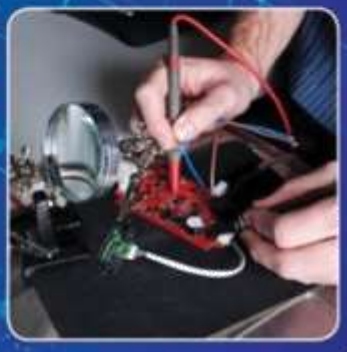
technology innovation
AGENCY



STRATEGIC PLAN

FY 2015 -FY 2020

An initiative of the Department of Science and Technology

Technology Innovation Agency
Strategic Plan: 2015-2019
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FOREWORD BY THE CHAIRPERSON

This document sets out the TIA Strategic Plan for the fiscal years 2015/2016 to 2019/2020 and represents the aspirations of TIA to deliver on its mandate as per the Key Performance Indicators (KPIs) of the Department of Science and Technology. The five-year Strategic Plan of TIA (Plan) defines the company's strategic objectives and KPIs. The Plan sets out priorities for TIA in a manner that emphasises the outcomes-orientated monitoring and evaluation approach of the Presidency and identifies funding required in order to achieve the stated strategic objectives.

Context

Our passion is to enable and support technological innovation across all sectors of the economy in order to achieve socio-economic benefits for South Africa and enhance its global competitiveness. This entails bridging the innovation chasm between research and development from higher education institutions, science councils, public entities, and potential funders and/or adopters of technologies so as to achieve a knowledge-driven economy that delivers innovations to the market and appropriate stakeholders, in response to priority areas identified by the government.

Over the past Strategic Planning Cycle, the Agency has focused on consolidating and aligning its investment portfolio and defining new approaches and instruments to drive its mandate. This period, of paramount importance, was for the Agency to position itself against the backdrop of a fragmented National System of Innovation (NSI) in a bid to complement the government's efforts to consolidate the system and promote a closer coordination of the various instruments that are geared towards building the innovation system in South Africa.

In defining the value proposition of the Agency we observed that South Africa has the early building blocks for a productive NSI, although this is still not adequate for the country to meet its potential for translating new knowledge and inventions into innovations that address our socio-economic priorities. Over and above the historical over-dependence of the economy on its resource endowments as opposed to expansion into emerging sectors, the continued existence of an innovation chasm in the NSI requires a rethink as part of building an effective NSI that will contribute to a growing, inclusive and competitive economy.

Strategic approach

The recommendations of the Ministerial Review of TIA and the outcome of the International Benchmarking Studies have set the strategic direction for TIA. Despite the substantial cut in the Agency's baseline budget, through leveraging the limited available resources TIA will strengthen its position as a key entity supporting technological innovation and thought leadership in the field. This

will be done by connecting and leveraging the power of synergies and coordinating the application of multiple policy instruments readily available across the innovation value chain.
Through our new funding instruments we will aim to de-risk and facilitate the adoption and commercialisation of the most promising technology innovations.

We have sought to refine and align the Agency over the following strategic period by adopting a systematic approach to translate knowledge generated into technologies, products and processes that can be commercialised. We have mapped our strategy hereafter to deliver on the following:

1. NATIONAL DEVELOPMENT PLAN

It is noted in the NDP 2030 document that "innovation is the primary driver of technological growth and drives higher living standards" and "to bring about economic growth, we propose a larger, more effective innovation system, closely aligned with firms". Our strategy hereon emphasises innovation-led economic growth, whereby the Agency will ensure that through its programme interventions there is integration of knowledge and learning, by playing a more active role in new product/service development, which leads to commercialisation. Moreover, our strategy will ensure that the intellectual capital gained in the process is applied in a manner that advances the innovation system.

2. EMERGING TECHNOLOGIES

The Agency will contribute to the realisation of national priorities through structured and focused support of emerging technologies within the limitations of TIA's resources. TIA will strengthen its linkages and the role it plays in the implementation of strategic technology areas identified through the leadership of the DST. These technologies include areas such as information and communications technologies, biological sciences, clean technology and energy. Participation in the development of these technologies is a valuable opportunity that TIA should make use of to lead and advance innovation.

3. BIO-ECONOMY

The Agency will continue to strengthen its portfolio and will work in earnest to achieve the outcomes of the Bio-economy strategy which seeks to contribute to the development and growth of the Human, Animal Health, Industrial and Agro processing industries.

Funding limitations

While the Agency's funding has been reduced in the short term, there are also a number of projects that have to draw down on existing commitments, creating a strong need for effective fund management. In order to mitigate against the funding shortfall, we aim to reduce administration costs (including human resource related costs) to acceptable levels through various cost cutting and business streamlining initiatives. We will further motivate for additional funding by engaging with the DST and National Treasury and actively seek additional funding sources and funding partnerships.

Year of Transition (2014/2015)

During the 2014/2015 financial year the Agency continued with strategic initiatives that commenced during the year. These initiatives prepared it for and aligned it to the new Strategy (2015/2016-2019/2020) as presented here. Such initiatives include, for example, the organisational design initiative that aims at streamlining the organisation to fulfill the new strategic approach. It also includes the initiation of new funding mechanisms and appropriate processes and procedures, and the re-engineering of the core business function of the organisation i.e, funding/investment process.

Conclusion

TIA plays a proactive role in driving technology innovation through coordination and collaboration on technology development with all its stakeholders. We have taken the time to understand the drivers and influencing factors that will enable the Agency to deliver on its strategic objectives and mandate. To this end, the Agency will implement the strategic plan in a structured manner in a bid to improve on performance, effectiveness and impact.

We are confident that our spirited efforts to address the gaps within in the NSI will contribute towards the realisation of a portfolio of technology innovations whose impact is for the benefit of South Africa's competitiveness.

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Ms Khungeka Njobe

Chairperson of the Board

OFFICIAL SIGN OFF

It is hereby certified that this Strategic Plan:

- was developed by the management of the Technology Innovation Agency (TIA) under the guidance of its Board;
- takes into account all the relevant policies, legislation and other mandates for which TIA is responsible;
- and accurately reflects the strategic outcome-oriented goals and objectives TIA will endeavor to achieve over the fiscal years 2015 – 2020.

Werner van der Merwe

Chief Financial Officer signature: _____

Prof Rivka Kfir

Acting Chief Executive Officer signature: _____

Khungeka Njobe

Chairperson of the Board signature: _____

Approved by:

Minister Naledi M. Pandor

Executive Authority signature: _____

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LIST OF ACRONYMS

CIDA	Canadian International Development Agency
CoC	Centre of Competence
CSIR	Council for Scientific and Industrial Research
DFID	Department for International Development
DST	Department of Science and Technology
EU	European Union
FIND	Foundation for Innovative and New Diagnostic
EXCO	Executive Committee
GATB	Global Alliance for Tuberculosis
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure on Research and Development
HSRC	Human Sciences Research Council
IATs	Institutes of Advanced Tooling
IDC	Industrial Development Corporation
IP	Intellectual Property
IPAP	Industrial Policy Action Plan
ISD	Innovation Skills Development
ISP	Incubation Support Programme
KPIs	Key Performance Indicators
MMV	Medicines for Malaria Venture
MTSF	Medium Term Strategic Framework
NDP	National Development Plan
NGP	New Growth Path
NIPMO	National Intellectual Property Management Office
NRF	National Research Fund
NSI	National System of Innovation
OECD	Organisation for Economic Cooperation and Development
PATH	Program for appropriate Technology in Health
PFMA	Public Finance Management Act
POC	Proof of Concept

PPPFA	Preferential Procurement Policy Framework Act
R&D	Research and Development
SEDA	Small Enterprise Development Agency
SET	Science, Engineering and Technology
SMME	Small, Medium and Micro Enterprises
SPII	Support Programme for Industrial Innovation
STP	SEDA Technology Programme
The Dti	Department of Trade and Industry
THRIP	Technology and Human Resources for Industry Programme
TIA	Technology Innovation Agency
TRL	Technology Readiness Level
TPP	Technology Platforms Programme
TSP	Technology Stations Programmes
TYIP	Ten Year Innovation Plan

PART A: STRATEGIC OVERVIEW

1. TIA BACKGROUND

TIA is a national public entity that is intended to serve as the key institutional intervention to bridge the innovation chasm between R&D from higher education institutions, science councils, public entities, and private sector, and commercialisation.

Its mandate is unique because it is the first and only fully state-funded organisation charged with the responsibility of bridging the gap with interventions to support technology development from proof of concept to technology demonstration. The Agency was established against the backdrop of a fragmented National System of Innovation (NSI) and therefore represented government's efforts to consolidate the system. The enactment of the TIA Act (Act 26 of 2008) has been largely predicated on supporting innovation that would spur industrial expansion, SMME development and trade and investment that will contribute to growth of the economy.

The drive behind the establishment of TIA was influenced by:

- the need for a deepening of economic development policy towards a knowledge-driven economy, at the centre of which is TIA, which is expected to help guide the evolution of this system.
- the need to promote a closer coordination of the various instruments that are geared towards innovation in South Africa.

Since 2009 the Agency's operations have been heavily influenced by the need to operationalise and consolidate programmes from the seven consolidated entities. In this time, attention has been given to consolidating and aligning investments and defining new approaches and instruments to drive its mandate.

During the financial year 2013/14 the Agency entered its second phase with the appointment of the new Board that coincided with the release of the TIA Ministerial Review. [1]TIA's Ministerial Review Report highlighted challenges around the Agency's positioning within the NSI and the negative perceptions of stakeholders of the Agency. The international benchmarking study commissioned by TIA highlighted inefficiencies in the organisational design and key processes that are core to the TIA's business.
In addition to this, the last customer survey that was concluded revealed that TIA is not well known within the National System of Innovation (NSI).

