CHAPTER 5: INFORMATION AND COMMUNICATIONS TECHNOLOGY AND POLICY

Integrating Science, Technology and Innovation in National Development Planning Process: the Case of Uganda

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ABSTRACT
Science, technology and innovation (STI) plays a critical role in enhancing economic growth and contributing to national development. It is the means by which new products and services are developed or improved and brought to the market. However, to make this contribution, STI must be integrated in the national development planning process. Over the years, the integration of STI in Uganda's national development planning has been implicit. Intentions to use STI as the vehicle for economic growth are evident in the country's comprehensive development framework such as the Poverty Eradication Action Plan (1997 – 2008/09) and the National Development Plan (2010/11-2014/15). However, strategies of how to use STI to bring about the desired outcomes of economic growth were lacking. The recent designation of STI in the National Development Plan of Uganda as a sector that provides institutional and infrastructural support to the production of goods and services demonstrates that integration of STI in development planning could be accomplished through endogenous efforts. But such inclusion of STI in the Plan should not be taken as an end in itself; rather it should be seen as a process. And implementation of the STI provisions of the NDP ought to be undertaken within the context of the national innovation system.

Key words: Innovation, Innovation System, Science, Technology, Uganda.

1.0 INTRODUCTION

Science, technology and innovation (STI) plays a critical role in enhancing economic growth and contributing to national development. It is the means by which new products and services are developed or improved and brought to the market. Ideally, these new or value added products and services are intended for improvement of the quality of life. Economically they create new market opportunities, attract better prices and provide employment.

The importance of STI in economic growth and development of low income countries generally and of Uganda in particular has been echoed since the 1960s (East African Community (EAC), 2000). After independence in 1962, the country embarked on nation building with industrialization being at the centre of the development agenda. STI was expected to play a key role in the industrialization process but it did not feature vividly in the development plans of the time. There was lack of clarity on how to promote STI for national development. This led some scholars to believe that STI was often given low priority in the development planning process (Senghor, 2000).

Only recently has STI been given more prominence in Uganda's National Development Plan 2010/11 – 2014/15. The NDP stipulates Uganda's medium term strategic direction and development priorities, focusing on growth, employment and socio-economic transformation for prosperity (Ministry of Finance, Planning and Economic Development (MFPED), 2010). The plan recognizes STI as a sector that provides institutional and infrastructural support to the production of goods and services. The promotion of STI is identified as one of the strategic objectives for achieving the goals of the NDP. Previously, also intentions to use STI as the vehicle for economic growth were evident in the country's comprehensive development framework, which was known as the Poverty Eradication Action Plan (MFPED, 2001). The Poverty Eradication Action Plan (PEAP) was a three-year planning framework for government. Programs and projects not aligned to the PEAP would not receive budgetary support. STI was not explicitly mentioned in the PEAP. The challenge, therefore, was to make STI projects PEAP compliant in order to qualify for public funding.

Thus, the development planning process in Uganda since independence until recently only implicitly considered STI. However, a clear strategy of how to translate the intentions to use STI for development into actions with tangible results was generally lacking. This challenge continues to date even with the deliberate inclusion of STI in the NDP. This paper examines the process of integrating STI in Uganda's national development planning process.

2.0 METHODOLOGY

The paper is based on a retrospective review of literature on STI in Uganda. A desk review of key STI documents was done. The focus was on the national development frameworks, for example, the National STI Policy (2009); National Industrialization Policy 2008; Poverty Eradication Action Plan 1997, 2001, and 2004; the National Development Plan 2010/11 – 2014/15. Other historical documents pertaining to Uganda's economic development since independence were also reviewed; as well as reports of STI regional and international meetings. The documents were read and summarized.

3.0 RESULTS AND DISCUSSION

Science, Technology and Innovation (STI) taken together may mean *a dynamic process involving discovery and generation of new knowledge and the application of knowledge to develop new and/or improve goods and services.* STI is not an end in itself; rather it is the means by which new products and new processes are developed and brought to the market. The process of integrating STI in Uganda's national development planning could be looked at from two dimensions: the exogenous and endogenous dimensions.

