the [COVID-19 Africa Rapid Grant Fund](#), alongside SGCI, international funders from Canada, Sweden and the UK, and the 15 SGCI participating countries. This fund aims to “support knowledge generation and translation to inform diagnostics, prevention and treatment of COVID-19; strengthening of African regional and continental science engagement efforts in response to the pandemic; and leveraging existing and new multilateral collaborations from international partners.” It provides resources for both primary research and science engagement: “for the research strand and applicable only to Nigeria and South Africa, only ARUA member universities will be eligible to participate. For the two strands on science engagement, practitioners across all the countries, including Nigeria and South Africa may apply.” Ongoing conversations around the adjustment to Government budgets for Higher Education and Training and Science and Innovation centre on concerns around negative impacts on national science and research systems, with some concerned about the impact of the budget cuts on some “[already severely underfunded](#)” institutions which may themselves be playing a role in national efforts to curb COVID-19.

### **New Zealand**

We have also included the example of New Zealand, using this to reflect on this report’s opening statements concerning the importance of organisational innovation in the response to COVID-19. Box 3 below illustrates how organisational innovation has partly underpinned New Zealand’s response to COVID-19. These insights are drawn from secondary research only (reviewing online institutional webpages and media). pandemic, an example recognised as globally exemplary in its response and particularly interesting in terms of the role of science granting actors<sup>24</sup>.

#### **Box 3: New Zealand’s Response to COVID-19 pandemic: A lesson of organisational innovation**

##### **National response and data coordination**

New Zealand is relatively among the least affected countries with regard to COVID-19 pandemic. According to the government of [New Zealand](#), as of 28<sup>th</sup> November, 2020 all cases outcomes since first New Zealand case in March, 2020 was 2077 including: 69 active cases, 1956 recovered cases and 25 deaths. This performance partly stems from the government response in a range of actions organised through: alert system, border restrictions and testing. The ministry of business, innovation and employment (MBIE), through the New Zealand Research Information System (NZRIS) team, has coordinated a [central source of data about COVID-19](#) research and funding. In the context of this work, MBIE could be considered as the SGC-equivalent in New Zealand.

##### **Intra-government agency collaboration for science funding and impact to national science capability**

In New Zealand, COVID-19 research was mainly [funded by three government entities](#) namely: MBIE, the Auckland Medical Research Foundation, and Health Research Council. According to [MBIE’s](#)

<sup>24</sup> Bloomberg Covid Resilience Ranking <https://www.bloomberg.com/graphics/covid-resilience-ranking/> Accessed 08/12/20

[Science and Innovation team report](#), as of 8<sup>th</sup> July 2020, MBIE has awarded \$18.3 million, the Auckland Medical Council \$0.5 million, and the Health Research Council \$3.8 million for COVID-19 research. This COVID-19 research funding brought about the impact to New Zealand's scientific capabilities at and influence to the national and global scale. For instance, (i) of the 92,688 global publications on COVID-19, the New Zealand has contributed to 358 publications (approximately 0.4% of global research literature); (ii) New Zealand saw a surge in researchers 'use of open access publications for wide and rapid dissemination and access of their knowledge output to the global public audience while 87% of New Zealand's COVID-19 publications were published via open access platforms. This rate was at 41% of all the New Zealand-affiliated publications in 2019; (iii) While the majority of published research has focused on public health and clinical science, non-medical research focused on three areas namely: tourism, psychology, and policy. The non-medical research activities mainly aimed at understanding the influence of lockdown on mental health and well-being of the people, and the impact of government response and how this may influence recovery; (iv) Despite the impact of lockdown, there has been collaboration of researchers gauged through cross-disciplinary research and support for young researchers to begin their publishing careers. The MBIE's Science and Innovation team report also suggests that the COVID-19 research programme for New Zealand was spearheaded by universities, making them the central sources of knowledge production in response to COVID-19 pandemic.

## 6. Conclusions

It is without doubt that the pervasive impact of the COVID-19 pandemic is one of the biggest challenges that humanity has faced in a long time. At this moment when infections, hospitalisations and fatalities from COVID-19 are persisting in many parts of the world, especially the northern hemisphere, in the midst of rays of hope from potential vaccines coming from humanity's massive fightback against the virus, this study is an important contribution to reflections on the complex and multisectoral character of the collective action that has been a necessary part of effective responses to the pandemic. Responses to the pandemic have drawn from, and revealed, the need to take seriously the roles and contributions of a range of actors, institutional processes and organisational forms. Carried out as a case study of 9 countries which are part of the on-going Science Granting Councils Initiative (SGCI) in Sub-Saharan Africa, the research informing this report and building upon an earlier study understanding the influence of the SGCI in strengthening SGCs in the study countries, this report has presented the significance of this training and capacity building on COVID-19 response. Prominent among these were tools on grant management, and leveraging inter-SGC networking and partnership opportunities facilitated through SGCI. The SGCs were also able to influence national responses either directly as members of national COVID-19 response taskforces (as was the case in Burkina Faso, Malawi, Namibia and Senegal), or through feeding ideas, evidence and advice into designated response mechanisms (as was the case in Kenya, Mozambique and Rwanda). Meanwhile, all the SGCs were involved significantly in one way or another in funding mechanisms for research in response to the pandemic. The different ways in which the SGCs were involved, as detailed in the report, were lobbying for more government funding for science, in partnership with other science system actors; issuing, managing and evaluating calls for research proposals; and soliciting external funding for research. Our findings also showed a number of skills or capability gaps in the form of areas not covered by SGCI such as capacity building in the management of short-term result-oriented research; identification of funding partners and resource mobilisation for research; monitoring and evaluation of the funded research projects; and digital skills and infrastructure, all of which could be considered for SGCI phase two.