All these efforts pointed to a need for TIA to move to the next level, where it not only achieves operational efficiency but also realises organisational effectiveness and impact, hence the purpose of this strategy. The formulation of this strategy is underpinned by outcomes of the above mentioned reviews and is aimed at repositioning the organisation within the NSI for maximum impact. It is envisaged that the financial year 2014/15 serve as the initial year of transition.

[1] The final report was presented to the Minister 15 April 2013.

2. VISION

To be a world-class leading technology innovation agency that stimulates and supports technological innovation to improve the quality of life for all South Africans.

3. MISSION

To facilitate the translation of South Africa's knowledge resource into sustainable socio-economic opportunities.

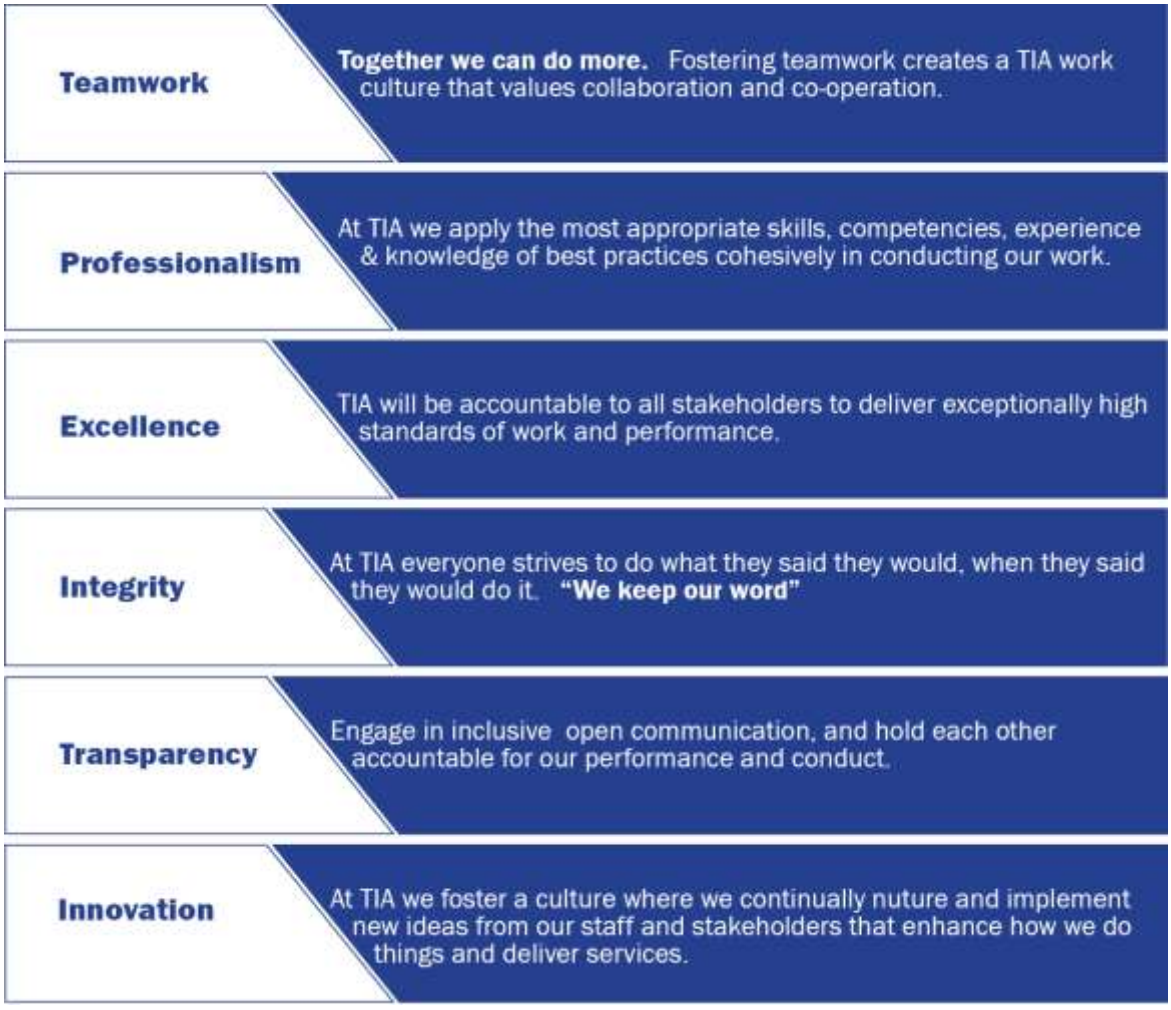
4. OVERARCHING GOALS

a. To position TIA as a thought leader in technological innovation in South Africa.
b. To provide South Africa with appropriate and effective support for innovation with high social and economic impact.
c. To support and enhance technological innovation in Africa and globally through partnership initiatives.

TIA's strategy for the planning period 2015 to 2020 addresses the above overarching goals. The goals will be further translated into outcome orientated key performance areas. TIA's Overarching Goals are closely linked to the NDP and DST's new strategic outcome orientated goals, including "A greater share of economic growth is derived from R&D based opportunities and partnerships over the next five years".

It should be noted that this Strategic Plan document reflects TIA's core strategy. It is envisaged that this Plan will be supported by a strategic plan for each TIA Strategic Technology Area that will be developed and presented during the early stage of the strategic period.
Furthermore, linkages to specific current and future technology missions will be clearly addressed in the strategies of the technology areas.

5. VALUES



6. LEGISLATIVE AND OTHER MANDATES

6.1 Legislative mandate

The mandate of TIA is derived from the provisions of the Technology Innovation Act (Act 26 of 2008), which establishes TIA as an Agency to promote the development and exploitation, in the public interest, of discoveries, inventions, innovations and improvements. The object of TIA is to support the State, through the DST, in stimulating and intensifying technological innovation in order to improve economic growth and the quality of life of all South Africans by developing and exploiting technological innovations.

In addition, the Public Finance Management Act (Act 1 of 1999) (PFMA) classifies TIA as a Schedule 3A public entity. Chapters 5 and 30 of the National Treasury Regulations provide a framework upon which TIA must prepare a Strategic Plan that is consistent with the period covered by the Medium Term Expenditure Framework for approval by the relevant Executive Authority.

6.2 Policy mandate

The NDP is the principle guiding document, with the MTSF, the NGP, the IPAP and other strategies/policies giving articulation to achievement of the NDP vision. To this end TIA's Strategic Plan is informed by and aligned to the broader government policies and priorities, and is part of the Policy Framework for the government-wide Monitoring and Evaluation System. A summary of these policies and their relevance to TIA is provided below.

TABLE 1: ANALYSIS OF THE POLICY LANDSCAPE

POLICY-Year	POLICY LINK TO TIA STRATEGY
National Development Plan 2012	The NDP acknowledges the key role that the National System of Innovation (NSI) can play in developing new tools and methods to improve the delivery of solutions to the economy as well as coordinate the migration of research outputs.
MTSF 2014-2019	Identifies technology innovation as one of the critical policy areas required to speed up growth and transform the economy to create decent work and sustainable livelihoods.
New Growth Path 2011	Identifies technological innovation as means of opening opportunities for substantial employment creation.
IPAP 2014/15-2016/17	IPAP aims to strengthen technology platforms that will encourage innovation and technology development and the acquisition and commercialisation of new technologies. IPAP 6 sets out to develop the policy instruments required for technology acquisition, innovation support and the commercialisation of home-grown new technologies. TIA is well positioned to contribute towards the achievement of this intent.
Bioeconomy Strategy 2014	South Africa's Bio-economy Strategy provides an economic engine for a new bio-based economy that will in turn, provide a basis for future growth.
Ten-Year Innovation Plan 2008	To drive South Africa's performance towards a knowledge-based economy.
National R&D Strategy 2002	Emphasises an integrated approach, which includes human resource development, knowledge generation, investment in science and technology infrastructure, and improving the strategic management of the public science and technology system.

The following sections elaborate on TIA's role and contribution to the realisation of the objectives of the above-mentioned national strategies, plans and policies.

6.3 Linkages to government outcomes

Government has implemented an outcomes-based approach to planning for the effective management of its various programmes. This outcomes-oriented approach measures the impact of government's programmes and is designed to ensure that government is focused on achieving the expected improvements in the lives of South Africans. In line with this, government has identified a number of priority outcomes as key focus areas. During the 2015/16 to 2019/20 financial years, TIA will focus its planning efforts on linking and aligning its strategy with the following six government outcomes:

- Outcome 2: A long and healthy life for all South Africans.

- Outcome 4: Decent employment through inclusive economic growth.
- Outcome 5: A skilled and capable workforce to support an inclusive growth path.
- Outcome 7: Vibrant, equitable and sustainable rural communities with food security for all.
- Outcome 10: Protect and enhance our environmental assets and natural resources.
- Outcome 11: Create a better South Africa and contribute to a better Africa and a better world.

6.4 TIA's contribution towards a more effective innovation eco-system

South Africa has a well-developed research and development system, which has been effective in driving the efforts of universities and science councils and producing research papers and generating technologies. TIA recognises its role in ensuring that the system of innovation is responsive, coordinated and efficient, and that through its projects, programmes, and funding in technology priority areas, it builds on the gains made thus far within the NSI. TIA further acknowledges the importance of linkages within the NSI to further advance TIA's undertakings. In order to strengthen TIA linkages with the NSI, a strategy for engagement in specific programmes, areas and projects will be developed with DST and relevant key stakeholders. TIA will seek technology innovation opportunities that support the Department's technology missions in areas such as the bio-economy, nanotechnology, advanced manufacturing, resource-based industries and ICT.

