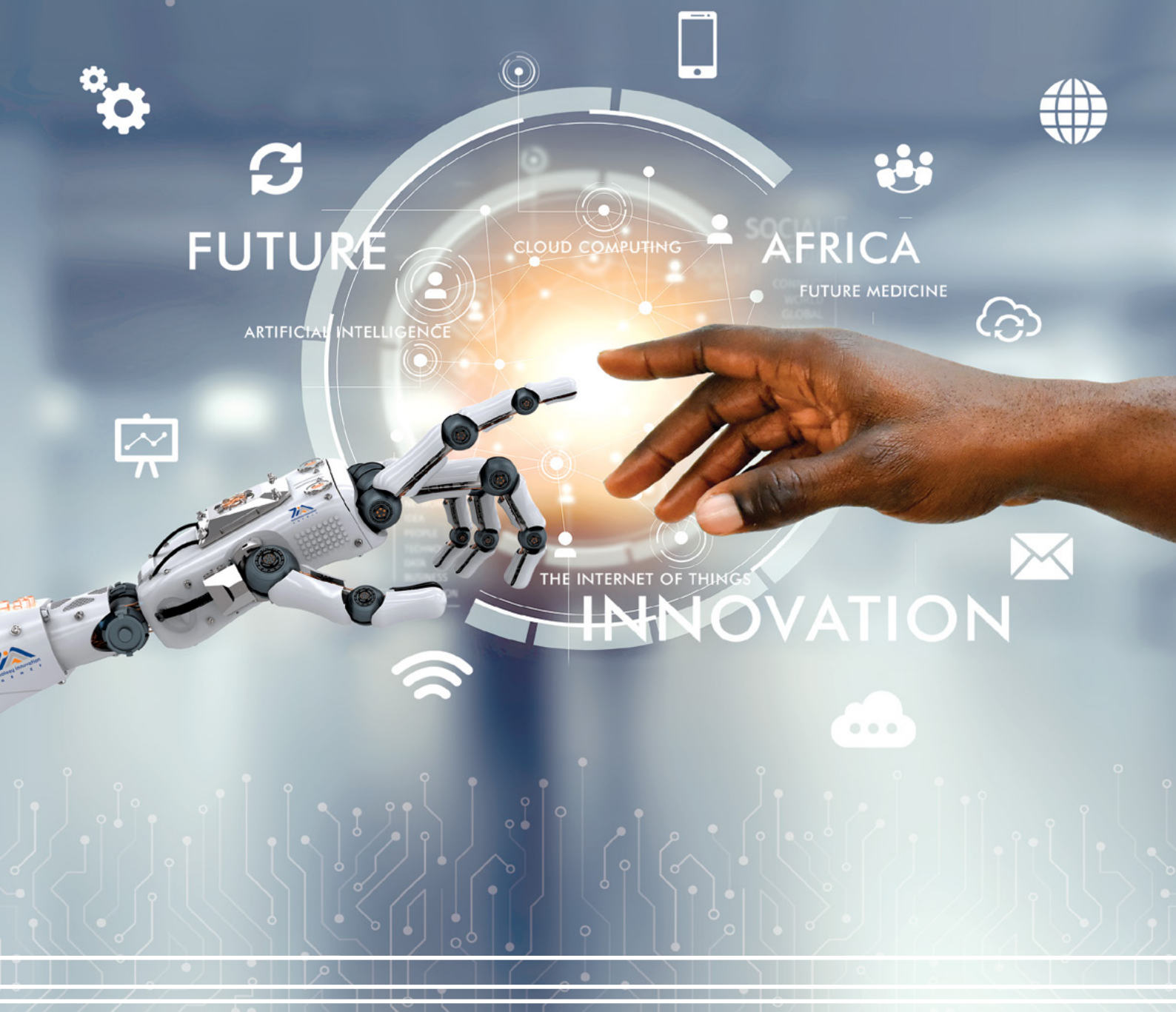


Annual Performance Plan 2018/19



The background of the document features a complex, abstract design. It consists of a grid of overlapping, semi-transparent geometric shapes, primarily triangles and quadrilaterals, in shades of blue and grey. Overlaid on this grid is a pattern of thin, light-grey lines that resemble a circuit board or a network diagram, with small circles at the intersections and along the lines. The overall effect is a high-tech, digital aesthetic.

FINAL SUBMISSION

Technology Innovation Agency

FY2018/19 Annual Performance Plan

Tel: (012) 472 2701

83 Lois Avenue

Menlyn

0063

Pretoria



FOREWORD BY THE CHAIRPERSON

In line with National Treasury directives, we present the Technology Innovation Agency (TIA) Annual Performance Plan (APP) for the 2018/19 financial year. This plan serves as a commitment of the Agency to deliver on its mandate as per the Key Performance Indicators (KPIs) of the Department of Science and Technology. The APP is derived from TIA's Strategic Plan 2015 – 2020, which defines the organisations strategic objectives which in turn are aligned to key government priorities, inter alia, the Government's Nine Point Plan, the National Development Plan 2030, the New Growth Path, the Industrial Policy Action Plan and the DST's Decadal Innovation Plan.

In finalizing this plan, we revisited the mandate entrusted to TIA to ensure that we are effectively aligned to this important reference during implementation. In doing so TIA plans to play a greater role in defining and refining the innovation ecosystem both locally and globally through effective partnerships and collaborations. TIA will continue to fund technology development through its Seed Fund, the Technology Development Fund and the Pre-Commercialisation Support Fund with an enhanced attention to client management and post-approval support, to existing and new technology projects within the TIA portfolio of projects.

In order to add value to the policy context TIA is gearing to respond to the inevitable implications of the 4th Industrial Revolution. Given that the swiftness of recent breakthroughs which have "no historical precedent", it is clear that TIA would have to be alert to the rapidly changing landscape of disruptive and exponential innovation, as it seeks to address Government's triple challenges of poverty, inequality and unemployment. This plan seeks to accelerate the development and deployment of technologies to high impact areas to increase economic competitiveness and socio-economic transformation.

Of significant focus is the bio-economy strategy established by the Department of Science and Technology to support future growth of the country. TIA's role is

central and through pertinent partnerships, will aim to advance the prescripts of the strategy.

TIA's continued non-financial support to its projects through the Innovation Skills Development unit will aim to strengthen its support in the areas of business and entrepreneur development. The 4th Industrial Revolution places creativity and critical thinking high on the list of primary skills, required to drive the motivation of this new age and accordingly projects and programmes will be designed to ensure that the development and retention of these skills are on the priority agenda of the skills development component of TIA.

On an operational level, TIA is reaching its conclusion on the change-management process with an optimistic expectation that the organisation will be more agile and streamlined. Stakeholder engagements have indicated various weaknesses which will be addressed through the optimised processes being implemented.

TIA continues to strengthen its internal control environment to ensure quality, efficiency and accountability throughout its governance processes.

Conclusion

As a new Board, our vision is to ensure that the requisite transformative changes which are required do indeed take place. The Strategic Planning Workshop conducted during in June 2017 set the tone and impetus of the organisation. An important focus of this board is to ensure that TIA's efforts go beyond transactional impact. We are committed to ensure the organization remain a catalyzing thought-leader towards an innovation ecosystem that enables greater transformation as we deliver on our mandate.

Prof Edward Chr Kieswetter
Chairperson of the Board



PREFACE

This document serves as the Technology Innovation Agency (TIA) Annual Performance Plan (APP) for the Financial Year (FY) 2018/19 and signifies the commitment of the Agency to deliver on its mandate as per the Key Performance Indicators (KPIs) of the Department of Science and Technology (DST). This APP is based on the Agency's Strategic Plan FY2015/20.

The Strategic Plan defines the organisation's strategic objectives which have been aligned to key government priorities (Government Nine Point Plan) outlined in the Medium-Term Strategic Framework Policy (MTSF) for FY2014/19, the National Development Plan (NDP) 2030, the New Growth Path (NGP), the Industrial Policy Action Plan and the DST's Bio-economy Strategy.

OFFICIAL SIGN OFF

It is hereby certified that this Annual Performance Plan:

1. Was developed by the management of TIA;
2. Takes into account all the relevant policies, legislation and other mandates for which TIA is responsible; and
3. Accurately reflects the performance measures TIA will endeavour to achieve over the financial year 2018/19.

Mr Werner van der Merwe

Chief Financial Officer

Signature:

Mr Barlow Manilal

Chief Executive Officer

Signature:

Prof Edward Chr Kieswetter

Chairperson of the Board

Signature:

Approved by:

Minister Naledi M. Pandor

Executive Authority

Signature:

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1. INTRODUCTION

This Annual Performance Plan (APP), which has been prepared in line with the National Treasury requirements, elaborates on how TIA’s APP for the financial year (FY) 2018/19 will be implemented during the Medium-Term Expenditure Framework (MTEF) period. It is informed by the priorities identified in TIA’s FY2015/20 Strategic Plan and provides details of TIA’s annual targets.

