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Science, Technology and Innovation Policy-Making in Africa : An Assessment of Capacity Needs and Priorities

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Executive Summary

Overview

Many African countries have projects or activities to formulate and/or to revise national policies for science, technology and innovation (STI). These efforts have been stimulated by a wide range of factors including the following. First is the increasing recognition by African leaders and the public of the critical roles that STI play in economic change and human development. African leaders now recognise that their countries need to increase investments in STI in order to achieve economic growth, reduce poverty, fight diseases such as HIV/AIDS and tuberculosis, stem environmental degradation, and to integrate themselves into the global knowledge economy. This recognition is reflected in political and policy statements that are frequently made by the leaders.

Second, there is a growing public constituency for STI. In the 1970s to the 1990s issues of STI promotion and debates on the roles of scientific research and technological innovation were confined to small circles of eminent African scientists and engineers. Today, the general public increasingly recognising the importance of STI and there is an emergence of African civil society organisations and think tanks that are dedicated to raising awareness of STI issues in areas such as biotechnology and information and communication technologies.

Third, the growth in public awareness and political recognition of STI has been accompanied by more donors getting interested in supporting STI programmes including those for policy development. In the 1990s there were very few donors that supported programmes for STI policy development. There is now a variety of bilateral and multilateral donor institutions that are supporting African governments to formulate and implement STI policies.

Lastly, during the past decade a number of regional, continental and international initiatives for STI policy development have been launched in Africa. In 2007 the African Union (AU) and its New Partnership for Africa's Development (NEPAD) launched the African Science, Technology and Innovation Indicators (ASTII) Initiative to support countries to generate statistical evidence for STI policy development. The Regional Economic Communities (RECs) have integrated STI issues or considerations into their treaties and protocols. The AU has been instrumental in getting African leaders to start making policy and declaratory statements on STI. The United Nations Educational, Cultural and Scientific Organisation (UNESCO) has renewed its support for STI policy programmes in Africa.

African countries have different or varied capacities and experiences in managing STI policy development. Indeed they have different human and institutional capacities for STI policy formulation, implementation and evaluation. However, one common characteristic of STI policy formulation in

all the countries is the long gestation period from agenda setting to adoption of policy regimes. It is taking most countries not less than five years to initiate and complete STI policy development.

The African Observatory for Science, Technology and Innovation (AOSTI) of the African Union commissioned this study to provide an indicative or preliminary survey of African countries' common capacity needs and priorities for STI policy development. The survey is intended to generate empirical information on the needs and priorities in order to inform the design a comprehensive programme for STI policy capacity development. It is based on reviews of reports (e.g. proceedings of workshops) on national STI policy development activities, reviews of outcomes of policy development efforts, and interviews with key stakeholders in governments and donor institutions.

Conceptual Issues

What is STI policy? The phrase 'STI policy' has acquired wide usage by policy-makers and researchers but rarely is it properly defined. It is not uncommon to come across 'STI policy' being equated to 'R&D policy' or even being reduced to 'technology policy'. Generally, it is about the governance of STI. By this we mean decisions and actions that are taken by governments to promote, regulate and use STI. STI policy is actually a regime or body of many policies. It has two facets: policies for STI and STI for policy. These facets are not separable but constitute a useful typology for studying STI policy making.

Policies for STI are about actions that governments or decision-makers take in order to promote scientific research, development of technology, and diffusion and adoption of technological and organisational innovations. Such measures include choice of R&D projects, choice of technology, allocation of resources for scientific research and technology development, economic and legal incentives for private firms to adopt and use new technologies, regulations on procurement of new technologies, regulations for research and clinical trials, biosafety, and the protection of intellectual property rights.

STI for policy is when science, technology and innovation are used for policy development. Scientific data or information, information on the nature and impacts of a technology and data on innovation are used to inform policy-makers with the aim of influencing and enhancing their abilities to make decisions. This is about the use of science and related technological information to determine or influence decision-making in the wider sphere of governance. It also includes the use of STI to identify and build understanding of problems such as climate change and loss of biological diversity.