Over the planning period, the Treasury MTEF allocation to the Agency prioritises the continued support to the Technology Stations Programme and implementation of the recently launched Bio-economy Strategy, which will expand from the 2003 National Biotechnology Strategy. This informs the development of this Strategy along with the new programmes and initiatives needed to implement it.

DST has established the National Intellectual Property Management Office (NIPMO) to encourage, monitor and quantify intellectual property that is the result of publicly funded research and development. Furthermore NIPMO's role is to develop capacity at the level of universities and public research institutions to identify and protect such intellectual property. TIA complements NIPMO by actively supporting Technology Transfer Offices in commercialisation and technology transfer opportunities created at South African research institutions.

6.5 TIA's alignment to other government initiatives

South Africa's prospects for improved competitiveness and economic growth rely, to some extent, on the application of science and innovation across all sectors of the economy. For this reason, there is a need for all government departments to integrate technology innovation solutions and opportunities into their programmes. By taking the lead from existing technology roadmaps, TIA supports projects in research councils, who in turn respond to the research and innovation needs of their respective line departments.

However, technology innovation efforts require greater breadth and depth across government if South Africa is to achieve faster transition towards a knowledge-based economy. There is an opportunity for TIA to capture the strong existing political support for research, development and innovation, as well as growing recognition of the role of innovation in solving some of the country's challenges.

7. SITUATIONAL ANALYSIS

7.1 External environment

7.1.1 South African Innovation Landscape

The DST, as the custodian for science and technology, has put in place policies and instruments to improve the efficient and effective management of the South African NSI.
This is aimed at leading and contributing in the growth of knowledge-based economic activities to diversify the economy. It is through this shift in the economy that the true and potential value of science, technology and innovation in social and economic development could be realised.

South Africa's gross domestic expenditure on research and development (GERD) was R22.2 billion in the 2011/12 fiscal year, as reported in the DST's latest national R&D survey. This represents 0.76% of the GDP, which is still lower when compared to the OECD (2.7%) and Brazil (0.9%). Government is still the main funder of R&D within the NSI, contributing 43.1%, while the business sector contributes 39% to the GERD.

The business sector is still the largest performer of R&D in terms of R&D expenditure (R10.4 billion or 47.1%), followed by the higher education sector (R6.6 billion or 14.9%). Government is still a major funder of local R&D, contributing 43.1% to the total R&D expenditure by the business sector and 69.6% to the total R&D spend in the higher education sector. As an outcome of this R&D expenditure the country realised an average annual growth in high technology export of 12% between 1998 and 2008. South Africa's scientific publications were rated to have a higher impact factor when compared with China, Brazil and other Latin American countries.[2]

The revisions to the R&D Tax Incentive are an important part of a set of measures that government has announced to support R&D-led innovation, industrial development and employment creation. The incentive is available to businesses of all sizes and sectors of the economy that undertake scientific and technological R&D in South Africa. TIA will encourage businesses that it has supported before to make use of the tax deduction as an incentive for investing in R&D locally.

Even though South Africa has the early building blocks for a productive NSI, the country

[2] The OECD Science Technology and Industry Outlook 2010.

also has the potential for further improving the translation of new knowledge and inventions into innovations to address our socio-economic priorities. South Africa's R&D publications number is significantly high; however, only a limited number of technological/scientific concepts published are translated into products or processes that will provide socio-economic benefits. Over and above the historical over-dependence of the economy on its resource endowments, as opposed to expansion into emerging sectors, the continued existence of an innovation chasm in the NSI requires a rethink as part of building an effective NSI that will contribute to a growing and competitive economy.

TIA as the policy instrument established to bridge the innovation chasm has a major role to play in developing a new approach that will deliver innovations to the market, in response to priority areas identified by government. This has to take into consideration other roleplayers in the NSI, especially funders, in order to leverage fully the power of closer synergies and multiple policy instruments already available across the innovation value chain.

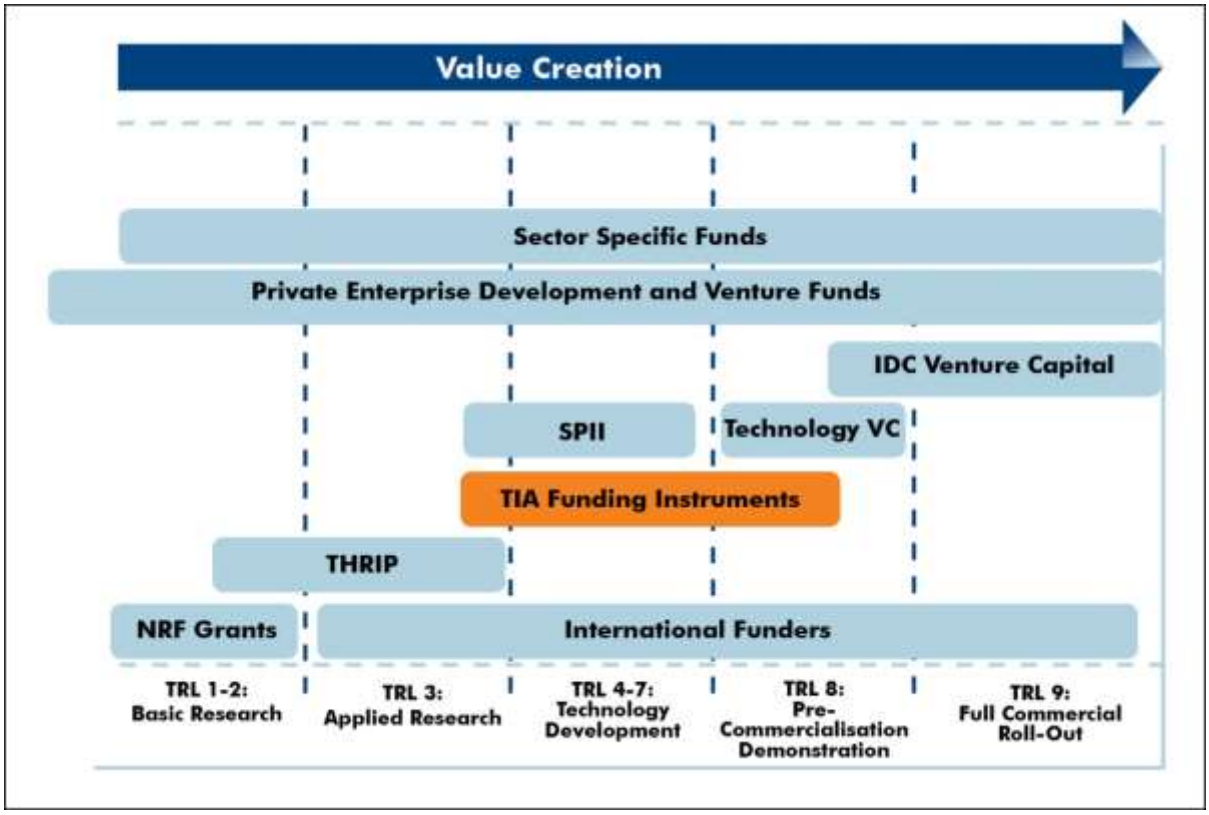


FIGURE 1: THE SOUTH AFRICAN INNOVATION FUNDING LANDSCAPE

TIA direct involvement through funding

The objective and positioning of each fund is discussed below:

7.1.2 Sector specific funds

Given that South Africa's prospects for improved competitiveness and economic growth rely to a great extent on science and innovation, the science councils play a critical role in

coordinating and setting research priorities that can be considered at the policy level. Science councils such as the MRC, ARC and WRC have sector specific mandates in health, agriculture and water respectively. Research councils account for 16% of the R&D expenditure in South Africa with 12.3% of researchers. Applied research represents 47.1% of the research councils' expenditure, while basic research accounts for 24.2% and experimental research for 28.8%.[3] The research councils are strategically located between the business sector – which allocate an important share of the R&D expenditure to experimental research – and the universities, for which the basic research represents the most important activity. This shows the position occupied by the science councils within the research, development and innovation value chain where at the latter stages of the value chain they play a key role in technology and knowledge transfer.

7.1.3 Technology Innovation Enablement

The South African government has set up a number of programmes to support and develop the country's capacity for innovation in industry, in research and development and in small business. These include:

i) Technology and Human Resources for Industry Programme (THRIP)

This is a **dti**-funded programme designed to enable South African industry to access skills, expertise and infrastructure within the higher education sector in order to develop innovative solutions to industry-specific needs. Its aims are to boost South African industry through technology development while enhancing the quality and quantity of skilled labour for absorption into local industries. TIA will actively promote the use of THRIP incentives, especially in cases where it is facilitating technology development partnerships between large and small enterprises and publicly funded research institutions such as higher education institutions. TIA will identify opportunities and build on established initiatives that already exist in the THRIP initiative.

ii) Support Programme for Industrial Innovation (SPII)

This **dti**-funded programme is designed to promote and assist technology development in local industries through the provision of financial assistance for projects that develop innovative products and/or processes. This is in support of the government's priority on the development of new technologies to strengthen South Africa's global competitiveness. The fund is positioned for ideas at the proof of concept stage until they reach a stage where a prototype is ready for production. TIA recognises the synergies that exist between its risk funding instruments and SPII. Opportunities to share resources have been explored in the past. These need to be taken further in order to achieve greater efficiencies and effectiveness in the funding space.