This APP forms the basis for monitoring progress against the strategic plan, where performance against the targets will be approved by the Board and reported to the Shareholders on a quarterly and annual basis. This document narrates the planned programmes, budget and annual indicators for strategic objectives for the MTEF period and quarterly indicators for the FY2018/19 for each of TIA’s three strategic objectives. Further detailed operational plans, including an appropriate programme risk register and risk-mitigating plan, will support the achievement of the strategic objectives.



Vision

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

TIA's aspiration finds expression in the vision of the Department of Science and Technology (DST) which is: *"Increased wellbeing and prosperity through science, technology and innovation"*, in that technological innovation should be intensified to uplift the lives of all citizens of South Africa through inclusive development. TIA will strive to ensure that its strategic programmes will yield outcomes that are aligned to this goal.

Mission

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





4. TIA's VALUES



Figure 1 TIA Values

4.1 Articulation of TIA values to drive performance

In articulating the focus activities going forward, the acronym “TIA” has been expressed per letter to reflect the values of the organisation:



T – represents **TEAMWORK**

This refers to collaborative engagement with all stakeholders within the National System of Innovation (NSI), inclusive of all government national departments, private sector partners and internally within the organisation.

I – represents **IMPACT**

This is in relation to the contribution the organisation makes to the NSI in addressing national imperatives through the execution of its mandate.

A – represents **ACCOUNTABILITY**

In terms of meeting expectations as well as ensuring optimal governance and compliance standards to both internal and external stakeholders with regards to the performance of the organisation.

Figure 2 TIA Values

to drive Performance¹

¹ Mr. B Manilal TIA's CEO Presentation at the Board Strategy management for increased organisation performance.

Session 27-28 June 2016 – Improving operational matrices and

5. LEGISLATIVE AND OTHER MANDATES

The mandate of the Technology Innovation Agency (TIA) is derived from the provisions of the Technology Innovation Act (Act No. 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**.²

In interpreting the mandate, the meaning of the words have been defined and articulated as follows:

- To promote is to provide technical insight and an enabling framework to find, develop, evaluate and commercialise innovative ideas.
- Development is the provision of technical expertise, access to technology infrastructure and funding to progress ideas across the innovation value chain.
- Exploitation is to take advantage of the research outputs from the knowledge economy to create new high-tech industries.
- Public Interest refers to the general welfare of the citizens of the country in relation to their rights, wellbeing or economic posterity that warrants recognition and protection. The public holistically has a stake in the management and affairs of local, state and national government which justifies governmental regulation.
- Discoveries refer to the recognition of phenomena, properties or laws of the material universe not previously recognised and capable of verification in relation to a new increment in knowledge.
- Inventions refer to any art or process (way of doing or making things), machine, manufacture, design, composition of matter, or any new and useful improvement thereof, or any variety of plant, which is or may be patentable.
- Innovations refer to doing something new that improves a product, process or service.
- Improvements refer to the application of new and better production processes or techniques that allow old or new products to be made more reliably.

The Act defines that “the object of TIA is to support the State in **stimulating** and **intensifying** the technological innovation in order to **improve economic growth** and the **quality of life** of all South Africans by **developing** and **exploiting innovations**”.³

In interpreting the object of the Agency, the meaning of the words have been defined and articulated as follows:

- To stimulate is to incentivise and mobilise actors within the innovation ecosystem to seamlessly progress ideas from proof of concept to full-scale commercialisation.
- To intensify is to create and catalyse technology development opportunities to advance ideas in a structured manner.
- Improve economic **growth** refers to the contribution that the technologies TIA have developed and commercialised

² TIA Act 26 of 2008 – extract from Section 3 titled “Object of the Agency”.

³ *Ibid.*

make to the country’s Gross Domestic Product (GDP), creating and or sustaining of jobs, improvement to the trade balance, enhancing core sector competitiveness and the creation of new industries.

- Quality of **life** refers to the rise in the standard of living (as defined in the National Development Plan 2030) and the improvement in service delivery and equality.

In fulfilling its mandate, the Agency operates within the context of an innovation ecosystem. An innovation ecosystem (also known as the National System of Innovation (NSI)) is defined as the interconnected relationships that are formed between actors or entities whose functional goal is to enable technology development and innovation. The innovation ecosystem comprises multiple sub- systems which include the Technological Innovation System, Sectorial Innovation System, Organisational Innovation System and Regional Innovations which, in turn, would comprise smaller sub-systems overseen by various actors and sub-actors. In this context, the actors would include the financial and physical resources (funding, research and development (R&D) infrastructure and technology platforms) and human capital (students, academic researchers, industry researchers and industry representatives) that make up the institutional entities participating in the ecosystem (e.g. the universities, science councils, private sector firms, public sector entities, venture capitalists (VC), industry research institutes, local economic development institutions, funding agencies and policy makers).

The words contained in the mandate above align to the strategic objectives of TIA and are illustrated below:



Table 1 Link of Mandate (verbs) to the Strategic Objectives, Programmes and Outputs of the Agency.

Mandate (Verbs)	Strategic Objectives	Strategic programmes enacted to realise the Mandate	Strategic Outputs and Outcomes
Development	To provide technology development funding and support in high impact areas.	Providing risk funding to enable the exploitation of technological innovation;	Products
Exploitation	To provide thought leadership and an enabling environment for technology innovation in collaboration with other role-players.	Developing technological innovations from the intellectual property sourced from innovators, Higher Education Institutions (HEIs), Science Councils (SC) and other stakeholders within the NSI;	Processes
Intensify		Supporting the commercialisation of industry enhancing technologies in cooperation with the broader NSI stakeholders;	Services
Public interest		Providing access to infrastructure that will enable innovators to develop new technologies;	Start-up companies
Discoveries		Promoting innovation skills –development initiatives between academic institutions and industry;	Creation of new industries
Inventions		Positioning itself as a key source and repository of knowledge and intelligence on key information regarding technology trends and opportunities that would be critical to supporting policy development and decision-making; and	Creation of employment and employment opportunities
Innovations		Enacting innovation-related schemes targeting specific groupings to provide access to general working space support, specialised equipment and access to technical experts.	Upskilling of innovators, researchers and entrepreneurs
Improvements			Innovative product, processes and services supporting economic growth
Promote			Rise in the standard of living
Stimulate			
Economic growth			
Quality of life			

In South Africa, the current levels of coherence within the NSI and among the existing policies, national programmes and public-sector institutions remain weak. This is evidenced by the variable uptake of incentive schemes and the multiple systemic pipeline jams that remain refractory to action.⁴ Thus, TIA has been positioned to be the link within the NSI in a bid to enhance the country's capacity to translate a greater proportion of local R&D into commercial technology products and services. This is the case because knowledge generated at various universities and public research institutions has not been reaching the market. This is owed mainly to: lack of systemic NSI coherence amongst the various actors, deep-seated gap between government and business⁵, lack of technical skills and capacity in technology transfer and commercialisation and risk-funding instruments targeted at the development of technologies. This has resulted in there being no adequate translation of the knowledge generated and utilisation in addressing the socio-economic development needs of the country. It is therefore the mission of TIA to exploit South Africa's knowledge resources into sustainable, socio-economic opportunities that can better lead to the creation of knowledge-based industries which, in turn, will result in companies becoming more competitive. This is key to the sustainability of the innovation ecosystem as the current operating environment highlights the need to develop technologies that would augment the advent of the 4th Industrial Revolution and to focus on speeding-up the adoption of innovations. It is envisaged that this could lead to the creation of smaller scale innovation ecosystems that push selected technology niches which may lead to transformative capabilities being developed faster.

Knowledge resources and economic systems are two sub-systems which are, amongst others, within the broader NSI. The knowledge economy is driven by fundamental research emanating from Public Research and Higher Education Institutions while the economic system is driven by market dynamics which are sensitive to any changes within the macro environment. TIA's role, therefore, is to create enabling mechanisms to allow for the interaction of both sub-systems with an aim to create new high-tech industries as these have high growth potential in spurring job creation and economic growth. To this end, TIA has established programmes and initiatives to ensure connectedness along the innovation value chain to allow for technologies to be supported and progressed from the laboratory to the market.

In performing against its mandate TIA has, through its various programmes and activities, supported the development of technologies in alignment to national priorities outlined in the National Development Plan (NDP) 2030, the Medium-Term Strategic Framework's (MTSF) outcomes and sub-outcomes, Government's Nine Point Plan, DST policies and its Bio-economy Strategy. From FY2010/11 to FY2016/17 the results are as follows: over 205 innovation products have been developed; a total of R2,6 billion has been disbursed to support the development of new technological innovations; and over 8 550 small, medium to micro-scale enterprises(SMMEs) have been supported. This has resulted in a contribution of R4,8 billion in terms of Gross Domestic Product (GDP) to the national economy and has led to 14 022 jobs being created.

Going forward, the Agency is positioning itself to be a hub in supporting technologies within the NSI by ensuring visibility of its project portfolio to all the various stakeholders therein. This would be underpinned by partnerships the Agency will form to ensure that there is a seamless progression of ideas across the innovation value chain. In addition, TIA will extend its service offering to other national departments and the private sector to

⁴ A Review of the South African Science, Technology, and Innovation Institutional Landscape (2016) page 15.