3.1 The exogenous dimension

Prior to Uganda's independence, STI was an integral part of the central government, which was the East African Common Services Organization (EACSO) with headquarters in Nairobi, Kenya (EAC, 2000). The three countries of Kenya, Uganda and Tanzania first cooperated in matters of STI through the EACSO. The latter body later became the East African Community. With this arrangement STI appeared to be quite well organized. However, STI was focused more on research aimed at improving productivity of cash crops such as cotton and coffee; and tackling tropical diseases such as malaria and trypanosomiasis (EAC, 2000).

This trend continued even after independence in 1962 through to the 1980s. Development planning during this period hardly incorporated STI. However, there was a growing global effort to help developing countries use STI as a tool for development (United Nations Educational,

Scientific and Cultural Organization (UNESCO), 1987). Several African countries in the 1960s and 1970s established national research councils as coordination mechanisms for scientific research and development. In Uganda, a National Research Council was set up in 1970 to guide and coordinate research efforts (Uganda National Council for Science and Technology (UNCST), 2001). The predominant view at the time seemed to be that industrialization was preceded by research, then experimental development and later production and commercialization of products. This linear view of STI has been criticized because it fails to recognize other factors necessary in the innovation process (Godin, 2006). A systems approach to STI seems to be the more favoured view currently (Balzat & Hanusch, 2004). A systems approach recognizes the contribution of several actors in an interactive learning relationship, and the factors which influence such a relationship (Edquist 2009; Lundvall, 2009; Banji, 2006). Innovation is believed to be an outcome of these complex interactions between diverse actors (Lam & Lundvall, 2007).

Most of all the drive to integrate STI into national development planning was initiated by continental wide efforts notably by the United Nations Educational, Scientific and Cultural Organization (UNESCO) supported Conferences of Ministers responsible for the Application of Science and Technology in Development in Africa I and II (CASTAFRICA I and II) in 1974 and 1987 respectively; and the Lagos Plan of Action (LPA) in 1980 (UNESCO, 1987). For UNESCO, rapid scientific and technological progress could only be achieved through the indigenous efforts of developing countries (Mullin, 1987). This view became popular among developing countries because they found it consistent with their aspirations to liberate themselves from colonialism (Mullin, 1987). Consequently, in 1980 African leaders met in Lagos Nigeria and developed a masterpiece LPA. The LPA provided that each country should establish a center or body to "help the country in determining the origins and effects of alleviating the technological dependence and in approaching technological self-reliance by striking a socio-economically favoruable balance between foreign inputs and those inputs that are generated by the indigenous science and technology system and utilized by the national sectors of production and services". Such a centre was to be entrusted with the mandate for national science and technology policies and coordination of all national research and development programmes. This centre in Uganda became in 1990, the Uganda National Council for Science and Technology (UNCST). The UNCST replaced the National Research Council. The ideals of the LPA were for member countries to attain self-sufficiency by becoming technologically independent. The LPA specifically called for member countries to develop short, medium and long term integrated development plans, with science and technology as an integral part.

Most recently, the Africa's Science and Technology Consolidated Plan of Action (CPA), 2005 prepared by the African Union/New Partnership for Africa's Development became an important regional framework for harmonization of STI development (African Union, 2005). The CPA evolved from a series of continental meetings. It is an instrument to implement the decisions of the African Ministerial Conference on Science and Technology that was held in Johannesburg in 2003. It is built on three pillars: capacity building, knowledge production and technological innovation; emphasizing the development of Africa through a system of research and innovation. The CPA lays down specific flagship programmes and projects including biodiversity, biotechnology and indigenous knowledge; energy, water and desertification; material sciences, manufacturing, laser and postharvest technologies; information and communication technologies and space science; as well as programmes to improve STI policy mechanisms. Implementation of CPA programmes is through centres of excellence; but requires determined and coherent actions by all member states. Undoubtedly, the CPA may have influenced STI planning in Uganda, but the extent of this influence is unknown.