[3] R&D Survey 2011/12

iii) Technology Transfer Offices

Technology transfer offices play numerous roles, ranging from encouraging researchers to disclose their inventions, to securing patent protection for technological inventions, evaluating the commercial potential of the inventions, developing marketing and business models (for start-ups) and also negotiating licensing deals. In a nutshell their role is to identify, evaluate and exploit IP. Since the establishment of the TIA Seed Fund, the TTOs located at the different universities are strategic partners ensuring a supply of quality technology development opportunities entering the technology innovation value chain.

iv) NIPMO

The National Intellectual Property Management Office (NIPMO) recognises that human ingenuity and creativity must be acknowledged and rewarded and that all enterprises must have preferential access to opportunities arising from the production of knowledge from publicly financed R&D and the resultant IP. NIPMO's activities include supporting TTOs in the identification, disclosure and protection, and management and commercialisation of IP referred to it by a recipient of public R&D funds. The intellectual property support and guidance received from NIPMO, coupled with TIA's role in facilitating the common circulation of IP, allows for more effectiveness within the NSI.

v) Department of Small Business Enterprise (DSBE)

Small and medium enterprises are very important in building South Africa's economy. Equally important is empowerment, particularly Black people, who had been excluded from the economy of the country. Given TIA's role in high technology SMME development, a close partnership with the DSBE is envisaged. Special attention will be paid to fostering a relationship with the department while it is still establishing itself in order to be able to encourage the creation of structures that will enable and support high technology enterprises.

7.1.4 Funding Entities

i) *National Research Foundation (NRF*)

The NRF's mandate is to *"promote and support research through funding, human resource development and the provision of the necessary facilities in order to facilitate the creation of new knowledge, innovation and development of all fields of science and technology, including indigenous knowledge, and thereby to contribute to the improvement of the quality of life of all the people of the Republic of South Africa".* This is achieved by funding ***basic research, human capital development*** and research **infrastructure** related to new knowledge generation in priority areas performed in the higher education sector. There is an opportunity for TIA and the NRF to combine efforts to accelerate the development of essential technologies from basic research through to proof of concept. The Animal Health Innovation Programme is one such initiative where this is being achieved; however more partnership programmes are required.

ii) IDC: Technology Venture Capital Fund

*This is a **dti** fund administered by* the IDC aimed at assisting entities supported through the SPII fund, who struggle to access funding from other financiers due to lack of **proof of market** for their innovative products/processes. As our missions are related, TIA should explore how similar funding entities could work as a collective to broaden the reach of funding towards innovation and technological advancement.

iii) Venture Capital Including the IDC Venture Capital Fund

This fund is aimed at business opportunities where the business or technology has progressed to the point of working prototype. The mandate of the fund is to invest in businesses where there is a unique proprietary technology that provides a long-term competitive advantage, is globally scalable and would generate an internal rate of return of above 30% to the IDC. TIA is already working with the IDC's VC fund on a number of projects and the IDC remains a key development partner whose funds have helped to carry technology enterprises beyond TIA's funding capacity.

iv) International Funders

There are a number of international funding opportunities that TIA should explore. These include foundations such as the Lemelson and the Bill and Melinda Gates Foundations; product development entities like FIND, MMV, PATH and GATB; development agencies including CIDA and DFID; the EU and the many European and

US initiatives concerned with identifying and preparing technologies for use that can result in commercially or socially viable products and high-potential companies. In the longer term, TIA should explore attracting VC funding from firms interested in social investments in the continent, but need a management agency to administer funds and manage investments.

7.1.5 Implications of Technology Trends on Economic Sector Focus

To remain globally competitive, South Africa has to invest in the appropriate emerging technology areas in order to ensure progress along the NDP roadmap and attainment of Vision 2030. This has to be balanced with the need to invest in technologies that either (1) support current growth strategies that are mostly underpinned by sectors where South Africa has a clear competitive advantage and/or (2) further areas of priority that can have the potential to slow down economic growth.

FIGURE 2: KEY ELEMENTS OF A DECENT STANDARD OF LIVING. SOURCE: THE NATIONAL

DEVELOPMENT PLAN.[4]

While an innovation system that is responsive to traditional sectors driving South Africa's economic growth is important, TIA as a key player in the space is presented with a unique opportunity to influence and inform how technology innovation and the knowledge economy could make a positive contribution to the country's commitment to minimum standards of living. As such supporting technologies responding to key elements of a decent standard of living will ensure direct alignment of TIA and its activities with government goals of socio-economic transformation.

Taking from the TYIP, biotechnology and translation of know-how in the space into economic outputs (Bio-economy) is recognised as one such area that presents great opportunities for developing technology solutions for the challenges the country is facing. The vision of the DST Bio-Economy strategy is to make the bio-economy a significant contributor to South Africa's economy by 2030. To achieve this, the strategy identifies agriculture, health and industry as sectors that need the most technology interventions; and have the greatest potential to result in social and economic impacts in line with the NDP's aspirations.

TIA is strategically positioned to contribute to these goals based on the current project portfolio that aligns to chosen sectors in the Bio-Economy. As part of contributing to this strategy, the Agency will continue to prioritise the effective and efficient management of these projects to ensure successful development and commercialisation is realised within the planning period. New programmes will be developed and implemented that build a new portfolio of technologies that will respond to the country's current unmet needs and future demands.

[4] NDP 2012

7.2 Internal environment analysis

7.2.1 TIA's Stakeholders

TIA has a large number of important stakeholders whose needs and interests it serves directly and indirectly. The four most important stakeholders, who form the core of the TIA "ecosystem", are: the Innovator, the Investor, the Public and Private Funder and the Citizen. As illustrated in Figure 3, TIA is at the confluence of the needs and aspirations of these stakeholders. In the innovation context "ecosystem" refers to the dynamic interactions between the different players within the NSI.

FIGURE 3: TIA'S KEY STAKEHOLDERS

A stakeholder perception survey was conducted to better understand the environment in which the Agency operates, in order to develop funding schemes and programmes that are relevant to the NSI. The research evaluated market segmentation, brand awareness, competitive environment and TIA products and services. The general expectation from customers is that while the Agency's funding is valuable and they appreciate the technical competencies of employees, attention needs to be given to value add to stakeholders, such as mentoring programmes to nurture innovations and support for innovators to successfully develop and commercialise their ideas. In formulating the Strategic Plan, TIA identified the stakeholders and their needs as discussed in Table 2.

TABLE 2: STAKEHOLDER NEEDS ANALYSIS

STAKEHOLDERS	STAKEHOLDER NEEDS
INNOVATOR: *Higher Education Institutions (HEIs), Science Councils (SCs), State Owned Entities (SOEs), Private companies, Start-ups and Entrepreneurs*	o Expertise – technology innovation and commercialisation expertise and advice. o Customer-centric financial and non-financial products and services. o Supporting infrastructure – technology platforms, stations and innovation programmes. o Enabling environment – funding, business support and access to entrepreneurial eco-system.
FUNDER/INVESTOR: *Department of Science and Technology; Government Departments and Agencies; Provincial and Local Government; Industry, Follow-on Investors (Venture Capitalists, Private Equity Funders, Angel Investors)*	o Business acumen – sound, well-structured, articulate strategy and business plan. o Sound governance – integrity, trust, structures, transparency and honesty, sound internal procedures and controls. o Thought leadership – guidance on challenges and opportunities in technology innovation commercialisation. o Value for money – maximum benefit from the services that TIA provides, within the resources available to it. ROI – acceptable Return on Investment to the South African economy. o De-risked investment opportunities for follow-on funding.
CITIZEN: *Communities*	o Socio-economic impact – investment in innovation that grows the economy and addresses social challenges. o Opportunities – entrepreneurial opportunities in technology innovation.

The Agency will develop and implement a targeted stakeholder engagement and outreach plan during the strategic planning period. This is aimed at improving public understanding of innovation as well as continuously receiving feedback and inputs that will be used in ensuring our relevance, responsiveness and impact within the NSI.

7.2.2 Ministerial Review of TIA

During January 2013, the Minister of Science and Technology commissioned a Ministerial Review to assess TIA's fitness for purpose. Key recommendations from the review outcomes include:

- The need for TIA to act as a bridge between the various sources of innovative ideas and potential supporters and investors.

- TIA to play the role of using its funding to facilitate connections between the proven concept, generated through TIA's primary grant.
- Development of an organisational structure and culture that would fit its mandate
- The efficiency and reputation of the Agency to be strengthened.
- Enhancement of the core function of the Technology stations and increased alignment with TIA activities.
- TIA should not focus on financial returns accruing to its balance sheet, but rather on the impact measured as contribution to the fiscus. As such TIA must be a grant-giving Agency.
- TIA must develop programmes that place people as innovators by supporting innovation skills development.
- A regionalisation strategy for the Agency developed to clarify the scope and to guide operations at regional locations.

The TIA's Ministerial Review Recommendations, as well as outcomes from other internal and external surveys, have been taken into account and are incorporated in this strategic plan.

7.3 TIA's strategic roles in the innovation value chain

7.3.1 Strategic roles

TIA will scout for new ideas through a number of mechanisms, including those it has not exploited before such as open innovation initiatives, and will play the following strategic roles within the NSI in response to current gaps and weaknesses in the system:

- **A connector**: catalyse partnerships between SMMEs, industries, universities and science councils to develop an enabled environment supporting sector-specific innovations for global competitiveness.
- **An active funder**: provide risk funding and support for innovators to progress ideas towards market entry and commercialisation.
- **A facilitator**: attract and facilitate late- stage funding (companies, industries, venture capital firms, and development finance institutions) for the commercialisation of market ready technologies.
- **A service provider**: reduce barriers of access to expensive high-end skills and equipment for innovators by repositioning Technology Stations and Platforms. TIA's specific role in this regard is to fund and support host institutions to provide relevant service offerings.
- **Technological innovation thought leader**: TIA is continually gathering valuable

intellectual capital on best practice in technology innovation. This has strengthened the capability of the Agency to inform and provide advice on policy issues, frameworks and mechanisms relating to the advancement of technology innovation.