⁵ *Ibid.* Page 11.

capacitate the system in developing new technologies. It is envisaged that this will unlock additional funding which will be applied to strengthen the interventions needed in localising technologies to achieve a broader socio-economic impact. Furthermore, intelligence will be gathered from all the innovation activity occurring in Science Councils, HEIs, Universities of Technology (UoT), Offices of Technology Transfer (OTT), amongst others, in a bid to understand the evolution of the NSI and the technical needs of NSI stakeholders. Efforts are ongoing to enhance internal capacity to ensure that all processes and systems are optimised to deliver on the expectations of TIA's direct stakeholders.

6. TIA's POSITIONING

In response to its mandate, TIA is positioned to provide “gap”⁶ funding for technology development projects with a potentially high social and economic impact. These projects are unable to attract commercial funding due to the inherent high-risk nature associated with the technology development process. TIA's funding focuses on de-risking technologies that are going through the technology development phases. The focus areas are as follows:

- a. De-risk knowledge outputs from innovators, academia, science councils and public research institutions.
- b. De-risk the knowledge outputs that have been converted to prototypes which would need further development into technologies.
- c. De-risk the entrepreneur/innovator who is developing the technology in terms of the skills needed to establish a tech-based enterprise.
- d. De-risk the enterprise established during the commercialisation phase to ensure that it contributes to improved economic growth and enhancing the quality of life of South Africans.

The phases that are applied in developing technologies are measured in terms of Technology Readiness Levels (TRL) which, when simply defined, are a measurement system used to assess the maturity level of a particular technology. Each technology project is evaluated against the parameters for each technology level and is then assigned a TRL rating based on the project's progress. There are nine Technology Readiness Levels (TRLs). TRL 1 is the lowest and TRL 9 is the highest. TIA focuses on TRL 3-8 only; which are defined below:

- i. Proof of concept stage is termed TRL 3;
- ii. Technology development, which entails prototyping and/or piloting, is termed TRL4-5; and
- iii. Technology demonstration and pre-commercialisation is termed TRL 6-8.

TRL 1 and 2 is largely basic; TRL 9 is full commercialisation and these three TRLs are presently not part of TIA's primary focus. Enabling the transformation of such ideas into commercially sustainable products, services and processes (including the necessary start-up companies) is the immediate output of TIA's value chain, as depicted in Figure 3 below. The inputs into TIA Value Chain are namely innovators, the expertise of TIA's human resources, financial resources allocated by the National Treasury and other sources as well as facilities, expertise and resources provided by NSI partners such as research and academic institutions.

⁶ Gap funding definition – this risk-based funding that bridges the innovation chasm for innovators to prove and progress their ideas to the market. The funding covers the costs of proving the technological concept, to development and demonstration of the actual technology and for the commercialisation thereafter.

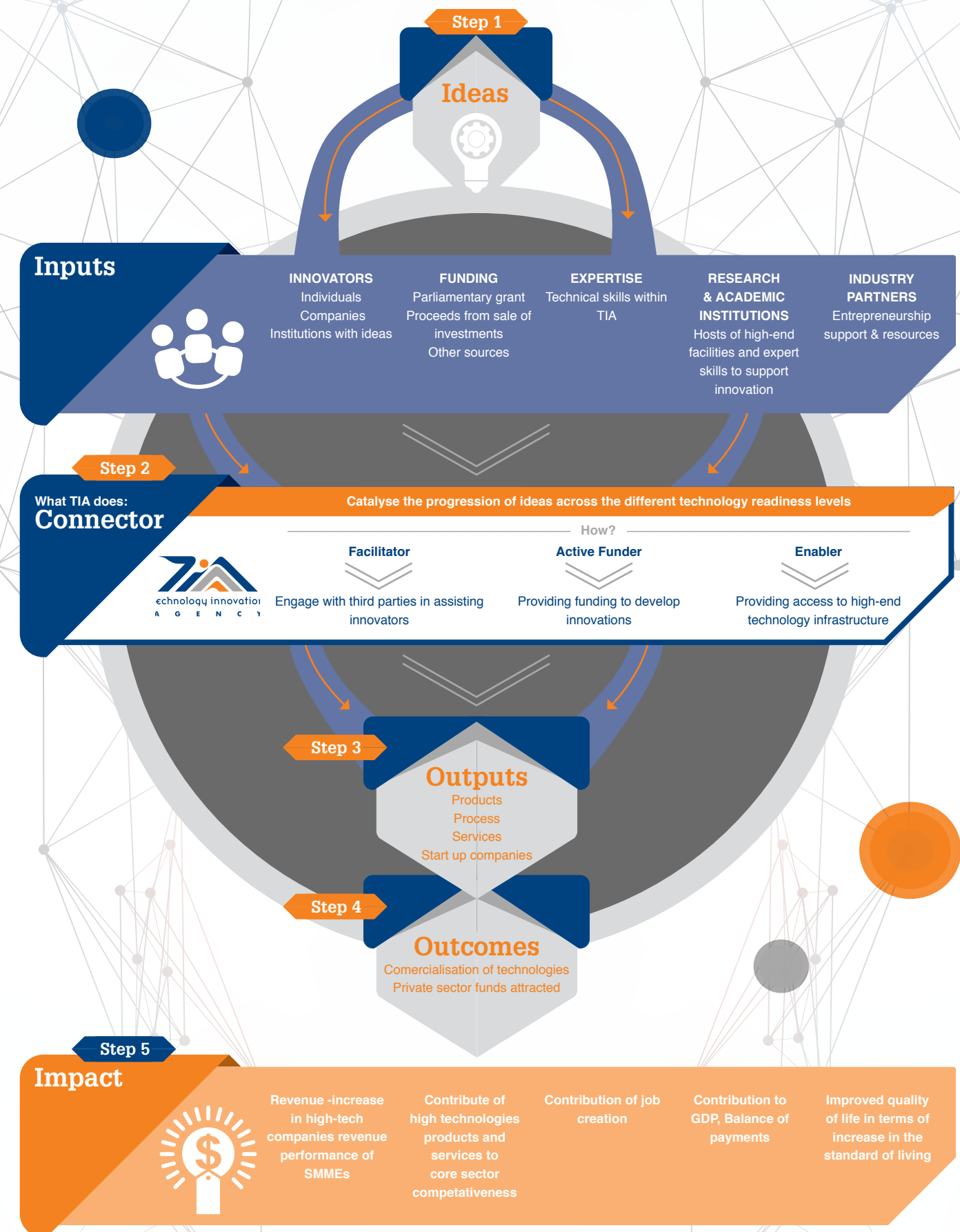


Figure 3 TIA Positioning

The figure below provides an outline for TIA’s role as a connector within the innovation ecosystem in South Africa.