These exogenous influences have to some extent shaped the process of integrating STI in the national development process of Uganda. Specifically, they helped to raise awareness among policy makers of the importance of STI in economic growth and development. Despite the efforts, however, regional or continental STI initiatives have been poorly domesticated in Uganda. There is often little room for consultations on these regional initiatives within country, and collective involvement of local actors in the STI system has remained weak. As a result, there is seldom sufficient local ownership for the programmes proposed by the regional or continental wide initiatives.

3.2 Endogenous Dimension

Endogenously the integration of STI in Uganda's national development planning could have started in the 1990s. During the 1970s and early 1980s, development planning was interrupted by political instability and civil unrest; and further by the structural adjustment programmes of the 1980s and the early 1990s (MFPED, 2010). Between 1986-97 government implemented an economic recovery program aimed at stabilizing the economy and creating a conducive environment for rapid economic growth. These included among others interest rate reforms and fiscal measures to reduce Uganda's budget deficit, liberalization of trade policies and revitalization of the private sector (Kreimer *et al*. 2000). From 1997 to 2008 development planning was guided by the PEAP. Significant reforms of the public sector happened during this period including the creation of dedicated research and development organizations such as the National Agricultural Research Organization and the Uganda Industrial Research Institute. Government line ministries assumed a policy and regulatory function, leaving research to academic and research organizations.

It is at this stage that traces of STI integration into national development planning started to emerge. Though not explicitly stated, the need for STI was implied in most of the PEAP actions particularly those meant to increase ability of the poor to raise their incomes such as modernizing agriculture; as well as in actions to improve the quality of life of the poor, for example, in combating HIV, developing more efficient energy systems, designs for improved housing, and improving primary and secondary education (MFEPD, 2001; MFPED, 2004). The PEAP was Uganda's comprehensive development framework from 1997 to 2008/09. It was government's three-yearly planning document. All government expenditure had to be aligned to the PEAP. All the PEAPs, PEAP 1997, 2001 and 2004, had no specific actions to promote STI. But they all recognized the need for STI in some of the actions such as those aforementioned. It may have been possible to articulate STI within the context of the PEAP, but such a strategy would not be sufficient mechanism to promote STI primarily because results from STI are usually realized in the long term, though there could also be some short term outputs. PEAP neither provided a clear mechanism of how to use nor invest in STI to bring about the desired outcomes of economic growth. As such it appeared as if STI had been given low priority and no status in the planning process despite its potential central role in enhancing economic growth.

The PEAP was replaced by the 5-year National Development Plan (NDP) starting 2010. The plan is the first of six 5 –year development plans intended to transform Uganda from a peasant society to a middle income country. This time, STI has been included in the NDP as a sector that provides institutional and infrastructural support to the production of goods and services. It is the first time STI has been explicitly recognized in the national development planning process of Uganda. Unlike in the 1960s, 70s and 80s where exogenous influences shaped STI planning, the integration of STI into NDP was an outcome of endogenous efforts. The planning for STI within the NDP was done in a participatory manner involving a diverse group of actors. The success in

according STI a sector status in the NDP demonstrates that home grown efforts in STI can be harnessed.

However, designation of STI as a sector within the NDP is not an end itself. It should be considered as a learning process of systematically integrating STI in national development planning. As the process evolves, it will be important to guard against the likely danger of promoting STI in isolation and the risk of backsliding to the linear view of STI of the 1960s to 80s. Implementation of the STI provisions of the NDP ought to be undertaken within the context of the national innovation system. Innovation system here refers to the complex web of interactions and relationships among diverse actors (Lam & Lundvall, 2007). It will be essential not only to focus on the expected outputs of the STI in the NDP, but also pay close attention to the multiplicity of actors involved in STI, how they relate and what policies, laws, behaviours, norms, routines and practices influence their interactions.