Collaborations within the NSI are critical to allow for the nurturing of technologies along the innovation chain, from the laboratory through to the market. TIA plans to take an "ecosystem view" and be the "centre" that holds the NSI together, and to develop programmes that connect industries, SMMEs and knowledge institutions within the national system of innovation to allow for the nurturing of technologies along the innovation chain.

To achieve this TIA requires formalised partnerships with universities, public research institutions, SMMEs and entrepreneurs on the one hand and the support instruments and technology strategies of government on the other. TIA will work in all priority sectors of business, and with organisations that are committed to innovation and growth. A variety of mechanisms will be used to tailor services to customer needs and stage of development.

7.3.2 Organisational Environment

In the period covered by this plan, there is a need to prepare the organisation to appropriately and effectively implement the new strategy. To successfully implement this strategy and deliver on strategic objectives will require an extensive review of TIA structures, process systems and resources and ensure complete alignment.

Inasmuch as the talent base forms a good foundation for a growing organisation, there is a need to pay attention to critical areas that will bring operational efficiency and effectiveness. This is necessary as the Agency repositions itself to execute the new strategy and delivers to both the shareholders and stakeholders alike.

Some of the areas that will be prioritised include:

- Implementing an organisational design that leverages and deploys the talent base for maximum impact.
- Alignment of competencies and capabilities to achieve strategic goals.
- Implementing an effective core business process.
- Entrenching a high-performance culture within the organisation.

During the 2014/15 financial year the Agency initiated a number of strategic drives aimed at addressing the above areas of priority. It is envisaged that these drives will focus and align the Agency and improve its level of readiness to adopt and implement the strategy.

7.3.3 Funding constraints

As TIA's funding allocation was significantly reduced by R150m per annum from 2015/16, several projects will have to scale back on existing commitments. This creates a strong need for effective fund management. In order to mitigate the effect of the funding shortfall, the agency aims to reduce administration costs, including human resources related costs, to

acceptable levels through various initiatives in order to cut costs and streamline business activities.

TIA will, during the planning period, engage with the DST and National Treasury to agree on alternative funding that will enable the implementation of new programmes and initiatives necessary for the achievement of strategic goals. Actions will include but not be limited to:

- Further measures to reduce operational costs
- Increased funding by the state
- Leveraging of funds from the innovation ecosystem to support strategy execution.

Financing is extremely important for innovation and growth, in particular at the seed and early stages of business development. Access to finance is a central issue for both innovative entrepreneurs and TIA. TIA needs to grow and diversify its funding sources in order to broaden the coverage of its work. During the planning period covered by this strategy TIA will strive to establish partnerships and funding agreements that will allow it to expand its financial resources and therefore its impact.

8. TIA's POSITIONING

Given its mandate, TIA has a unique and important function in providing thought leadership in the technology innovation space. By leveraging its core competencies in terms of processes, resources and intellectual capital, TIA will ensure firm positioning of the organisation as the advocate of technology innovation within the NSI for the overall benefit of the system itself.

As a driver of technology innovation, TIA will focus on outcomes-based delivery to make impact. Narrowing the innovation chasm is one such area. Even with the existence of the above funding schemes, an innovation chasm between academic research outputs (post the NRF and THRIP funding) and the market still exists, especially for high technology projects. In the Ministerial Review of TIA, it was recommended that the Agency's funding must also allow entrepreneurs and SMMEs to come through the NSI system as they endeavour to commercialise their technology innovations.

TIA is well positioned to fund technologies from proof of concept stage (TRL 3) through technology development (prototyping and/or piloting) (TRL 4-5) to technology demonstration and pre-commercialisation (TRL 6-8). This allows for a seamless progression of technologies along the innovation value chain within a single entity, with stakeholders fully benefiting from TIA's value creation initiatives.

The following is TIA's value proposition as it bridges the innovation gap between new knowledge and technology commercialisation:

- The Agency plays an active role in stimulating, promoting and driving innovation across the technology innovation value chain; leading by example.
- The Agency actively promotes transfer of skills and knowledge between research institutions and industry, in particular SMMEs.
- The Agency provides conditional grant funding from proof of concept to market validation and limited funding for market deployment.
- The Agency will establish partnerships locally and internationally to play the connector and facilitator role.
- The Agency will build and maintain in-house competencies geared for:

    a. Spotting and nurturing ideas and innovations in the early stages of development until full development.
    b. Continuously identifying and matching technology innovations from researchers with market needs; and guiding the management of intellectual property throughout the whole technology development value chain to maximise economic benefit.
    c. Linking TIA de-risked opportunities to appropriate funders for market development and commercial rollout.

9. STRATEGIC TECHNOLOGY AREAS

The world is experiencing technology advancements at a very fast pace with almost all new technologies being punted as the next breakthrough that will affect economies and people's lives. In reality, in mainstream economies very few technology innovations are ultimately adopted and the predicted value for most is never realised. Conversely, there are breakthrough (disruptive) emerging technologies that have the potential to change how the world works, how people live and interact on a daily basis.

These emerging technologies have the potential to contribute to economic growth through their disruptive nature. The ability of policymakers, technology developers, funders and the business world to identify emerging trends is becoming a critical enabler for the right technologies to be supported for future adoption and socio- economic exploitation. This has become the key differentiator between leading and competitive economies and those of the rest of the world.

During this planning period, TIA will continuously scan the technology innovation space to provide thought leadership on the importance and opportunities that emerging technologies could contribute to the country's competitiveness and advancement.

Emerging technologies are defined as those that are still emerging from the science base, that are at an early, pre-commercial stage and that have the potential to enable innovations that will disrupt the marketplace. These new technological fields may result from the technological convergence of different systems evolving towards similar goals. Convergence brings previously separate technologies together so that they share resources and interact with each other, creating new efficiencies.

Opinion on the degree of impact, status and economic viability of several emerging and converging technologies varies. It is apparent that emergence is a matter of stage of development and that emerging technologies are a subset of enabling technologies.

A recent study[5] was conducted on behalf of the dti to "identify global technology trends, which will influence the competitiveness and future development of South African industries, with specific focus on identifying areas for innovation so as to reduce industrial dependency on foreign technology, whilst ensuring that appropriate programmes are offered to promote innovation and technology".

The study identified the current enabling technologies as:

- Advanced materials
- Advanced manufacturing systems
- Micro and nano-electronics
- Nanotechnology
- Industrial biotechnology
- Photonics.

The World Economic Forum's Global Agenda Council on Emerging Technologies identifies recent key trends in technological change in its annual list of Top 10 Emerging Technologies.[6] By highlighting the most important technological breakthroughs, the Council aims to raise awareness of their potential and contribute to closing gaps in investment, regulation and public understanding. For 2014, the Council identified ten new technologies that could reshape our society in the future. They are:

- Body-adapted Wearable Electronics. These virtually invisible devices include ear buds that monitor heart rate, sensors worn under clothes to track posture and a temporary tattoo that tracks health vitals.

[5] Study on Technology Trends DTI: A Review of Technologies and Policies, Prof Anastassios Pouris, 2012
[6] http://www3.weforum.org/docs/GAC/2014/WEF_GAC_EmergingTechnologies_TopTen_Brochure_2014.pdf

- Nanostructured Carbon Composites. Emissions from the world's rapidly-growing fleet of vehicles are an environmental concern, and raising the operating efficiency of transport is a promising way to reduce its overall impact.
- Mining Metals from Desalination Brine. Brine from desalination as a resource to be harvested for valuable materials, which include lithium, magnesium and uranium as well as the more common sodium, calcium and potassium elements.
- Grid-scale Electricity Storage. There are signs that a range of new technologies is getting closer to cracking the challenges with electricity storage. Some, such as flow batteries, may in the future be able to store liquid chemical energy in large quantities analogous to the storage of coal and gas.
- Nanowire Lithium-ion Batteries. The next generation of batteries could help transform the electric car market and allow the storage of solar electricity on a household scale.
- Screenless Display. Various companies have made significant breakthroughs in the field, such as virtual reality headsets and bionic contact lenses.
- Human Microbiome Therapeutics. A new generation of therapeutics comprising a subset of microbes found in healthy gut is under clinical development with a view to improving medical treatments.
- RNA-based Therapeutics. A new generation of RNA-based drugs that can attenuate the abundance of natural proteins, or allow for the in vivo production of optimised, therapeutic proteins.
- Quantified Self (Predictive Analytics). Using smartphone data and specialised machine-learning algorithms, detailed and predictive models about people and their behaviours can be built to help with urban planning, personalised medicine, sustainability and medical diagnosis.
- Brain-computer Interfaces. The ability to control a computer using only the power of the mind is closer than one might think. Brain-computer interfaces, where computers can read and interpret signals directly from the brain, have already achieved clinical success.

The above list seems to align with the current enabling technologies identified by the dti study. The study also found that all countries investigated identify technologies of importance to their industries and societies. Countries support technologically various sectors depending on their economic plans; however, all of them support strategic sectors such as ICT, aerospace, and green energy.

At the same time, a number of cross-cutting technologies that impact on more than one sector have also been identified by all countries. These include:

- ICT
- Renewable energy
- Advanced materials and nanotechnology
- Advanced Manufacturing Technologies
- Aerospace technologies
- Biotechnology

It should be mentioned that the above technologies support the development of high technology industries, which industries are not fully developed in South Africa as in other countries despite their importance to trade, economic development and security. The technology roadmaps and strategies in emerging research areas and technologies championed by the DST and other government departments provide guidance to TIA on technology opportunities that it can exploit. TIA will contribute to the ongoing discussions and development of the roadmaps, strategies and implementation plans, as well as to the development of suitable processes for the identification of new and emerging technologies to meet South Africa's needs and priorities.