This study focused policies for STI. This is mainly because most of the current efforts of many African countries are about designing policies to promote STI. There are several reasons as to why policies for STI matter. First, market and systems failures are the core rationales for STI policy. 'Market failure' is when private sector cannot be relied on to invest in scientific research or knowledge production and as such government intervenes in R&D or knowledge creation. Public resources are used or relied on to close investment gaps in R&D.

The 'system failure' rationale for STI policy is when existing organisations are not configured or when there no appropriate organisations to produce scientific knowledge, develop technologies, and effectively engage in innovation processes. In this case STI policy is needed to address the problems of institutional design and articulation. It has also to focus on such aspects as building marketing and entrepreneurial capabilities within firms and R&D institutions.

What is STI policy capacity? It is the ability to organise and manage processes of decision-making on how best to promote STI. STI policy capacity has three interrelated components: skills, institutions and overall socio-economic and economic context. Skills are embodied in persons who are trained, experienced and used to conduct STI policy research and analysis, and organise and manage policy-making processes. Such skills are multidisciplinary or generally involving adequate conceptual understanding of STI and related broader issues of development.

Institutions are critical elements or components of STI policy capacity. They are the main vehicles for mobilising, creating, nurturing and using skills or expertise for STI policy research and analysis. Institutions are used to design and manage STI policy processes, including the formulation, monitoring, evaluation and implementation of specific policies. They possess, or are expected to possess, such infrastructure as funds and libraries. Institutions are the legitimate loci of STI policy-making. Individuals cannot in their personal capacities claim authority for national STI policy-making. It is not the mere existence of agencies or organisations that constitute the institutional component of capacity but how each of the agencies or organisations are configured within a country to create the necessary space for the creation, mobilisation and utilisation of the skills and other resources. Intra-institutional or agency articulation is, thus, an important factor to consider in the assessment of STI policy capacity.

The third component of STI policy capacity is the overall context in which the skills and institutions evolve and are utilised. The context comprises of the overall economic, political, socio-cultural conditions, national physical infrastructure, inter-institutional/organisational articulate (how and whether institutions or agencies in a country communicate), the nature (including adequacy) of other policy regimes (non STI policies, laws and administrative measures) and how and whether these are implemented or enforced on the basis of agreed upon or set benchmarks.

Building STI policy capacity involves creating, mobilising, utilising, enhancing or upgrading, and converting skills/expertise, institutions and contexts. Skills are mobilised in various ways including networking of individuals and can be enhanced through training. Institutional strengthening involves providing organisations with more resources—human, financial and infrastructural. It is also about giving organisations more authority and autonomy to experiment and function. In the case of STI policy institutions this may entail giving an organisation more legislative powers to conduct research, and coordinate and convene policy making processes.

Empirical Findings

This study focused on organisational, finance, expertise, infrastructure, and information aspects of policy-making capacity. Its key findings are outlined below.

Organisational capacity—Many African countries have created departments and ministries for STI policy activities. Some (for example Kenya and Uganda) have also councils or commissions for science and technology in addition to the ministries. It was not possible for this study to assess the organisational capacities of the individual departments, ministries and councils or commissions. It put emphasis on whether these institutions were appropriately located in the whole of executive structure of policy-making. One of its key findings is that in many African countries ministries and departments responsible for STI policy *tend to operate in isolation from the rest of other policy agencies of government and have weak links to academic institutions and private sector.* They are also not adequately linked to international and the few African think tanks in policy research. As such they are not able to easily access empirical material and ideas for STI policy-making.

Funding STI policy activities—the survey for this study showed that most countries do not have budgets dedicated to STI policy activities, particularly for research or evidence gathering. Some rely on short-term project funding that is linked to events such as workshops and consultancies to review R&D systems or to collect STI indicators for UNESCO and NEPAD. Important aspects of STI policy development such as monitoring and evaluation are not budgeted for and thus not resourced in most countries.

Infrastructure capacity for STI policy—Most countries have the requisite ICT related infrastructure in the relevant ministries and/or departments for STI policy. Only respondents from three out of 18 countries identified ICT as a priority for capacity building. For some of the countries, infrastructure capacity needs relate to access to Internet and easy email communications.

Human resources or expertise for STI policy—Most ministries of and/or departments responsible for STI policy-making are not staffed with persons with relevant research and analytical skills. Many of the officials involved in or required to be in charge of drafting policy documents are not really versed with or trained in STI policy and have no experience in evidence based policy making. On the whole, expertise in (skills for) STI policy development is in short supply in most African countries.