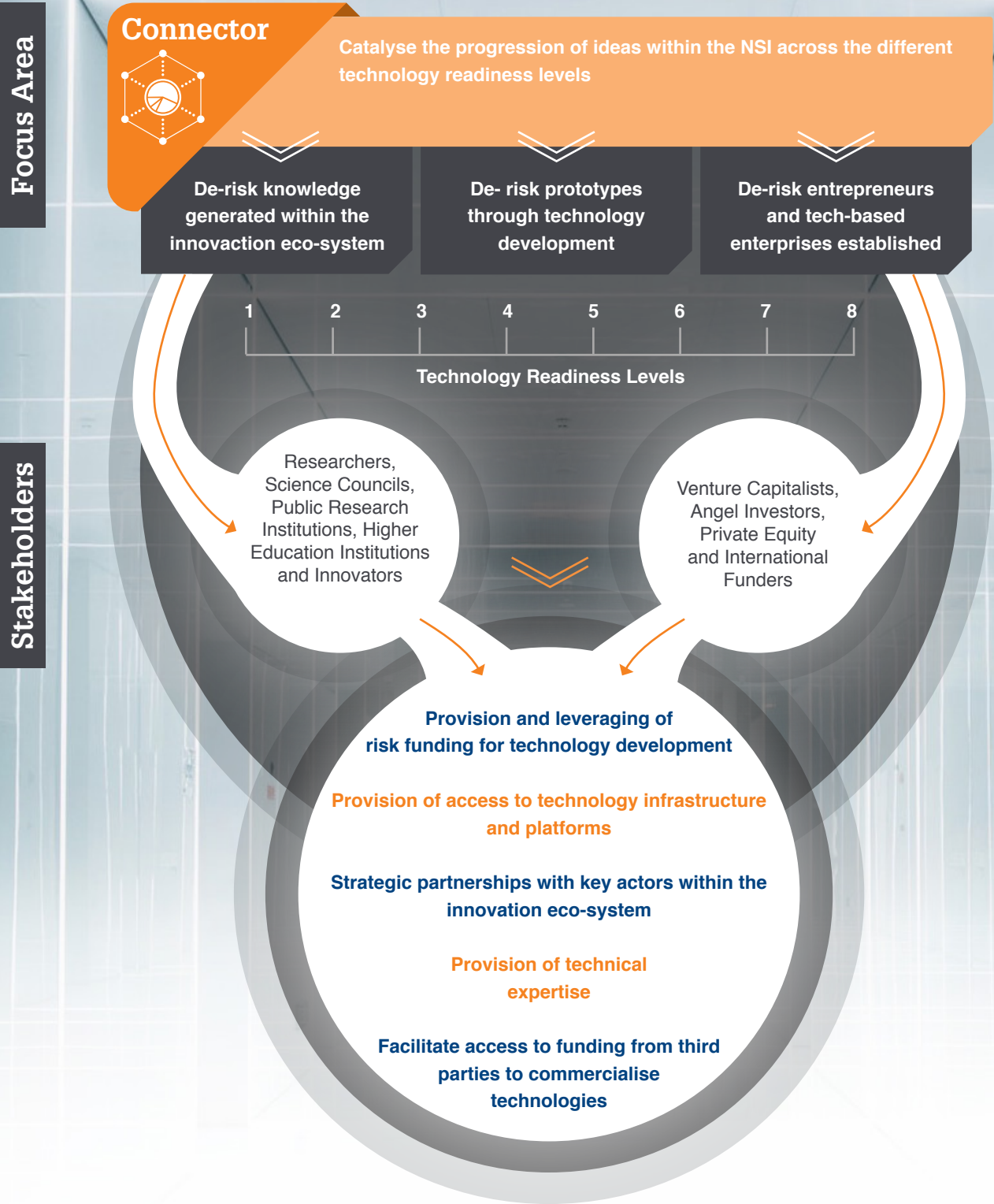


Figure 4 Role of Technology Innovation Agency

These inputs are the main elements that are converted in the transformation of ideas into technology development outputs which ultimately, once deployed into the market, have a socio-economic impact.

The role that TIA plays in applying these resources and stakeholders to achieve its outputs and desired outcomes is that of a **Connector** which entails catalysing the progression of ideas across the different technology readiness levels through partnerships with private industries, universities and science councils in order to create an environment for supporting sector-specific innovations that enable global competitiveness. The activities that TIA undertake in its connector role are:

a. Provide funding to advance ideas towards market entry and to de-risk commercialisation. TIA currently 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. The funding providing is structured to provide support at each stage at which the technology is undergoing development. Figure 5 below:

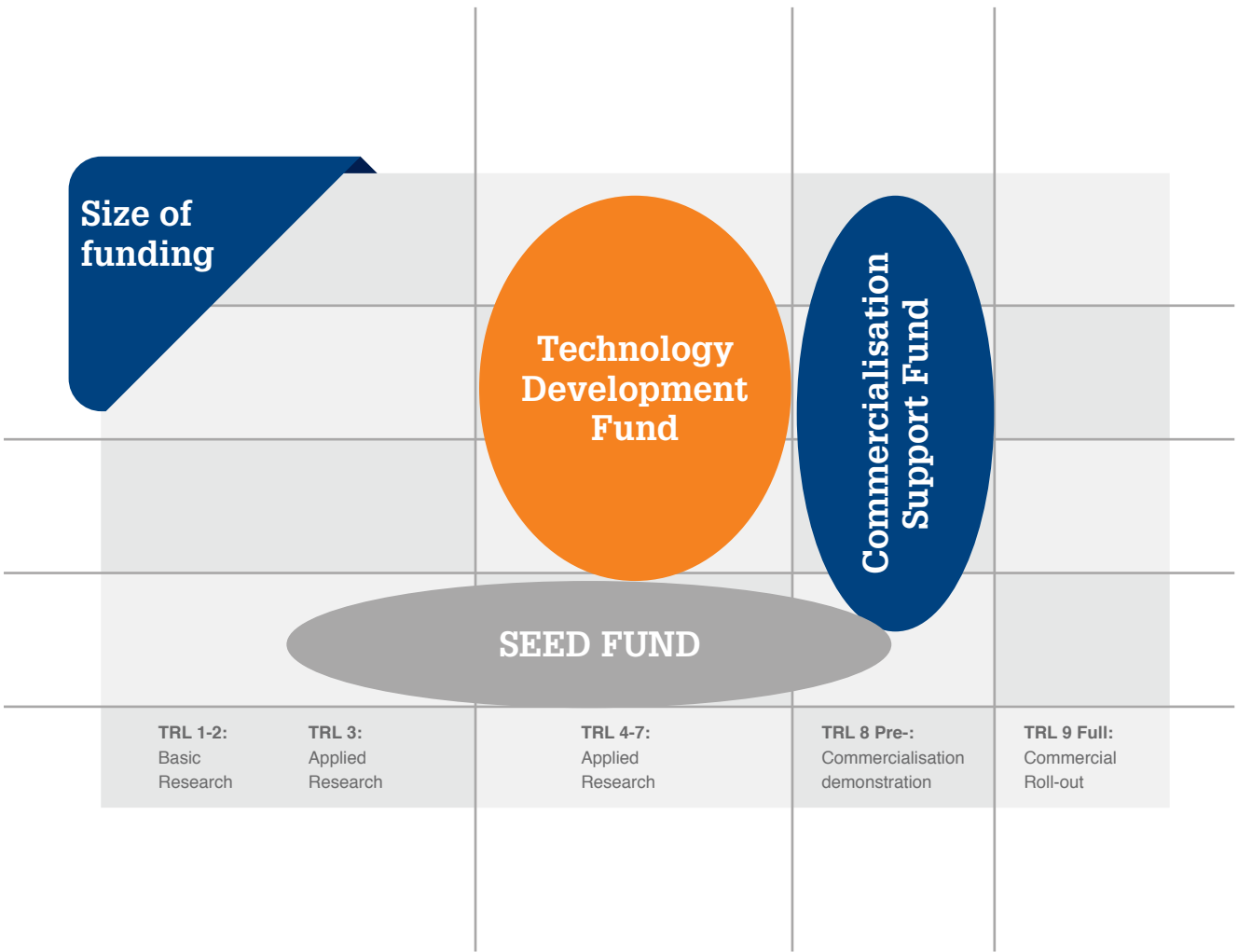


Figure 5 TIA Risk Funding Scheme

The funds are clearly differentiated based on the stage of technology development as defined by the TRL framework as presented below:

Name of Fund	Purpose of the Fund	TRL
Seed Fund (SF)	To assist innovators at HEIs, Science Councils and SMMEs to progress their research and technological outputs to develop prototypes, establish proof of concept and validate business cases. This should serve to build a pipeline for other funding instruments and external funders. This fund will be managed in partnership with Seed Fund Programme partners.	3-8
Technology Development Fund (TDF)	To assist innovators to advance technologies along the innovation value chain, from proof of concept/prototype to technology demonstration. The fund is designed to make early stage technology development more attractive and less risky to the market.	4-7
Pre-Commercialisation Support Fund (PCSF)	To prepare innovators for follow-on funding through support for market testing and validation. In this space, TIA's role is to connect technology innovators to business and investment opportunities.	8

Figure 6 TIA Technology Development Fund descriptions per TRL level

TIA's primary funding vehicles are grants which are conditional in 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 or market-ready and are often important for raising venture capital and/or accessing other applicable sources of funding.

b. Provide access to technical expertise for innovators to validate, develop and exploit their ideas. This is undertaken through experts who work at hosted technology stations located at Higher Education Institutions across the country and through TIA staff who work together with the innovator in developing the technology. Both have the technical competence and industry experience to ensure that the innovator is supported. Notably, township-based enterprises are particularly disadvantaged, due not only to lower economic activity and purchasing power in these areas, but also to deficiencies in skills. Within some sectors, these skills deficits have hindered the growth of local SMMEs in particular. TIA will contribute to the realisation of the Gauteng Provincial Government Township Economy Revitalisation Strategy by granting SMMEs access to technical expertise to ensure that township-based SMMEs are better trained, equipped and supported.

c. Provide innovation skills development for innovators. Considering the advent and demands of the 4th Industrial Revolution, it is imperative that the innovators are trained to contend with the skills required for the future industries. Digital literacy is an absolute must in the new world of work which is always on, always connected and global. The skilled innovator of the future will also have to be media literate and trans-disciplinary with the ability to understand concepts across multiple disciplines. They must be equipped with a design mind-set and the ability to represent and develop tasks and work processes for desired outcomes in establishing enterprises. The focus of the TIA skills development programme is on developing skills within these niche areas to support the development of new technologies, identify skills gaps within technology start-ups and provide enterprise development support for sustainability.

d. Enable access to high-end equipment for innovators located at institutions of higher education across the country. The technology infrastructure platforms are equipped with high-end technology and are hosted by academia who have specialised knowledge to progress ideas across the various TRLs up to pre-commercialisation. The value proposition herein is the contribution made to improving the enterprises' turnover and cost recovery through utilisation of the equipment in improving the products and services. This would support, for example, the realisation of the outcomes of Gauteng Provincial Government Township Economic Revitalisation Strategy.

e. Facilitate and assist innovators to secure funding (from companies, venture capital firms and development finance institutions) for the commercialisation of products, services and processes developed through TIA's support. TIA has strategic relationships with upstream and downstream funders to support de-risking the technology developed and enterprises established by the innovators. Greater emphasis is being placed on migrating of technologies through the TRLs to harness the full benefits of the commercialisation process. This allows for a seamless progression and de-risking of technologies along the innovation value chain, within a single entity, so that other stakeholders may find it more attractive to participate in these projects based on the value that TIA has created. To this end, a seamless integrated Innovation Portal concept is being developed with upstream and downstream NSI partners to ensure that researchers and innovators who receive support for technology development are capacitated, monitored and constructively handed over to each institution during the technology development cycle to enable them to reach the commercialisation stage.