Taking into consideration TIA's current project portfolio, it is clear that it closely mirrors the above list with the exception of Mining and Minerals. The technology areas that TIA should therefore continue to focus on include:

- ICT
- Renewable energy
- Advanced Manufacturing Technologies (including Advanced materials, nanotechnology and Aerospace technologies)
- Biotechnology
- Technologies to improve exploration/exploitation of natural resources (eg mining)

TIA's current project portfolio addresses the above list with the exception of the existing Mining and Minerals Sector. TIA will therefore continue to focus on those emerging research and technology areas as championed by government. In addition, TIA will also support emerging technologies that improve the exploration and exploitation of South Africa's natural resources (eg mining). This strategic technology area is of importance, given the resource intensity of the South African economy.

9.1 Risk funding schemes

Technology innovation is inherently a high-risk activity that requires a clearly defined and structured approach (a funding philosophy) that will ensure that the right technologies are

identified and supported until the risk is greatly reduced for other roleplayers to provide follow-on investments directed at technology adoption and commercialisation.

Thus the TIA funding philosophy must reflect appreciation of the risks and present “a TIA way” of funding and supporting technology innovations and innovators. The key principles of the new funding philosophy are:

- TIA will be active in innovation mining and/or spotting.
- TIA will nurture (hand-hold) innovations and innovators as part of value-creation and de- risking of the opportunities for the market.
- TIA will provide funding support primarily through grants and royalties, while other instruments such as loans will be considered where appropriate.
- Return on investment on TIA support will be measured at a country level by monitoring both social and economic impacts of investments made.

In support of the funding philosophy (and as presented in the Agency’s revised Investment Framework policy), the following funding schemes and programmes will be core to the TIA product offering. These funding schemes are responding to the innovation needs of the NSI.

The Agency offers three risk funds over and above the programmes aimed at creating and supporting an enabling technology innovation environment to support progression of innovation towards market readiness.

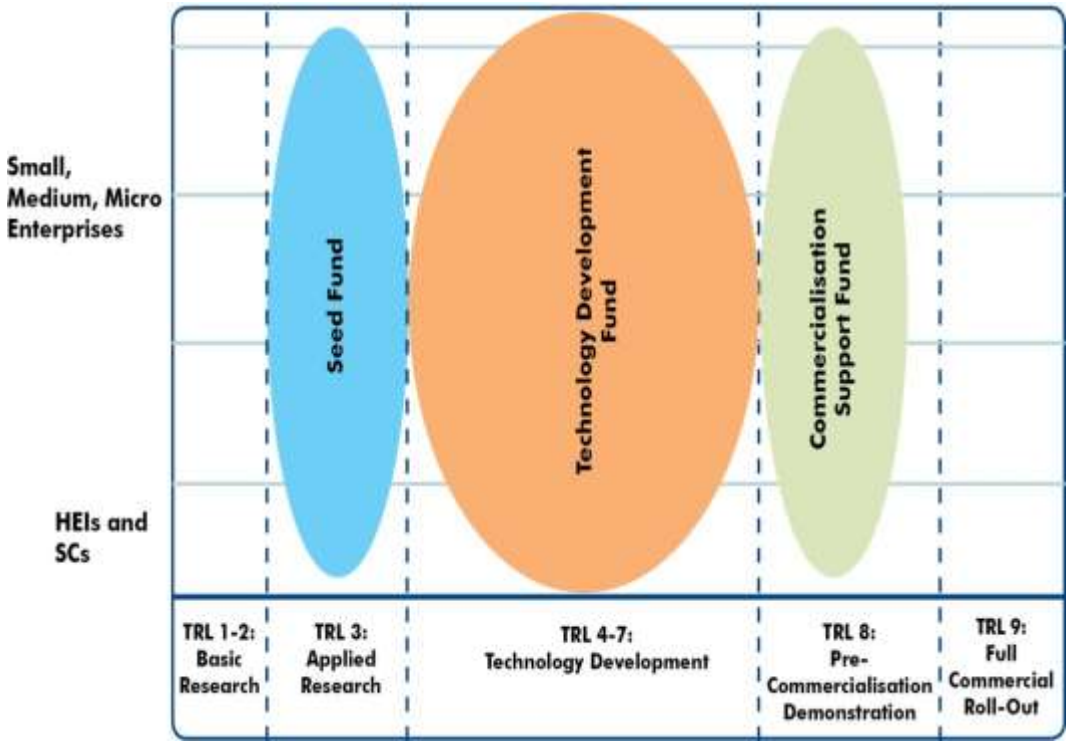


FIGURE 5: TIA RISK FUNDING SCHEMES

The funds are clearly differentiated based on the stage of technology development as defined by the technology readiness level (TRL) framework.[7]

Name of Fund	Purpose of the Fund	TRL
Seed Fund (SF)	To assist HEIs, SCs and SMMEs to advance their research outputs and ideas to develop prototypes, proof of concept and business cases that could be used for further development. This fund will be managed in partnership with TTOs	3-7
Technology Development Fund (TDF)	To assist innovators to advance technologies along the innovation value chain, from proof of concept to technology demonstration. The fund is designed to make early stage technology development more attractive and less risky to the market.	4-7
Commercialisation Support Fund (CSF)	To prepare innovators for follow-on funding through part funding with other funders and limited support for market testing and validation. TIA's main role at this stage is facilitation.	8

[7] Technology readiness levels (TRLs) are measures used to assess the maturity of evolving technologies during their development and in some cases during early operations.

TIA's primary funding vehicles are grants which are conditional on areas such as performance, risk and other factors. Near proof of market projects are part of the support needed to make an idea investor-ready and are often important for raising venture capital. As part of our toolkit, we will work with other government agencies such as the IDC and relevant dti instruments to establish a more co-ordinated and coherent approach for commercialisation and industrialisation of technology innovations. As mentioned above, such funding will be provided as conditional grants and loans and in exceptional cases as equity.

9.2 Programmes to enable and stimulate the culture of innovation

TIA has established the following programmes aimed at enabling and stimulating the culture of innovation in South Africa in order to build a vibrant ecosystem within the NSI through the following initiatives:

- Technology Innovation Programmes (TIPs)
- Technology Station and Platform Programme (TSPP)
- Youth Technology Innovation Programme (YTIP)
- Innovation Skills Development (ISDP)

There are limited resources to implement the YTIP and ISD into fully fledged programmes. As additional resources are obtained, these will be directed at building the programmes to realise their maximum potential.

i) Technology Innovation Programmes

Technology Innovation Programmes (TIPs) are collaborations by different players such as entrepreneurs, SMMEs, large companies, research institutions and government competing and cooperating in a particular industry. This exploits TIA's unique positioning in South Africa's innovation landscape to bring together stakeholders along the value chain. TIA will work closely with other government departments and entities to ensure a coordinated government approach where support for technology innovation is a key driver for growth and development.

The purpose of the programmes is to facilitate greater collaboration within the existing ecosystem by leveraging the strengths of respective partnering groups to drive a technology solution addressing a specific social and/or economic need**.**

The key drivers of the successful TIPs are:

- An existing innovation research base (research organisations, human capital, adequacy of funding for applied research and commercial deployment).
- An innovation industry base (existence of SMMEs and entrepreneurs, large companies, industry associations).
- The presence of a skills base and workforce involved in technology innovation.
- A certain level of infrastructure and capital base.
- A supportive policy and regulatory environment.

The three Models proposed for TIPs are:

Model 1: National Priority Driven	***Model 2: Industry-Led***	***Model 3: Emerging technology space***
This is a technology push-driven approach designed to address a social need or a national priority. This model addresses specific market failure and for this reason, private industry participation will need to be induced.	This is an industry-led initiative where the agenda is set by industry seeking to pull technologies from innovators for adoption and exploitation. In the beginning TIA may still choose to anchor the initiative by providing matching funds to industry.	This model arises from the recognition of a high level of R&D competence and technological capacity existing in a specific technology area. The collaborative effort will be directed at developing leading competence areas upon which new industries can be established.

ii) Technology Stations and Platforms Programmes

TIA provides support through the Technology Stations and Platforms to local innovation in the form of technical support for products, prototypes, diagnostics and drug development. These services are mostly located at the universities and are also targeted at supporting the local SMMEs and skills development. TIA has in its portfolio 18 Technology Stations and eight Technology Platforms.

The **Technology Stations programme** was established in 2002 to enable universities of technology to provide technology services to small and medium enterprises. TIA provides financial support to institutions that house Technology Stations to facilitate technical support to SMMEs in terms of technology solutions, services and training. The stations provide innovative Science, Engineering and Technology (SET) solutions for complex engineering challenges within the relevant industrial sectors and aim to support government's socio-economic priorities.

The positioning of the TSP is achieved through the following interventions:

- Providing technical oriented services to SMMEs/businesses to be competitive in related sectors of manufacturing to accelerate the exploitation of technology.
- Technology development in partnership with host universities to enable beneficiation of new knowledge through the intervention of TS projects.
- Diffusion of knowledge and skills by conducting skills transfer to companies.

In addressing the shortcomings identified in the Ministerial Review Report, TIA commissioned a Stakeholder and Perceptions Survey of all eighteen stations, to obtain more holistic feedback from all stations. The analysis reflected that the stations are exceptionally well aligned to the mandate of the TSP, being SMME development, technology transfer, skills development. The reason for any lack of alignment is largely due to contextual factors. Some stations reflect that either the conditions of the sectors within which they work or the lack of support from the universities at which they are located may affect the extent to which they are able to fulfil the mandate effectively.

Given the outcomes of the review, TIA will, during the planning period, develop a management framework for the Technology Stations and develop an appropriate mechanism for supporting the technology stations. In order for TIA to manage this effectively and determine the level of support and engagement required, it may be helpful to categorise the stations into four groups:

- Mature, delivering on the mandate and requiring minimal monitoring and support
- Mature, at risk of moving away from the mandate and hence requiring some engagement and monitoring
- Relatively mature, but experiencing difficulties at the host institution or within the sector
- Newly established and requiring guidance.

