

**The Technology Innovation Agency (TIA): A public support  
mechanism for technological innovation in a developing country**

Dhesigen Naidoo\*

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**Abstract**

South Africa has since the dawn of democracy progressively built the science and research support components of the National System of Innovation (SANSI) with consistency. At national government level, science and technology developed from being a branch in the Ministry of Arts, Culture, Science and Technology in 1994, to a fully fledged Ministry ten years later. Investments were initially heavier in developing a sustainable research support system with encouraging results. A more recent set of reviews of progress with the development of the SANSI, including a comprehensive OECD review, has catalyzed the development of a public sector innovation support system, the core of which is a new agency – the Technology Innovation Agency (TIA). The TIA has been established through the Technology Innovation Agency Act, as a public entity that will function as a key structural intervention to support government in stimulating and intensifying technological innovation and thereby enhance the country's capacity for local innovation and lessen dependence on imported know-how.

**The Rationale for TIA**

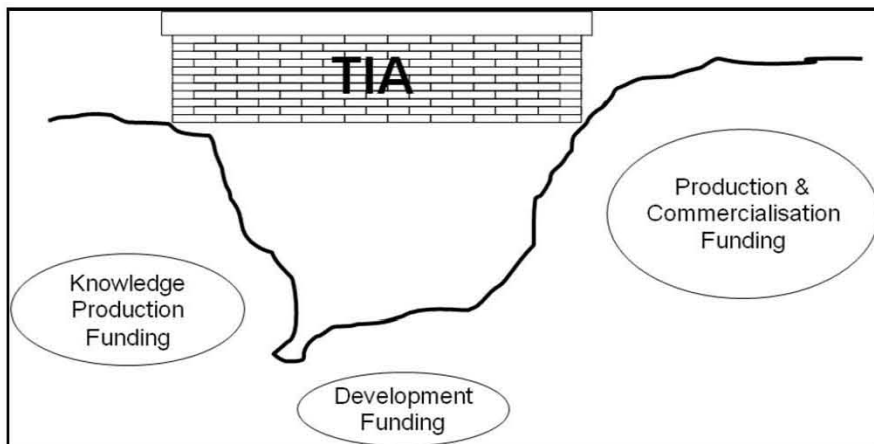
The notion of a National System of Innovation (NSI) and the role of science and technology in a NSI first appeared in the South African government national policy dialogue during the development of the Science and Technology White Paper (Republic of South Africa, 1996).

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\* Director of Research and Innovation of the University of Pretoria, Republic of South Africa, Email: dhesigen.naidoo@up.ac.za

This was subsequently reaffirmed in the National Research and Development Strategy (NRDS) (Republic of South Africa, 2002). The National R&D Strategy went on to further examine the concept of South Africa's "Innovation Chasm" as described in figure 1.

**Figure 1: Bridging the South African Innovation Chasm**



(Adapted from the Draft Foundation for Technology Innovation Conceptual Framework, 2007)

This is a concept that combines the notions of the "European Paradox" and the American 'Valley of Death. The scientific version of the European Paradox describes the state of affairs that while Europe produces outstanding academics and knowledge as witnessed by such parameters as the number of Nobel Prize winners, it tends to lag behind the US, Japan and more recently China and Republic of Korea as far as dominance of the technology market is concerned. The "Valley of Death" in the United States of America describes a funding void for innovation and product development, even in the situation where there is substantive funding for research and where there is a developed market for technology based goods. The South African Innovation Chasm as described in the NRDS (Republic of South Africa, 2002) and Kaplan (2008) goes further and combines these two challenges with a third i.e. knowledge generated in South Africa and shared globally through such mechanisms as publications as well as information exchange is sometimes developed in products and services elsewhere in the world. These are then bought by South Africa at high prices. This is an exacerbated scenario of exporting both knowledge and hard currency.

The South African Innovation Chasm is composed of three distinct components:

- A funding support gap for innovation and product development. This was recognized as a market failure as the funding sources, both public and private funded either research or the commercialization of finished products, not the innovation and development of new products and services.
- A cultural gap associated with a South African dominant view that research and development of new technology based products was the privy of developed countries and the best developing countries could do was as best organize to be early adopters.
- A capacity gap particular with regard to the human capital for innovation. This would range from the product development expertise all the way through to entrepreneurship skills and the various support capacities that would be required.