7. POLICY CONTEXT

The current economic and social landscape is advocating for an increase in the rate of economic growth in the country in a bid to address the triple challenges of unemployment, poverty and inequality. In response to these, the government has enacted various initiatives to stimulate the economy by positioning them to yield economic growth and competitiveness, improved social development, quality of life and standards of living, enable cost savings to be realised through use of Science, Technology and Innovation (STI) for decision support and to enhance government decision making. The national policies are as follows:

7.1 Sustainable Development Goals (2030)

On 25 September 2015, the 194 countries of the UN General Assembly, adopted the 2030 Development Agenda titled: “*Transforming our world: the 2030 Agenda for Sustainable Development*”. This agenda has 92 paragraphs. Paragraph 51 outlines the 17 Sustainable Development Goals and 169 associated targets. Each goal has specific targets to be achieved over the next 15 years. These include amongst others: **ending poverty, protecting the planet, and ensuring prosperity for all**. The goals are aligned to the outcomes of the aspirations of the National Development Plan 2030 and other government policies.

7.2 National Development Plan (NDP) 2030

The NDP notes that the development in Science, Technology and Innovation fundamentally alters the way people live, communicate and transact with profound effects on socio-economic growth and development. The NDP highlights that STI is key to equitable growth and underpins economic advances, improvement in health systems, education and infrastructure.

7.3 Medium-Term Strategic Framework (MTSF) 2014-2019

The NDP is the overarching government framework for the socio-economic transformation of South Africa. The NDP has been divided into five-year implementation plans, the first of which has been the 2014-2019 Medium-Term Strategic Framework (MTSF). The MTSF has 14 Outcomes of which TIA has aligned its initiatives and contributes to the following four 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 10: Protect and enhance our environmental assets and natural resources

In the execution of its mandate, TIA has aligned its strategic programmes to the key DST policies in a bid to strengthen the National System of Innovation through coordinating and leading the development of country-level strategies and policies.

7.4 New Growth Path (NGP) 2020

The NGP advocates that, in order to drive economic growth, new jobs would need to be created through “*seizing the potential of new economies by growing the knowledge economy*”.

In FY2018/19 the plan enters the second phase in which there should be intensive improvements in productivity wherein there is innovation across the state, business and social sectors. The NGP notes that this would be achieved through accelerating the transformation of the STI sector and enhancing efficiency in the economy through knowledge.

7.5 Government Nine Point Plan

During the 2015 State of the Nation Address (SONA), the President outlined a Nine Point Plan that comprises simultaneous actions in key strategic areas at a scale large enough to constitute a “*big push*” to ignite economic growth.

TIA, in its strategic positioning, has structured all its programmes to address the identified priority areas in a bid to propel innovation products as a key growth translator. The adoption of localised technologies in the implementation of the plan would lead to improved productivity and an increase in core competitiveness directly leading to advances in manufacturing processes.

7.6 Industrial Policy Action Plan (IPAP) 2017/18 – 2019/20

The Department of Trade and Industry’s (dti) IPAP, highlights the need to leverage STI for industrial growth and development. The plan outlines targeted interventions that seek to: ensure that the foreseeable effects of the 4th Industrial Revolution and emergent disruptive technologies are understood; and adapt SA’s productive and services sectors to meet the challenges, including those relating to employment displacement. To this end, the plan notes that a stronger inter-departmental effort is already under way to optimise technology transfer and diffusion (building on the Technology Localisation Unit programme) and to commercialise ‘homegrown’ R&D in key sectors – these efforts will be further broadened and stepped up.

7.7 Department of Science and Technology (DST) Priorities

7.7.1 National Research and Development Strategy (NRDS)

This policy aims to identify specific priority areas that need to be capacitated to enable economic growth to be underpinned by Science, Technology and Innovation. This is to be achieved through targeted innovation skills development interventions that empower innovators from HEIs and Science Councils to be entrepreneurial and knowledgeable on how to protect and exploit their intellectual property.

7.7.2 Ten-Year Innovation Plan (TYIP) 2008-2018

The policy aims to help drive South Africa’s transformation towards a knowledge-based economy in which the production and dissemination of knowledge leads to socio-economic benefits. The NSI holds immense potential to increase the rate and pace of innovation, thereby accelerating the process of start-up creation, economic growth and contributing to job creation. TIA is aligned to the **DST Grand Challenges**.

7.7.3 Bio-economy Strategy

The policy instrument seeks to position South Africa’s bio-economy to be a significant contributor to the country’s economy by 2030 through the creation and growth of novel industries that generate and develop bio-based services, products and innovations, with a corresponding increase in the new and existing companies that provide and utilise these solutions.

7.8 Contribution of STI to the reduction of poverty, inequality and unemployment

To achieve greater alignment to National Government imperatives focused on achieving cohesive socio-economic impact, TIA has aligned its activities and Figure 6 below reflects the structure thereof:

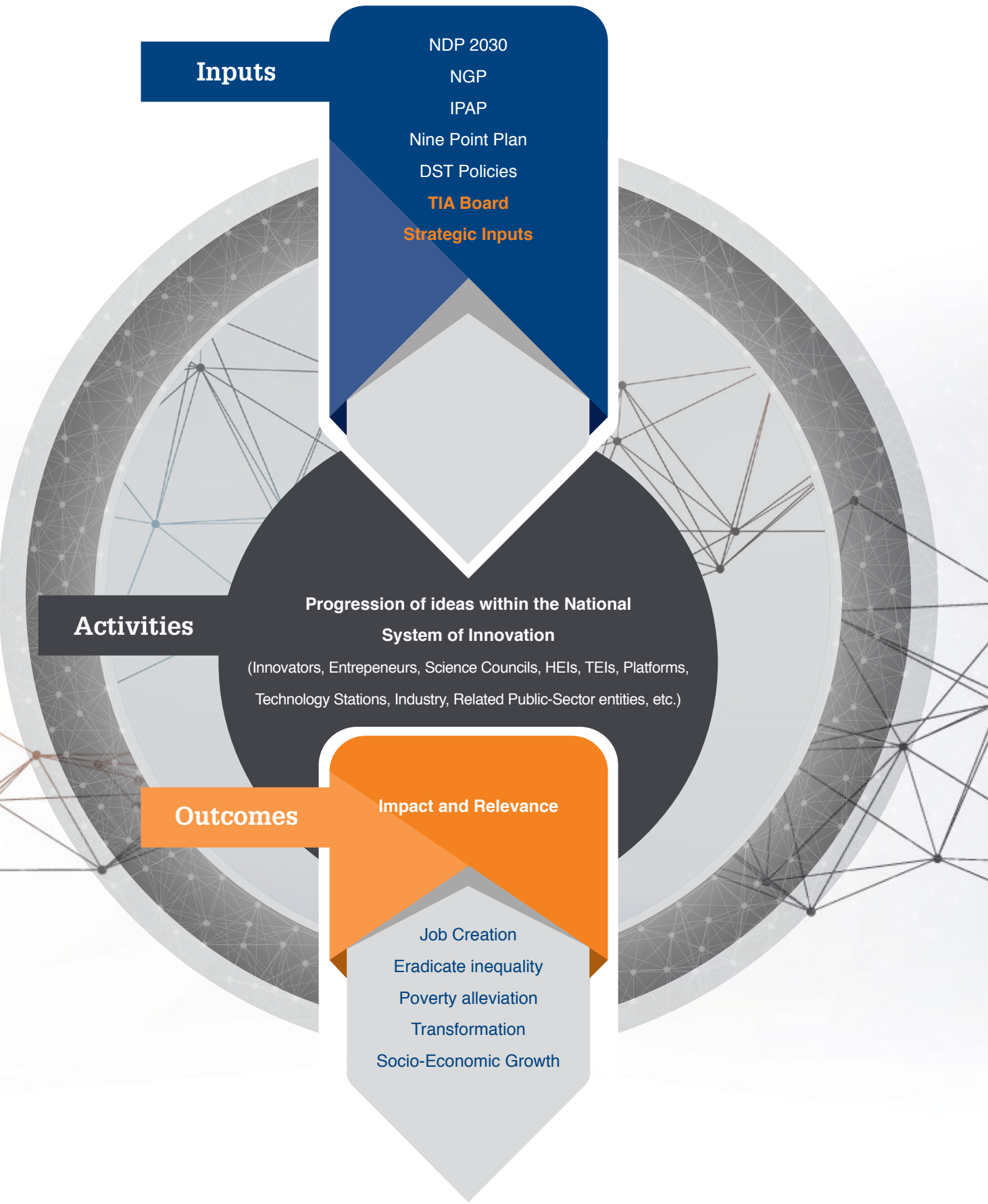


Figure 7 Flow Diagram – TIA’s Impact Areas

Table 2 Contribution of STI to the reduction of poverty, inequality and unemployment

Contribution of STI to the reduction of poverty, inequality and unemployment			
STI Contribution	Poverty	Inequality	Unemployment
Direct	Innovation enabled local economic development	The nurturing and supporting of ideas of inventors, especially from disadvantaged backgrounds, will contribute towards the bridging of inequality.	Funding of projects to develop technology immediately results in the creation of high-end technical jobs.
Outputs	Support the development of indigenous knowledge systems (IKS) for healthcare products. The developed systems will equip individuals with the necessary knowledge to be able to start their own sustainable businesses, thereby generating income.	Innovation to enhance standards of living. Technological innovations from previously disadvantaged HEIs, where majority of researchers come from impoverished backgrounds, will be targeted and supported.	Support youth participation for ICT Technology development for mobile applications. This will assist the youth to be self-employed by starting their own businesses and possibly creating jobs in the process. This will be done in partnership with both private and public stakeholders where youth may be placed for internships to learn and gain experience while receiving an income.