The support requirements of the various stations will be customised to meet their needs and those of the overall programme, in order to deliver on the programme's mandate.

The **Technology Platform programme** is designed to provide funding to facilitate access to key infrastructure for technology innovation in specific technology areas. The targeted outputs are not for the development of specific technologies into products, but instead the provision of a service to the NSI that lowers the barriers for others to engage in technology

innovation. The platforms must support the development of technologies with market interest, either now or envisaged.

Both programmes facilitate access to world-class infrastructure and expertise that would otherwise not be available to actors in the NSI or enable them to engage in technology innovation. The funding provided by TIA to the Technology Stations and Platforms is in the form of grants.

iii) Innovation Skills Development Programme

TIA has identified a need to strengthen the fundamental business skills associated with technology innovations. The Innovation Skills Development Programme (ISDP) is designed to enhance the business innovation skills of TIA funding recipients in order to improve the commercial prospects of their projects. The scope of the ISDP will be broadened to make it a more meaningful contributor to government's efforts in advancing HCD in the country. Sources of additional funds and/or partners will need to be identified to effectively realise this goal.

iv) Youth Technology Innovation Programme

Recognising the importance of investing in young people to unleash the potential of innovation and entrepreneurship, TIA established the Youth Technology Innovation Fund (YTIF). The YTIF assists young innovators in need of funding, mentorship and business support. The purpose of the fund is to promote and stimulate the culture of technology innovation and entrepreneurship among young South Africans by providing access to financial and business support resources. In addition, the fund is driven to deliver on developing a pipeline of innovation technologies for various TIA programmes. This funding instrument is targeted at the youth between the ages of 18 and 30 who are currently not funded by any of the TIA funding instruments.

10. STRATEGIC PLANNING PROCESS

In order to meet its legislative obligation, TIA embarked on a strategic planning process, which was interactive in nature and focused on critically examining the goals, objectives and performance metrics to ensure alignment with stakeholder expectations of the Agency.

The process has taken into consideration the following reports and followed a consultative process across all levels of the organisation and shareholders:

i) Ministerial review, which provided direction on the purpose and mandate of the Agency.

ii) Customer stakeholder survey that assessed the impact TIA's current service offerings.

iii) The TIA Board and EXCO deliberated on the revised scoping of the entity's role.

iv) Staff engagement and workshops held were to define and align the entity's objectives.

v) Shareholder consultations and feedback to inform planning.

11. STRATEGIC OUTCOMES ORIENTED GOALS

The analysis of the external and internal operating environment and how that impacts on TIA going forward reveals the following:

i) The recommendations of TIA's Ministerial review provide the basis for a TIA turn-around strategy to ensure alignment with the key stakeholder feedback.

ii) TIA operates in an innovation ecosystem that presents opportunities for co-operation and leveraging of resources, competencies and capabilities for maximum impact across the value chain. The enablement of this ecosystem is in turn a key success factor for the Agency in executing its mandate.

iii) There is alignment between emerging technology trends and their potential in delivering solutions for challenges faced by South Africa as defined by the NDP. This is especially relevant in the areas of education, healthcare, nutrition, housing, water and sanitation, electricity, clean environment, transport and safety and security.

iv) TIA needs to focus on areas in the innovation value chain where the impact of interventions will be high. As such the main focus of the new strategy will be to support the progression of technologies from early stage development towards follow on funding readiness.

vi) Understanding customer needs and expectations is critical for TIA in order for the right products, services and facilitation to be made available for technology innovators to successfully commercialise their ideas.

Given these factors, it is important for TIA to adopt a new strategy that positions the organisation to effectively and efficiently execute its mandate of "supporting the state in stimulating and intensifying technological innovation in order to improve economic growth

and the quality of life for all South Africans by developing and exploiting technological innovations".

11.1 Strategic objectives

In the context of the above, and in order to realise the overarching strategic goals (Section 4), the organisation has set the following strategic objectives for the current planning period:

i. To provide technology development funding and support in strategic high impact areas.
ii. To provide thought leadership and an enabling environment for Technology Innovation in collaboration with others.
iii. To develop an effective and efficient internal environment to successfully execute the strategy.

The above strategic objectives position TIA:

a) To provide South Africa with appropriate and effective support for innovation with high social and economic impact through a stimulating and enabling environment for technology innovation in collaboration with other role players (including role players in Africa and globally)
b) As a thought leader in technological innovation in South Africa
c) To build an effective and efficient organisation to successfully execute the strategy.

11.2 Strategic initiatives

During the planning period TIA will implement the following strategic initiatives:

- Active management and involvement in funded projects to provide value creation support
- Matchmaking programme to facilitate follow-on funding for commercialisation of market-ready projects
- Establishment of industry-specific technology innovation programmes that address areas of economic and social importance
- The establishment of partnerships with Provincial Economic Development Agencies to support the Regional Innovation Strategies
- Adoption of innovative business processes and systems to streamline the investment management process
- Attracting and retaining the right skills; and developing core competencies and capabilities to ensure responsiveness to stakeholders in support of strategic goals

- Establishing partnerships with private and public funders locally and globally to ensure that the above strategic initiatives are adequately resourced.

11.3 Key performance indicators

Strategic Objective 1: To provide technology development funding and support in high impact areas.

Rationale for the Objective	To support and facilitate the development and progression towards commercialisation of industry- enhancing technologies in cooperation with the broader NSI stakeholders to ensure seamless absorption of technologies to the market.
Key performance Indicators	• Number of technologies, products, processes and services reaching demonstration stages (at least TRL 7) • Number of technologies, products, processes and services taken up in the market • Amount of third party funding attracted to projects in TIA's portfolio • Amount of external income raised
Outcome	• Creation of employment and employment opportunities • Innovative product, processes and services strengthening of the knowledge economy
Output	• Number of jobs created by companies that went through TIA funding channels • Turnover generated by companies that went through the TIA funding channels • Number of technology based companies established • Survival rate of established companies
Link to government Outcomes	This objective is linked to the government's Outcomes 4, 5, 7 and 10.

Strategic Objective 2 : To provide thought leadership and an enabling environment for technology innovation in collaboration with other role players.

Rationale for the Objective	To provide leadership within the NSI on technology innovation. To lower barriers to technology development and transfer within the NSI by introducing innovation-related schemes targeting specific groupings, and provision of general working space support, specialised equipment and expertise to innovators, including SMMEs.
Key performance Indicators	• Number of knowledge innovation products produced by TIA supported projects. • Number of knowledge innovation products produced by TIA supported funding receiving third party funding • Number of Small and Medium Enterprises receiving technology support from the Technology Stations and Platform Programmes • Number of PDI owned SMMEs as a percentage of total SMMEs supported • Number of Technology Innovation initiatives undertaken by TIA (externally funded)
Outcome	• Creation of employment and employment opportunities • Innovative product, processes and services supporting economic growth • Sustaining of struggling sectors through introduction of new technologies
Output	• Number of jobs created • Turnover generated
Link to government Outcomes	This objective is linked to government's Outcomes 4, 5, 6 and 11.

Strategic Objective 3: To develop an effective and efficient internal environment to successfully execute the strategy.

Rationale for the Objective	• To optimise its financial resources and implement initiatives for business and investment process improvement. • To develop a culture of high performance and innovation among employees
Key performance Indicators	• Investment approval turnaround time • Improved adequacy and effectiveness on control environment • Amount of funds utilised for projects and programmes as a percentage of the total actual expenditure. • Functional organisational structure as measured by vacancy rate • Effective change management initiatives (employee engagement index)
Outcome	• A high performance culture developed in the organisation • TIA becoming the funder of choice in the technology development and early commercialisation demonstration space • TIA becoming an employer of choice
Output	• Efficient investment management processes • Highly motivated TIA staff • Customer centricity
Link to government Outcomes	This objective is linked to government's Outcomes 4 and 5.

PART B: PROGRAMME PERFORMANCE PLAN

12. CORPORATE STRATEGIC OBJECTIVES

STRATEGIC OBJECTIVE 1: To provide technology development funding and support in strategic high impact areas

STRATEGIC OBJECTIVE 1		Medium Term Target	Baseline	Medium-Term Targets		
				2015/16	2016/17	2017/18
Key performance indicator						
1.1	Number of technologies, products, processes and services reaching demonstration stages	27	5	6	9	12
1.2	Number of technologies, products, processes and services taken up in the market	19	5	4	6	9
1.3	Amount of third party funding attracted in TIA's portfolio	R250	R75m	R75m	R75m	R100m
1.4	Amount of external income raised	R346m	No baseline	R98m	R119m	R129m

STRATEGIC OBJECTIVE 2: To provide thought leadership and an enabling environment for Technology Innovation in collaboration with other role players

STRATEGIC OBJECTIVE 2		Medium Term Target	Baseline	Medium-Term Targets		
				2015/16	2016/17	2017/18
Key performance indicator						
2.1	Number of knowledge innovation products produced by TIA supported programmes	110	27	30	30	50
2.2	Number of knowledge innovation products produced by TIA supported programmes receiving third party funding	47	No baseline	7	20	20
2.3	Number of Small and Medium Enterprises receiving technology support from the Technology Stations and Platforms	6500	1904	2 000	2 200	2 300
2.4	The number of PDI owned SMMEs as a percentage of total SMMEs supported		No baseline	Develop measure and target		
2.5	Number of technology innovation initiatives (eg lectures, awards, debate, panel discussions, newsletters and events) undertaken by TIA	18	No baseline	3	5	10