The National Research and Development Strategy (Republic of South Africa, 2002) proposed the development of a public agency then called the Foundation for Technological Innovation (FTI) to address this gap. In the interim South Africa progressively set up a national Innovation Fund (IF) to begin this experiment. In time this was followed by the establishment of four Biotechnology Regional Innovation centres, the BRICS and a national support agency for plant biotechnology based product development in the form of a trust called PlantBio. Such support instruments were also set up in other sectors. Examples include the Advanced Manufacturing Technology Strategy (AMTS) and the Advanced Minerals Initiative (AMI). In parallel *thedti* in South Africa initiated the THRIP (Technology and Human Resources for Industry Programme), the SPII (Support Programme for Industrial Innovation) focused on small and medium enterprises and PII (Programme for Industrial Innovation) aimed at supporting large industries.

### **Establishing the TIA**

South Africa's national system of innovation has developed a substantial repository of local knowledge. This, however, has minimal influence on the real economy currently. This is exacerbated by a number of impediments to productivity and technological innovation, including, amongst others, a lack of access to adequate financing (and particularly seed and first-stage financing); market inefficiencies; a relatively weak and uncoordinated Intellectual Property (IP) rights framework; as well as a lack of institutional coordination and alignment within the national system of innovation. These constraints together with the encouragement from the relative success of the interim support instruments have galvanized South African Government support for the development of a single public agency in the form envisaged in the

concept of the FTI (Department of Science and Technology, 2007). This has since been renamed the Technology Innovation Agency or TIA.

Further support came from the results of the South African National R&D Surveys: National Survey of Research and Experimental Development for the fiscal year 2004/5 (2006) (HSRC, 2007a) as well as the South African Innovation Survey Highlights, 2007 (HSRC, 2007b) from the first National Innovation Survey conducted by the Centre for science, technology and innovation indicators (CESTII) at the HSRC. The former confirmed an increasing R&D expenditure approaching 1% of GDP. The latter indicated that the industry partners were not looking to the knowledge producing institutions like universities and research institutions for new knowledge and know how on product development and innovation. This provided further impetus to provide support to convert the knowledge generated into products for the real economy. The OECD review of the South African NSI (OECD, 2007) confirmed the need for a public support instrument to bridge the innovation chasm.

In this context, the motivation for the Technology Innovation Agency (TIA) is to develop a public institution that, together with private sector partners where appropriate, develops the capability of enhancing the country's capacity towards translating a greater proportion of local research and development (R&D) into commercial products and services.

An international benchmarking study was conducted by the DST in order to learn from successful models that could inform the development of TIA. The following institutions were examined- TEKES in Finland, VINNOVA in Sweden, the Canadian Foundation for Innovation (CFI), the Malaysian Technology Development Corporation, Innovation Norway and the Foundation for Innovation and Technology Transfer (FITT) in India.

Some of the key learning informed that since investments for bringing new technology products and services to the market require substantial amounts of resources and the corporate form of the TIA should be able to generate additional revenue for re-investment into the system through equity shareholding and the facilitation of venture capital financing, amongst other things.

The TIA was designed to build on the capacity that already existed in the system. Institutions such as the Innovation Fund and the Biotechnology Regional Innovation Centres (BRICs) have already implemented systems and processes, which will be incorporated into and further refined by the TIA in a manner that extracts synergies from existing relationships and infrastructure in order to ensure the rapid acceleration of service delivery.

## **Legislation and Objectives**

The TIA Bill was developed and gazetted for public comment in August 2007. After a vibrant stakeholder participation process led by the Parliamentary Portfolio Committee on Science and Technology of the General Assembly and the Select Committee of the National Council of Provinces, the bill was passed as the Technology Innovation Agency Act of 2008 (Republic of South Africa, 2008).

The Act provides for the appointment of the TIA Board, Executive and staff and sets out the objects, powers and functions of the Agency, which are, amongst other things to:

- I. Support the State in stimulating and intensifying technological innovation and invention in order to improve economic growth and the quality of life of all South Africans by developing and exploiting technological innovations and inventions.
- II. Provide financial assistance to any person, consortium, or enterprise for the purpose of enabling that person, consortium or enterprise to develop any technological innovation or invention.
- III. Draw together and integrate the management of disparate technological innovation, inventions, incubation and diffusion initiatives in South Africa.
- IV. Develop the national capacity and infrastructure to protect and exploit intellectual property derived from publicly financed research.