Contribution of STI to the reduction of poverty, inequality and unemployment			
STI Contribution	Poverty	Inequality	Unemployment
Outputs	<p>Number of IKS technologies supported:</p> <p>Four IKS projects supported:</p> <ol style="list-style-type: none"> Imperium Dynasty Group is a company whose focus is on the development of hair formulation. The company products are currently on the local market but require more scientific data to be able to penetrate international markets. Zuplex is currently producing botanical compounds through extraction from indigenous plant material. The company sources its raw material from a rural based community trust which also has shareholding in the commercial entity. 	<p>Technologies supported from PDI's:</p> <p>Six ICT projects funded through MLAB collaboration.</p> <p>Afrobodies aims to locally produce recombinant antibodies for research application. Currently there are no local producers and similar biologics are imported.</p>	<p>Youth SMME's supported:</p> <p>Seven ICT projects funded through MLAB collaboration</p>

Contribution of STI to the reduction of poverty, inequality and unemployment			
STI Contribution	Poverty	Inequality	Unemployment
	<p>3. The Heal your Gut project uses fermentation technology, as had been traditionally applied in rural communities, to produce new product variants that are healthier and can suppress a number of predominant diseases. The technology is currently being investigated for deployment in vegetable and fruit fermentation to realise and enhance pre- and probiotic characteristics of final product.</p> <p>Majestik Cosmetics currently produces facial cosmetic products at a small scale. Due to market demands, the company is required to scale up its operations. This will improve its sustainability and propensity to create employment.</p>		

Contribution of STI to the reduction of poverty, inequality and unemployment			
STI Contribution	Poverty	Inequality	Unemployment
	<p>Small-Scale Farmer and Artisanal and Small-Scale Mining Technology Diffusion initiative: By implementing an active drive to promote social or informal innovation amongst rural communities in order to drive service delivery and improved products within the context of rural and township economy programmes</p>	<p>Supporting transformation in terms of gender and race in funding of innovation projects would lead to the creation of jobs which result in the employment of previously disadvantaged individuals.</p>	<p>Support entrepreneurs by funding technology development that leads to the creation of new industries: Bio-fuels, gas, renewable energy and energy management.</p> <p>SMME's supported through Technology Localisation and Technology Station programme to enable them to become more competitive.</p>
Indirect	<p>Supporting the technology transfer process especially among the previously disadvantaged universities across South Africa. These institutions are prioritised in terms of financial and non-financial resources that are put towards coaching them, assisting with implementing systems and processes; and giving guidance</p>	<p>Using technology to identify and test the use of technology to improve service delivery and demonstrate better standards of living i.e. Water Resources Management technologies</p>	<p>Knowledge transfer to SMMEs through technical support offered by the Technology Platform may lead to the creation of start-ups that create employment opportunities.</p>

Contribution of STI to the reduction of poverty, inequality and unemployment				
STI Contribution	Poverty	Inequality	Unemployment	
	Licensing of technology developed in South Africa to a multi-national or company whose business activities are largely based overseas would generate royalties for TIA/South Africa that would contribute to the GDP.	Potential partnership with eThekwinini metropolitan on supporting projects mostly focusing on water management.	Facilitating the development and improvement of agro-processing, technology innovation and commercialisation of agro-food products by start-ups and existing SMMEs in the Limpopo province.	
Outputs	Mushroom production: production and development of shitake mushrooms for medicinal purposes			

8. SITUATIONAL ANALYSIS

8.1 TIA's Performance Environment

8.1.1 Contribution to the realisation of the outcomes of the Medium-Term Strategic Framework 2014-2019

TIA, through its mandate and activities, contributes to most of these outcomes, as well as sub-outcomes defined under the overall MTSF umbrella (see Table 1.2 below). The progress in the realisation of these is articulated therein.



Table 3 Contribution to the MTSF commitments undertaken by TIA in the 2014-2019 MTSF cycle

OUTCOME	SUB-OUTCOME	ACTION/COMMITTEMENT	PROGRESS 2017/18	PLANS 2018/19
Outcome 2: A long and healthy life for all South Africans	Sub-Outcome 8: Reduced costs of health care	Investment into the development of affordable and adaptable novel health products, examples of relevant projects:	The Health sub-programme continues sourcing, funding and managing bio-innovation health projects with a potential for high impact in terms of final product costs for the end user:	Increased collaboration with Medical Research Council (MRC) under the Strategic Health Innovation Programme.
		Health Sub-Programme Projects Actions:	CPT Pharma – Planned investment of R2.1m	Provision of focused funding and support for development of new capabilities.
		CPT Pharma – Total TIA planned/actual investment of R18.3m with co-investment by the IDC (Industrial Development Corporation);	Biodox – Planned investment of R2m;	CPT Pharma – Planned investment of R2.9m
		Biodox – Total TIA planned/actual investment to date of R14.3m co-investment as follow-on funding by the IDC to commercialisation activities;	MARTI – Planned investment of R2.3m.	Biodox – No planned investment beyond FY 2017/18;
		MARTI – Total TIA planned/actual investment to date of R14.3m – Co-investment with the University of Pretoria;	Enzyme Technologies – No planned investment beyond FY 2017/18;	MARTI – Planned investment of R8.3m.
		Enzyme Technology – Total TIA investment of R13.3m – University of Pretoria provided minimal funding for animal trials.	Seed Fund Programme is to continue providing funding for development of technologies in alternative therapies from indigenous plants and the environment for infectious and non-infectious diseases that plague the South African population including Diabetes, HIV Aids, Cancer, Tuberculosis and Malaria.	Monitoring and continued development of a portfolio of projects that are ready for commercialisation and which are supported by industry partners.
		Support early stage research outputs through providing funding and access to services, to enable innovators, researchers and SMMEs to address the health needs of South Africa with funding and programmatic support.		
		Collaborate with other NSI stakeholders and roleplayers to enable their pipelines of technologies that address the health of South Africans and contribute to a long life for all.		

OUTCOME	SUB-OUTCOME	ACTION/COMMITTEMENT	PROGRESS 2017/18	PLANS 2018/19
Outcome 4: Decent employment through inclusive economic growth	Sub-Outcome 10: Investment in research, development and innovation supports inclusive growth by enhancing productivity of existing and emerging enterprises and supporting the development of new industries.	<p>Support new energy generation technologies, examples of relevant projects:</p> <p>Energy: Micro-Algae (Coalgae) – TIA has invested R28m in the development of the Coalgae project. The project has reached technology demonstration stage (with a capability to produce 5 tons of Coalgae) and now needs to scale up to an industrial scale demonstrator that is estimated to require approximately R100m.</p> <p>Agriculture Small-Scale Farmers Technology Diffusion Programme – “The commercialisation of cassava as a local source industrial starch” and “The commercialisation of six new, PBR-protected cultivars of indigenous flower bulbs”</p> <p>Cassava Project – A project to diffuse TIA funded technology transfer to small scale farmers – Total TIA planned/actual investment to date of R9.3m;</p> <p>Indigenous Flower Bulbs – The Agriculture Research Council (ARC) developed six new varieties of Lachenalia, a flower bulb indigenous to South Africa.</p>	<p>Ongoing monitoring and evaluation of the Biofuels Technology Demonstration Programme (BTDP) noting any innovative technology development opportunities.</p> <p>Engagement with stakeholders to collaborate in joint risk funding of projects e.g. establishment of a manufacturing facility in Mamelodi. In partnership with Mothong Heritage Trust, as well as Ndabakazi Village in the Eastern Cape.</p> <p>Provision of pre-commercialisation funding and support for projects in agro-processing and health such as the Coalgae, Cassava and Indigenous Flower Bulbs projects.</p>	<p>Continued engagement with Department of Energy on the pending cabinet decision which will also clarify the role of incentives in supporting the biofuels industry, is to be undertaken at the beginning of FY2018/19.</p> <p>Extended collaboration with more stakeholders to scale up funding available to support entrepreneurs.</p> <p>Engagement with private sector to leverage additional funding resources for projects with potential to create jobs.</p> <p>Energy: Micro-Algae (Coalgae) – TIA will continue monitor progress on the performance of the project.</p> <p>Agriculture Small-Scale Farmers Technology Diffusion Programme – TIA will continue monitor progress on the performance of the project.</p> <p>“Cassava Project – TIA will continue to monitor progress on the performance of the project.</p>
	<p>Use our partnerships with science councils, HEIs and incubators and development agencies to provide financial and non-financial support to entrepreneurs and SMMEs; thereby increasing their chances of success and creating gainful employment.</p> <p>Actively promote and support entrepreneurs to receive follow-on funding for commercialisation.</p>			