Political, cultural, social and behavioural factors notwithstanding, it may be worthwhile to consider the following pillars in support of the process of integrating STI in the development planning process of Uganda:

Human capital: Uganda's human capital base for STI, that is, the pool of knowledgeable, competent and skilled people, is still small. For example, active researchers in all fields were less than 2,000 in 2008 (Ecuru, et al. 2008). Increasing the human capital potential depends on the strength of the education system. Uganda's education system is quite well developed and positioned to produce the necessary human capital. However, challenges still exist of improving science and mathematics education as well as improving business and vocational education. Reforms such as universal primary education and universal secondary education and emphasis on science careers at the tertiary level, may increase the supply of scientists; but reforms are also necessary to improve the quality of education.

Governance: Governance, that is, organizing scientists to produce involves formulating policies, issuing guidelines, developing legislation, preparing strategies and plans for STI. Early on in 1990, it was proposed to have an explicit national policy on all fields of science and technology. A National Science and Technology Policy was first proposed at a National Workshop in 1991 and approved by Cabinet in 2009. The policy provides an overarching framework for investment, coordination and management of STI in Uganda. It aims to build and strengthen national capability to generate, access, select, transfer, disseminate and apply scientific knowledge, skills and technological innovations for the realization of Uganda's socio-economic and development objectives, and to ensure sustainable utilization of natural resources (MFPED, 2009). The UNCST and Parliamentary Committee on Science and Technology (2003) are the principal STI governance institutions in Uganda. UNCST is a semi-autonomous agency under the MFPED. The NDP proposes to establish a separate ministry for science and technology. The Parliamentary Committee on Science and Technology oversees matters of STI in Parliament, and advocates for desirable legislations for STI in the country. Complementary institutions which support STI governance exist, notable among which is Uganda National Academy of Sciences (UNAS). The Academy was established and nurtured by UNCST in 2000, and is supposed to provide independent, well researched opinions and recommendations on topical STI issues. It is important that these organizations talk to each other, particularly to lay strategies of how to integrate STI in development planning, mechanisms to translate STI policies into actions, and also chart a way of how to broker relationships among other actors in the innovation system.

Financing: STI is mainly in public research institutes and universities. Financing for STI is predominantly by government and development partners. For example, in 2007/08 financial year, government expenditure on research and development was estimated at 42%, development partners 51%, and other sources 7%. Government pays mainly for administrative costs such as utilities, maintenance and personnel. Contribution from the private sector is miniscule. Total annual national expenditure on R&D as percentage of GDP averaged 0.3% between 2003/04 and 2007/08 (UNCST, 2008). This is very low compared to say South Africa which spends between 0.8% and 1%, and Sweden, 4% annually (OECD, 2007). Scientists in Uganda have no option but to rely on grants from abroad. There is increasing need to have stable and more sustainable domestic funding arrangements for STI. Successful countries like South Africa and Sweden have dual schemes for public funding of STI. The first is direct STI funding to research organizations and universities. The second is a national competitive funding mechanism. It is possible for Uganda to adopt this same dual approach because it already has a National STI Fund established under section 20(3) of the UNCST Act (Cap 209). Besides, through the US$ 30 million Millennium Science Initiative Project (2006 -2012), reasonable capacity has been built within the UNCST to operate national competitive grants for STI. The consolidation of this competitive funding scheme would also open up possibilities for bilateral and multilateral cooperation in STI, much to the benefit of Ugandan scientists. This would also be a key marker of the process of integrating of STI into national development planning. .

4.0 CONCLUSIONS

The integration of STI into national development planning processes is possible. This is demonstrated by the inclusion of STI in the NDP as a sector that provides institutional and infrastructural support to the production of goods and services. However, this should not be an end in itself. Integration of STI into national development planning is a process; not a single event. It will be important not only to focus on the likely tangible STI outputs in the NDP, but also on the process by which innovation takes place. This implies that the implementation of the STI provisions in the NDP ought to be undertaken within the context of the national innovation system, with due consideration to the relationships between the actors in the system. Further, the successful designation of STI in the NDP has demonstrated that home grown STI solutions are possible. Exogenous influences on national STI reforms are important, but by themselves may be inadequate to ensure effective integration of STI in the national development planning process.

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