This study reveals a number of key lessons with respect to deployment of organisational capabilities and institutional entrepreneurship among the SGCs in response to the COVID-19. Firstly, while the search for best practices that have worked elsewhere is an accepted approach

in policy processes (Bardach and Patashnik, 2016<sup>25</sup>), the pandemic revealed the limits to many best practices, necessitating the need for locally adjusted and tailored responses. Context does indeed carry a high premium, and we draw from this, that the pandemic taught the SGCs to look for 'best fit', and not necessarily best practice. The positioning of the SGCs in or around the national COVID-19 task forces is a reflection of the importance of context. The agency or legitimacy of the different SGCs did not seem to be in question here, but how best they could exert their influence within the given contexts.

Secondly, this study reveals the importance of and interplay between tacit and codified knowledge in deployment of SGC capabilities, and in the emergence of institutional adjustments to enhance the capabilities. The SGCs were able to harness both tacit and codified knowledge on collaboration and networking with other SGCs to form partnerships and issue joint calls. The third and related aspect linked to this is the imitable and complementary nature of the tools and skills from SGCI which allowed the SGCs to deploy incremental innovations in response to a challenge which was sudden and potentially competence-destroying in its manifestation. Being active in their national science ecosystems, allowed the SGCs to build and accumulate progressive architectural knowledge which placed them in a good position to contribute to responses to the pandemic. Finally, while locally-relevant routines and procedures remain very important, the pandemic highlights the importance of building resilience, not just into techno-social solutions, but also into policy and organisational capabilities, as an important centre-piece for timely and effective decisions in times of fast-paced and pervasive societal challenges.

We recognize some limitations and assumptions made in our study and the conclusions we draw. Firstly, we used a small and focused small sample size which precludes statistically relevant analysis and the use of control groups. We did collect data from non-SGCI countries (Ethiopia, South Africa and New Zealand), which allows an extrapolation of our findings to understandings on funding and governance responses to the pandemic broadly. The diversity of the responses from the study countries coupled with the insights from the other countries are important factors in counterbalancing limitations in our findings. However, future research should encompass comparisons between SGCI and non-SGCI countries in an exploration of sources of and evidence of tools and skills deployment specifically, or in broader analyses of the roles and contributions of science system actors - not just SGCs - to responses to the pandemic. Finally, it is important to keep in mind that the STECS-Plus study was conducted over a four-month period, in the midst of a rapidly evolving pandemic. Our results are liable to date quickly, which is why the lessons that we glean from the experiences of and in the SGCs, as presented in this conclusion, are of immense value.

It is paramount to consider undertaking further studies to particularly understand and document the impact of the [COVID-19 Africa Rapid Grant Fund with respect to strengthening \(or not\) the organizational innovation and trans-\(multi-\) disciplinary research and innovation capabilities in participating countries. This is partly based on diversified knowledge actors](#) targeted by the call (researchers, science and health journalists and communicators, and science advisers) within the national (or regional) systems of innovation.

## References

Embedded as footnotes

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<sup>25</sup> Bardach, E and Patashnik, E (2016). A practical guide for policy analysis: the eightfold path to more effective problem solving, 5 Ed. SAGE. Los Angeles, London, New Delhi, Singapore, Washington DC.

## Appendix: Study Questionnaire

- 1) Curating evidence on responses. How SGCs have contributed to and / or influenced responses to the pandemic? Lessons and good practices
  - a) Has the SGC been part of the national COVID-19 response organ(s)?
  - b) Which one(s) and what was/has been the role of the SGC?
  - c) What skills and (or) tools gained from SGCI trainings and technical support has the SGC deployed to support their contribution to COVID-19 responses?
  - d) Which skills/capabilities have not been covered by SGCI that are needed for SGCs to better contribute to the COVID-19 responses?
  - e) Have SGCs made specific research and innovation call(s) as a result of the COVID-19 pandemic?
  - f) If Yes, who funded/is funding these and who are targeted beneficiaries?
  - g) Have SGCs created/facilitated any new (or operationalised any existing) partnerships with other actors within the national science ecosystem or beyond (including other SGCs), as a result of the COVID-19 pandemic? Please provide details
  - h) What adjustments are being made for the SGC to leverage challenges and opportunities brought in by COVID-19 to strengthen their local influence?
- 2) If the 2008 financial crisis is anything to go by, in the economic recession following COVID-19 there will be reduction in funding for science. But then again, COVID-19 has somewhat brought science to the forefront of responses.
  - a) Have new sources of funding emerged?
  - b) Do you foresee any (more) new sources of funding?
- 3) COVID-19 has shown that time is of the essence in decision-making. SGCs are at the heart of influencing research and funding decisions.
  - a) What adjustments (internal to the SGC and external within the national science ecosystem) have been made for the SGC to have agile, rapid and efficient decision pathways during the current pandemic and post-COVID-19?
- 4) Any other thoughts and lessons
  - a) Please share any other thoughts and lessons which you see as important for SGCs as responses to the pandemic continue to evolve