OUTCOME	SUB-OUTCOME	ACTION/COMMITTEMENT	PROGRESS 2017/18	PLANS 2018/19
Outcome 5: A skilled and capable workforce to support an inclusive growth path	Sub-Outcome 2: Increase access and success in programmes leading to intermediate and high-level learning	Capacitating the NSI with critical thinking skills.	Support the technology transfer process and the NSI partners through facilitating critical thinking skill training thereby creating experiential learning opportunities through commercialisation of their opportunities	Capacitating innovators and TIA stakeholders with training in Critical Thinking Skills Levels 1-4. For Level 1 – 2 000 trainees, Level 2 – 1 000 trainees, Level 3 – 500 and Level 4 – 100.
Outcome 10: Protect and enhance our environmental assets and natural resources	Sub-Outcome 3: An environmentally sustainable, low-carbon economy resulting from a well-managed transition.	Promoting clean technology innovation. Examples of relevant projects: A Waste to Energy project – Nelson Mandela University Microalgae (NМУ microalgae) as detailed in Outcome 4 above; A renewable energy project – HyPlat – (which involves the development of the membrane electrode assembly (MEA) technology for the development of hydrogen fuel cells for energy production. Total TIA planned/actual investment of R36.2m with co-investment by MINTEK (Council for Mineral Technology) of R3.3m; and University of Cape Town of R3.6m. A Green Building Project - SAMAC Engineering Solutions – Total TIA planned/actual investment of R7.8m;	Continue sourcing, funding and managing innovation projects in Energy Efficiency, Renewable Energy, Waste to Energy, and Water Efficiency and Green buildings. Special consideration has been made to mainstream gender and youth imperatives into the programme by promoting women and youth entrepreneurship: Microalgae (NМУ): No further disbursement anticipated as technology objective of reading demonstration has been fulfilled. HyPlat – Planned investment of R12.7m; and A Green Building Project - SAMAC Engineering Solutions – Total TIA planned/actual investment of R2.9m.	Additional new projects will be supported in 2018/19 in line with the promotion of clean energy sources with a strong focus on commercialisation. HyPlat - Planned investment of R15.5m; and A Green Building Project - SAMAC Engineering Solutions - Total TIA planned/actual investment of R1.1m.

8.1.2 Contribution to DST Proxy Indicators

In order to position STI within the framework of the NDP, the DST's priorities, plans and deployment of funding will be directed towards the five strategic outcome-oriented goals which all are measured against proxy indicators. Defined, proxy indicators are an indirect sign or measure that can approximate or be **representative** of a planned outcome. As the Agency is funded by the DST, there is a need for alignment of performance measures to assess the effectiveness of enacted DST strategic policies. The table below reflects the Agency's contribution to these:



Table 4 TIA's Contribution to DST Proxy Indicators

Technology Innovation Agency		(Estimated)	(Estimated)
Contribution to the DST Strategic Outcome-Oriented Goals for FY2018/19		TIA Contribution in FY2017/18	TIA Contribution in FY2018/19
DST Strategic outcome-oriented goal 1	Goal Statement: Over the next five years, build on previous gains to create a responsive, coordinated and efficient NSI		
Proxy Indicator 4:	By 2019, a 300% increase in the rand value of investment by government and the private sector in R&D partnerships as compared to 2013 achieved (MTSF Outcome 4, sub-outcome 10).	28%	66%
DST Strategic outcome-oriented goal 3	Goal Statement: Over the next five years to increase the number of high-level graduates and improve their representivity		
Proxy Indicator 2:	4 200 graduates and students placed in science, engineering, technology and innovation (SETI) institutions by March 2019.	100	100
Proxy Indicator 3:	5 521 160 people reached through science engagement activities by 2019.	15 000	15 000
Proxy Indicator 4:	Three times the number of Masters and PhDs in areas of priority identified in the NRDS and TYIP by 2019 (measured on a 2012 baseline).	80	100
DST Strategic outcome-oriented goal 4	Goal Statement: Over the next five years to derive a greater share of economic growth from R&D-based opportunities and partnerships		
Proxy Indicator 2:	By 2019, additional revenue of R500m generated from firms and companies that are or have received support from DST-funded instruments since 2010.	R 2,9bn	R 2,9bn
Proxy Indicator 3:	By 2019, performance of 10 000 SMEs improved through technology interventions/support.	2 800	3 360
DST Strategic outcome-oriented goal 5	Goal Statement: Over the next five years to accelerate inclusive development through scientific knowledge, evidence and appropriate technology		
Proxy Indicator 2:	Between 2014 and 2019, contribution of technology-based opportunities for local economic development introduced or strengthened in at least five distressed municipalities.	1	1

8.1.3 TIA's Strategic Outcome-Oriented Goals

TIA prepares its Annual Performance Plan in accordance with the National Treasury Strategic Planning Framework and one of the requirements is the formulation of Strategic Outcome-Oriented Goals. Strategic outcome-oriented goals identify areas of institutional performance that are critical to the achievement of the mission. They should stretch and challenge the institution, but must be realistic and achievable. Strategic outcome-oriented goals focus on impacts and outcomes, but in exceptional circumstances may deal with other aspects of performance. A strategic outcome-oriented goal is a statement of intent that is specific, measurable, achievable, relevant and time-bound (SMART). TIA is currently implementing its FY2015/20 Strategic Plan, which was tabled in Parliament in March 2015. In order to position the activities of the Agency within the framework of the NDP and other DST priorities, the Strategic Plan is structured around three strategic outcome-oriented goals that will drive the initiatives of the Agency over the next five years.

These goals are as follows:

- Goal 1: To support the commercialisation of technological innovations;
- Goal 2: To increase infrastructure access for technology development; and
- Goal 3: To stimulate an agile and responsive NSI.

For each of these goals, TIA has defined a number of proxy indicators to measure the progress over the period of the Strategic Plan and the table below shows how these programme objectives are linked.



Table 5 DST Strategic Outcome-oriented Goals linked to TIA Strategic Outcome-oriented Goals, Proxy Indicators, and Programme Strategic Objectives.

DST Strategic Outcome-oriented Goal 4	Using knowledge for economic development
Link to TIA Strategic Outcome Oriented Goal 1: Support the commercialisation of technological innovations	
Strategic outcome-oriented goal statement	<p>Over the next five years, continue to accelerate the development and deployment of technologies into the market to in high impact areas to increase economic competitiveness and socio-economic transformation.</p>
Proxy Outcome indicators	<ul style="list-style-type: none"> • Number of enterprises established and trading 3 years post commercialisation • Revenue generated by enterprises that have received TIA funding • Amount of additional funding secured to expand business operations • Number of jobs created post commercialisation of technology
<p>PROGRAMME STRATEGIC OBJECTIVES SUPPORTING STRATEGIC OUTCOME-ORIENTED GOALS</p> <p>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.</p>	

DST Strategic Outcome-oriented Goal 2 and 3	Increased knowledge generation and human capacity development.
Link to TIA Strategic Outcome-oriented Goal 2: Increase access for technology development	
Strategic outcome-oriented goal statement	<p>Over the next five years, broaden access to advanced technology infrastructure that would enable knowledge and skills transfer to support innovation.</p>
Proxy Outcome indicators	<ul style="list-style-type: none"> • Number of black-owned enterprises receiving technology development support • Reduction in the operating costs for supporting each project • Percentage increase in revenue generated post receiving technology development support.
<p>PROGRAMME STRATEGIC OBJECTIVES SUPPORTING STRATEGIC OUTCOME-ORIENTED GOALS</p> <p>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 access to technical experts.</p>	

DST Strategic Outcome-oriented Goal 1	A responsive, coordinated and efficient NSI	
	Link to TIA Strategic Outcome Oriented Goal 3: Stimulate an agile and responsive NSI	
	Strategic outcome-oriented goal statement	<p>PROGRAMME STRATEGIC OBJECTIVES SUPPORTING STRATEGIC OUTCOME-ORIENTED GOALS</p> <p>To support the development and progression of industry enhancing technologies in cooperation with the broader NSI stakeholders to ensure seamless absorption of technologies to the market.</p> <p>To provide leadership within the NSI on technology innovation and improved alignment to the Agency's mandate.</p>
Proxy Outcome indicators		<ul style="list-style-type: none"> • Number of projects undertaken through partnerships • Amount of funding secured to support technology development through partnerships • Number of interventions made in influencing national policies to enable technology development.