Information capacity needs—In most countries, ministries and/or departments for STI policy do not have libraries or their staff do not have easy access to sources of relevant information for policy-making purposes. There is a paucity of local evidence-based analysis for policy development.

In additional to the capacity needs and priorities outlined above, there is a need to improve overall conditions or contexts for STI policy development. This includes strengthening executive and political leadership engagement in STI policy. National presidents and/or prime ministers need to play a more active leadership role in promoting STI and the formulation of relevant policies. Parliamentary committees on STI need to be strengthened to be actively engaged in STI policy activities. In most

of the countries these committees do not have research capacity or support for policy analysis, lack specific programmes and tend to work on ad hoc basis, do not dedicated budgets, and many of their members do not have adequate understanding of the wide range of STI policy issues that the committees are expected to handle.

Civil society organisations and think tanks for STI policy are nascent, almost non-existent in most of Africa. Although there are civil society organisations (CSOs) focusing on sectoral STI policy issues such as biosafety, climate change, biodiversity and other aspects of environmental regulation, these institutions do not focus on and/or participate in the development of overall national STI policy regimes in the countries.

Recommendations for AOSTI

The formulation, implementation, monitoring and evaluation of STI policies will increasingly preoccupy African countries as they seek to integrate their economies into the global knowledge economy. Many countries are going to seeking support build capacity for STI policy activities. The AOSTI has been established by the African Union (AU) to help African countries to build capacity for STI policy. AOSTI is now developing a comprehensive programme of work that will include or cover STI policy capacity building activities or initiatives. Based on this assessment it is recommended that AOSTI should focus on the following:

(a) Mobilising and making available existing African and international expertise to support STI policy activities in Africa—Many departments and/or ministries of STI do not have access to information on the available STI policy expertise in the continent and abroad AOSTI can be instrumental in supporting African governments to access and use the existing STI policy expertise by making information on the experts available through an organised database. AOSTI should design and manage web-based database of experts in STI policy. The database should contain information on the individual experts' education background, research outputs and experience in STI policy research and participation in national policy processes.

(b) Establish a consortium for STI policy training—the assessment shows that there is a variety of STI policy training courses. Some of the courses are tailored for government officials in departments or ministries of S&T. The UNU-MERIT DEIP course is tailored a specific country's needs. It has been offered to Ethiopia, Senegal and Nigeria. The new UNESCO-SADC STI policy course focuses on S&T policy review and R&D indicators. AOSTI should consider establish a platform or consortium that brings together the different institutions offering the courses in order to design and implement one comprehensive programme for STI policy training. The programme would be spearheaded by AOSTI but implemented by the consortium members as a partnership arrangement.

(c) Develop a virtual resource centre or unit on STI policy information—Almost all of the countries that participated in this survey or assessment exercise identified provision of STI policy information (with emphasis on STI data and statistics and on concepts of innovation and systems

of innovation) as need and priority in capacity building. All of them identified this as one area where AOSTI can play an important role of supporting them to have access to information and literature relevant to STI policy formulation and implementation in Africa. AOSTI should consider establishing a well-structured policy-makers' web-based STI policy library. This would be a virtual centre or unit that is tailor made to suit information needs of African policy-makers.

(d) Develop a policy-makers' guide to innovation concepts and innovation policy formulation— This survey of STI policy capacity also showed that the concepts of innovation, systems of innovation or innovation systems, and innovation policy are not well understood by most policy-makers and thus current efforts at STI policy formulation seem to lack clear conceptual clarity. AOSTI should consider developing an accessible African policy-makers' guide (with examples of practices drawn from other parts of the world) on definitions and application of innovation concepts as well as guidelines for innovation policy formulation, implementation, monitoring and evaluation.

Many countries are engaged in various activities to design modern STI policy regimes. However, most of the countries do not have the necessary capacities for STI policy formulation. The study recommends that AOSTI should incorporate STI policy capacity building with emphasis on first mobilising existing expertise, develop STI training programme that explicitly focuses on innovation policy, establish an information centre on STI policy and design a policy-makers' guide on innovation concepts and innovation policy.