### ***The Objectives and Functions of the TIA***

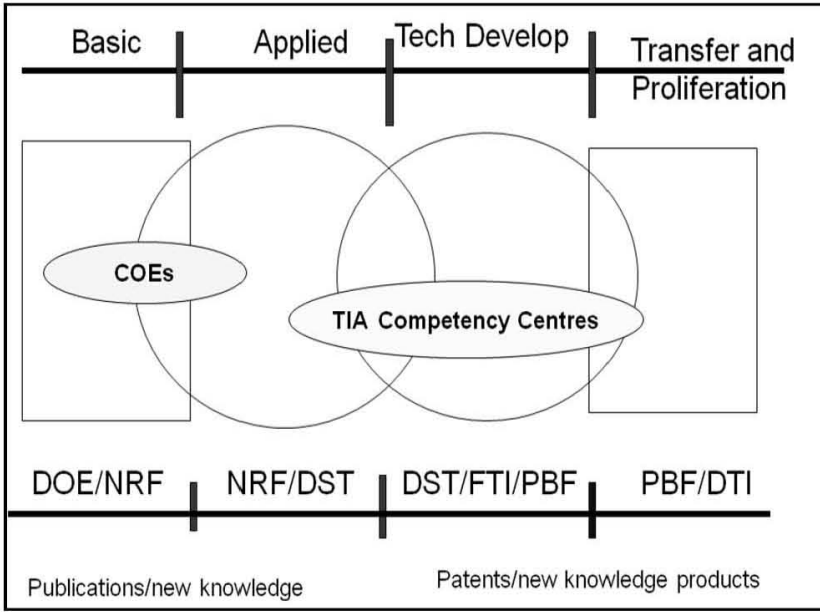
Taking into account South Africa's national context and international lessons learnt the key objectives of the TIA are to:

1. Provide the primary bridge between the formal knowledge base and the real economy;
2. Stimulate the development of technology based products and services;
3. Stimulate the development of technology based enterprises – both public and private;
4. Develop a significant technology base for the South African economy;
5. Provide an Intellectual Property protection support platform;
6. Stimulating investment – including through facilitating Venture Capital, Foreign Direct Investment (FDI) in R&D; and to,
7. Facilitate the development of Human Capital for Innovation.

The TIA's mission and strategic objectives will be achieved through the discharge of its core function of managing, coordinating and integrating all innovation activities by way of:

- Acting as a single contact point for all innovation-related matters;
- Managing IP related to innovation;
- Enabling and motivating the private sector to participate in the innovation industry;
- Promoting the innovation industry; and
- Building capacity.

**Figure 2: Contextualizing the TIA**



The TIA will not engage in fundamental scientific research, but will be concerned with identifying and evaluating available and new technologies. It will also provide shared R&D as well as technical business and commercialisation services for existing and emerging industries.

The TIA operational design also includes the provision of IP protection and support services, as well as Venture Capital facilitation and business process development in order to enable the development of new technology based or driven enterprises.

Another core element of the design is Human Capital Development, throughout the innovation chain. The proposed Competency Centres or

‘Centres of Excellence for Innovation’ will be the primary instrument of the TIA in this regard.

These structures will also serve to facilitate and consolidate linkages between national, provincial and local innovation policy and support measures. This is illustrated by Figure 2. The TIA will support the activities in the late applied research phase into the product/technology development and into the beginnings of the transfer and proliferation/commercialization phases. The Department of Education (DOE), the Department of Science and Technology (DST) and the National Research Foundation (NRF) funding instruments will continue to support research and the department of trade and industry (DTI) and its related agencies will use their support instruments to support the technology transfer and commercialization activities. The Public Benefit Foundation (PBF) is envisaged as a TIA-like agency with support instruments for the transfer of knowledge and innovations for public good.

## **Conclusions**

South Africa’s approach of creating an enabling environment towards stimulating and exploiting technological innovation is premised on a more enduring definition of sustainable, long-term economic growth through technological innovation. This is one which includes spin-off ventures and the commercialization of discoveries. This will support improvements to society and the quality of life of all South Africans.

Drawing on some international experiences and considering South Africa’s own innovation development challenges and opportunities, the implications for the form, function and objectives of a TIA for the country is that of a public institution that develops a significant and commercially viable technology base for the country through:

- Stimulating the development of technology based products and services;
- Stimulating the development of technology based public and private enterprises;
- Providing an Intellectual Property (IP) support platform;
- Stimulating investment: and particularly towards higher-risk Venture Capital funding (particularly also for start-up and “first adopters”);
- Providing an interface and promoting active collaboration between government, industry and academia and international FDI sources;
- Actively monitoring developments in national and international technological innovation trends with a view to accruing and providing accurate management information for decision-makers in all sectors;

- Facilitating the development of Human Capital for Innovation;
- Connecting technology entrepreneurs and enterprises with real opportunities towards greater competitiveness
- Increasing value added and finished goods exports

South Africa's experiences together with the more established experiences of other developing countries like Malaysia and India should be considered by African partners who are considering developing new institutional frameworks to stimulate the development of a national knowledge economy base through protecting and harvesting locally produced and in particular indigenous knowledge through innovation, product development and commercialization as a principle element of national development strategies.

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