STRATEGIC OBJECTIVE 3: To develop an effective and efficient internal environment to successfully execute the strategy

STRATEGIC OBJECTIVE 3		Medium Term Target	Baseline	Medium-Term Targets		
				2015/16	2016/17	2017/18
Key performance indicator						
3.1	Investment approval turnaround time	4 months	4 months	4 months	4 months	4 months
3.2	Improved adequacy and effectiveness of the control environment	Unqualified audit opinion	Unqualified audit opinion	Unqualified audit opinion	Unqualified audit opinion	Unqualified audit opinion
3.3	Amount of funds utilised for projects and programmes as a percentage of the total actual expenditure	71%	62%	68%	71%	71%
STRATEGIC FOCUS AREA 2 TO DEVELOP A CULTURE OF HIGH PERFORMANCE AND INNOVATION AMONG EMPLOYEES						
3.4	Functional organisational structure as measured by vacancy rate (12 weeks)	Below 5%	No baseline	Below 5%	Below 5%	Below 5%
3.5	Effective implementation of changed management initiatives	3.8	No baseline	3.5	4.0	4.0

1 3 . RESOURCE CONSIDERATIONS

13.1 Budget 2015/16 to 2019/20

		Budget 2015/16 R' 000	Budget 2016/17 R' 000	Budget 2017/18 R' 000	Budget 2018/19 R' 000	Budget 2019/20 R' 000
A	**Administration**	**141,659**	**150,814**	**158,807**	**167,045**	**175,711**
	Support and infrastructure cost	54,430	56,607	59,607	62,587	65,717
	Human Resources	87,229	94,207	99,200	104,458	109,994
B	**Investments**	**351,651**	**365,594**	**387,385**	**414,161**	**442,035**
B.1	**Biotechnology**	157,253	158,141	166,048	178,769	190,608
	Investments	*100,208*	*100,774*	*105,813*	*115,341*	*123,818*
	- Technology Innovation Programmes	5,000	5,028	7,673	12,000	15,000
	- Technology Development	80,927	81,384	83,419	87,840	92,496
	- Commercialisation support	14,281	14,362	14,721	15,501	16,322
	Technology Platforms	57,045	57,367	60,236	63,428	66,790
B.2	**Industrial**	93,398	102,057	106,921	114,058	122,467
	Investments	*93,398*	*102,057*	*106,921*	*114,058*	*122,467*
	- Technology Innovation Programmes	5,000	7,500	10,000	12,000	15,000
	- Technology Development	75,807	81,235	83,266	87,679	92,326
	- Commercialisation support	12,591	13,322	13,655	14,379	15,141
B.3	**Technology Station Programme**	70,000	70,396	73,916	77,834	81,960
	Ring fenced	34,317	34,511	36,237	38,158	40,180
	Additional initiatives	35,683	35,885	37,679	39,676	41,780
B.4	**Other programmes**	31,000	35,000	40,500	43,500	47,000
	Innovation Skills Development	3,000	5,000	6,000	7,000	8,000
	Youth Technology Innovation	3,000	5,000	8,000	10,000	10,000
	Seed fund	25,000	25,000	26,500	26,500	29,000
	Total expenditure	**493,310**	**516,408**	**546,192**	**581,206**	**617,745**
	Total funding	**493,310**	**516,408**	**546,192**	**581,206**	**617,745**
	Allocation from DST	385,188	387,364	406,732	428,289	450,988
	Additional income target	98,122	119,044	129,460	142,917	156,757
	Interest income	10,000	10,000	10,000	10,000	10,000
	Surplus/Deficit	-	-	-	-	-

13.1.1 Background

TIA's MTEF allocation was significantly reduced by R150 m per annum from 2015/16. This reduction has had a significant impact on the entity to function effectively as an important role player in the innovation space.

13.1.2 Administration costs

The funding reduction created a strong need for effective fund management. In order to mitigate the effects of the funding shortfall, management had to implement vigorous cost cutting and saving initiatives, which will reduce the administration costs considerably from 46% in 2014/15 to 28% in 2019/20. This was achieved through the organisation design process where the number of staff was significantly reduced. Further savings will be achieved through the reduction in the costs for consultants, rental, travel and subsistence and marketing.

13.1.3 Investment spend

Innovation investment and project cost had to be significantly reduced for the technology stations and technology innovation programmes, technology development and other ongoing initiatives. The current focus is on managing historical commitments while management reviews options to leverage additional funding. Other income will grow substantially when compared with prior years, to combat the reduction in funding. Initial initiatives over the short term include the exiting of equity investments and sourcing additional funding.

13.1.4 Cash position

The cash projection indicates that the surplus cash available at the end of the 2013/14 will be utilised by the end of 2014/15. The cash surplus has reduced considerably in the past three years due to TIA spending R289 million more than what was allocated.

13.2 Programme allocation

	2015/16 R'000	2016/17 R'000	2017/18 R'000	2018/19 R'000	2019/20 R'000
SO1: To provide technology development funding and support in high impact areas	193,606	202,832	212,734	229,399	246,285
SO2: To provide thought leadership and an enabling environment for technology innovation in collaboration with other role players	158,045	162,763	174,652	184,762	195,750
SO3: To develop an effective and efficient internal environment to successfully execute the strategy	141,659	150,814	158,807	167,045	175,711
	493,310	**516,408**	**546,192**	**581,206**	**617,745**

13.3 MTEF allocation

	2015/16 R '000	2016/17 R '000	2017/18 R' 000	2018/19 R' 000	2019/20 R' 000
Baseline and other costs	301,740	323,756	343,907	364,279	386,957
Administration, support and staff cost	141,659	150,814	158,807	167,045	175,711
Other Investments	160,081	172,942	185,100	197,234	211,247
Budgeted other income	-108,122	-129,044	-139,460	-152,917	-166,757
Baseline allocation ito allocation letter	193,618	194,712	204,447	211,362	220,200
Bio-economy Projects Allocation (Ring-fenced)	157,253	158,141	166,048	178,769	190,608
Technology Stations Allocation (Ring-fenced)	34,317	34,511	36,237	38,158	40,180
Technology Stations	34,317	34,511	36,237	38,158	40,180
Institute for Advanced Tooling	-	-	-	-	-
TOTAL MTEF ALLOCATION	**385,188**	**387,364**	**406,732**	**428,289**	**450,988**

14. RISK MANAGEMENT

No	Risk	Risk Description	Suggested/Future Mitigation actions
1.	Decreasing funds allocated to TIA	The National Treasury reduced TIA funding by R130m and R150m for FY14/15 and FY15/16 respectively.	1. Continuous engagement with Ministers for DST and NT 2. Continuous implementation of cost reduction initiatives 3.Obtain approval for the use of accumulated surplus. 4. Monthly monitoring of budget whereby each budget owner/ line manager will discuss their budget with Finance unit to determine their unit's financial position 5. Revision of the current budget to ensure that funds are reallocated where they are most needed.
2.	Under-spending of the allocated budget	Budget allocated by National Treasury to invest in technology development that is not expensed in these targeted activities in a specific financial year.	1. Develop and implement active project management process that is proactive in improving milestone performance in projects. 2. Analysis/Prioritisation of existing pipeline. 3. Introduction of "Calls" to manage project allocation for FY 2015/16 – (project prioritisation vs budget availability).
3.	Reputational Risk	Any risk that could have a negative impact on the trustworthiness, reliability and dependability of TIA	1. Develop and implement Code of conduct for engagement with customers/ external stakeholders 2. Development and implementation of an Internal Branding and communication plan.

			3. Revision of the communication policy/strategy 4. Resourcing the communication unit. 5. Communicate achievements of TIA in the Annual Report to change perceptions.
4.	Non adherence to policies, processes and decisions	Not following good practice and behaviour. Lack of management controls and failure to take accountability	1. Implementation of discipline and corrective action by line management. 2. Execute a "Culture Change" Drive through: - Leading by example - Proactive managing and taking accountability - Road shows /workshopping policies and procedures once approved - Retraining and maintenance of training registers - Signing declarations / acknowledgement of policies - Reduction of irregular expenditure 3. Finalisation of the Anti-Fraud and Corruption policy and implementation of awareness sessions of that policy.
5.	Low staff morale	Employees not motivated to deliver on their agreements	1. Conclusion of the organisational design and placement of employees into more stable and permanent roles. 2. The organisation must commit to the change management process to ensure the smooth transition into the new TIA. 3. Frequent communication with staff, engagement with the OD process to ensure staff concerns are address as they arise.

6.	Loss of critical skills	Loss of critical skills due to employees voluntarily leaving the organisation	1. Timely completion and implementation of the OD process 2. Moratorium on new appointment to give priority to internal candidates
7.	Leadership within the organisation	Unstable leadership team and lack of continuity due to acting positions	1. Permanent appointments at senior level pending finalisation of recruitment process 2. Plan for continuity
8.	Non-compliance with applicable statutory requirements	Non-compliance with legislation relevant to the activities of TIA and its projects. Include compliance of subsidiaries to PFMA	1. Continuous training and development on the TIA Policy Framework 2. Implementation of the Internal audit plan to improve the internal control system 3. Exiting of equity subsidiaries when and where appropriate
9.	Misalignment of design to strategy	Organisational design initiatives which will start after the implementation of the strategy	Involvement of all senior management ie General Managers, EXCO and Board
10.	Lack of a management system for project information	Project Management System (FMS)	1.Finalisation of the re-engineering exercise
11.	Not achieving the TIA targets for 2014/15	Not achieving the TIA targets per the APP for 2014/15	1. Monthly monitoring of the Dashboard for Projects to be developed from Finance 2. Quarterly discussion at EXCO for Business Performance 3. Streamlining the Performance Agreements to the targets across the organisation

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