8.1.4 Progress in achieving the Strategic Outcome-oriented Goals

The efforts of all the programmes in TIA are directed towards the realisation of the abovementioned strategic outcome-oriented goals. To date, TIA has continued to perform towards realising these goals against a backdrop of a highly fragmented NSI; a fluid technology landscape which is undermining the work done in managing the investment portfolio; IP leakages caused by a bureaucratic regulatory environment; slow growth rate of the economy and the lack of a private-public appetite for partnerships that can unlock risk funding for technology development and commercialisation. The progress made in achieving the goals is detailed in the section below.

Goal 1 – Support commercialisation of technological innovations

The key objective of TIA is to support the development of ideas and research outputs from proof of concept through to demonstration and pre-commercialisation. For this purpose, TIA invested more than R465m for various technology development projects. In supporting the technology development and pre-commercialisation activities of its funded technologies, TIA also raised additional income of R110m, which was R43m less than the previous year. On the other hand, TIA facilitated the commercialisation of 21 innovations compared to nine in FY2015/16. This represents a 130% increase, demonstrating the relevance of projects that the agency invests in. This has led to the creation of new jobs and the creation of companies producing products and services that are contributing to the economy.

Of TIA's total portfolio funded in FY2016/17, 31 projects advanced by two or more Technology Readiness Levels (TRLs) with some reaching the demonstration stage. This marks an improvement of four above the 27 projects realised in FY2015/16 with the Seed Fund Programme being the key contributor to this result. The remaining MTEF period (FY2018/19 to FY2019/20) will see much emphasis on improving the quality of the portfolio through strengthened internal processes that support the progression of ideas.

Goal 2 – Increase infrastructure access for technology development

TIA provides infrastructure services for technology development through its network of 18 Technology Stations and eight Technology Platforms. These facilities provide technical engineering and scientific support to innovators, entrepreneurs, SMMEs and large industry companies that require research, analytical and testing services to either validate or progress their technologies through the value chain. The financial year under review saw 64 technologies and knowledge-innovation products such as prototypes, patents, technology demonstrators and technology transfer packages supported from these facilities. The technology infrastructure that TIA manages, namely the Centre for Proteomic and Genomic Research (CPGR), Biosafety Platform and Bioprocess facilities, contributed to most of the performance achieved for the period under review. Each of these supported a range of projects to develop technology demonstrators in various scientific and technological disciplines.

The Technology Station Programme (TSP) has continued to deliver effective technology support services to SMMEs, particularly with regards to product and process improvements, prototype development and technology absorption services. The Programme has achieved a slight increase in the number of SMMEs accessing technology infrastructure to 2 261 of which 1 458 were Previously Disadvantaged Individuals (PDIs).

The performance from these programmes highlights the continued demand for such services. TIA has thus commissioned studies to evaluate the impact of these programmes to inform how they may be scaled up and repositioned to contribute to technology localisation which unlocks economic development and inclusive growth.

Goal 3 – Stimulate an agile and responsive National System of Innovation

TIA made concerted efforts in the last financial year to align itself with key partners in the NSI. Much progress has been made to date with respect to embedding its positioning and role within the NSI through multiple engagements with the main and sub-actors within the ecosystem. Key among these is the knowledge-generating community of HEIs, Science Councils and industry partners that support early-stage technology innovation activities. TIA has worked closely with the National Intellectual Property Management Office (NIPMO), National Advisory Council for Innovation (NACI), Centre for Public Sector Innovation (CPSI), Small Enterprise Development Agency (SEDA), in formulating initiatives that lead to unlocking the organisation's value proposition.

TIA portfolio also continued to attract interest from third parties who have invested a total of R182,2m, representing an 86% increase from the previous financial year's R97,9m leveraged to support commercialisation of promising technologies. In addition to funding, TIA continued also to embark on various thought leadership initiatives to inform the national discourse on innovation. Over 56 strategic engagements were undertaken in comparison to 27 in the previous financial year. This increase is attributed to the current macro-economic conditions and fluid nature of the technological landscape which has necessitated increased engagements with key stakeholders in the public and private sector to ensure that both are informed to make decisions to support TIA in its efforts.

8.1.5 TIA's Contribution to the Bio-economy Strategy

The Bio-economy Strategy established by DST seeks to establish an additional economic instrument for the new economy that will, in turn, provide a basis for future growth. "Bio-economy" refers to activities that make use of bio-related innovations, based on biological sources, materials and processes to generate sustainable economic, social and environmental development. In the bio-economy, the innovation system/network, which ranges from ideas, research, development, productisation and manufacturing to commercialisation, aimed to be used to its full potential in a coordinated manner.

The vision is for South Africa's bio-economy to be a significant contributor to the country's economy by 2030, in terms of the GDP, through the creation and growth of novel industries that generate and develop bio-based services, products and innovations, with a corresponding increase in the new and existing companies that provide and utilise these solutions. As a national initiative, the Bio-economy would aim to exploit the existing concentration of skills, expertise, infrastructure and companies across South Africa within the biotechnology environment. In response, TIA aims to stimulate and intensify technology innovation, as well as create an enabling environment in support of increasing the competitiveness of the industry. The transition from the National Biotechnology Strategy (2001) to the Bio-economy Strategy (2013) required a change of focus from developing bio-technologies, to focusing on bio-technology-based applications or solutions that address national priorities and thus have socio-economic impact.

Successful implementation of the Bio-economy Strategy advocates for the participation of various entities and is

dependent on multi-stakeholder collaboration across the innovation value chain and ecosystem by both public and private partners. The Bio-economy contributes significantly to the objectives of the presidency's Nine Point Plan, the NDP, IPAP and a host of other government initiatives that seek to support radical transformation to improve the quality of lives of all South Africans. Implementation of the Bio-economy Strategy aims to pave the way to a more innovative, resource-efficient and competitive society that alleviates the burden of disease, ensures food security and the sustainable use of renewable resources for industrial purposes while ensuring environmental protection. Active national facilitation for the various Bio-economy focus areas, such as Health, Agriculture and Industrial Bio-technology aim to inform research and innovation agendas, contribute to a more coherent policy environment, better interrelations between national and global policies and a more engaged public dialogue.

With respect to the focus areas as articulated in the Bio-economy; TIA's intent for implementation is as follows:

Health

TIA's objective is to support and strengthen the country's local research, development and innovation capabilities within the Health Sector – in collaboration with the Medical Research Council (MRC). By drawing on these capabilities, TIA, in partnership with the relevant government and non-government role-players intends to support the manufacture of active pharmaceutical ingredients, vaccines, bio-pharmaceuticals, diagnostics and medical devices to address the burden of disease, while ensuring a secure supply of essential therapeutics and prophylactics.

The development of new and improved therapeutics, diagnostics and medical devices is a key area of intervention as is the need to strengthen and coordinate the informal herbal medicines market, to grow the African traditional medicines sector, via a value-addition approach through cutting-edge biodiversity-based bioprospecting and product development research.

With this in mind, TIA will adopt the management of the Indigenous Knowledge-Based Bio-Innovation Programme. The Programme will first be rolled out on a pilot scale with management of four projects selected by the DST's Indigenous Knowledge Systems(IKS) management. The future focus of the Programme is to serve as a central point of IKS funding for better management of the national IK-based bio-prospecting pipeline.

The projects of the IK-Based Bio-Innovation Programme are part of the Bio-economy Strategy initiatives. The projects were supported by funding from the Farmer to Pharma budget. These indicated the necessity for the development of commercialisable products, job creation and wealth creation. Therefore, this creates a need to consolidate the National Bio-prospecting Strategy to integrate all fragmented Bio-prospecting initiatives. Furthermore, a long-term funding commitment needs to be earmarked for all Bio-prospecting projects under the Bio-economy Strategy. Thus, the "BioPANZA" (Bio Products Advancement Network South Africa) has been established by the Department of Environmental Affairs (DEA), in collaboration with DST, through the Bio-diversity Delivery Lab, to address these issues in the National Bio-diversity Economy Strategy (NBES) for the bio-prospecting and wildlife sectors.

It is envisaged that BioPANZA will undertake the following tasks:

- Harness the existing bioprospecting initiatives and address the innovation chasm identified by the Bio-diversity Delivery Lab;

- Play an important role in increasing the demand and local value addition of the country's indigenous biological resources, especially for the initially prioritised 25 indigenous plant species;
- Promote applied research, local processing, innovation and product development; and Promote the use and awareness of the plant species in the domestic and international market.

BioPANZA is a co-chaired initiative between the DEA and DST; because TIA is earmarked as one of the organisations that will play a leading role in the BioPANZA, the proposed TIA IKS Programme will be managed under the BioPANZA initiative and will serve as a step towards the consolidation of the National Bio-prospecting Strategy.

Agriculture

The three main objectives for the Agriculture Bio-economy Programme are:

1. To develop and commercialise new crops/plants/animals/aquaculture species – particularly related to indigenous knowledge or species – that offer a greater nutritional content and new market opportunities that will result in job creation and local benefit;
2. To support the ongoing improvement of commercial varieties of plants and animals for sector competitiveness and national food security; and
3. To provide bio-innovation-based knowledge, capacities/skills development, technologies and agricultural support that will underpin the innovativeness, competitiveness and sustainability of the agriculture sector, as per the Agriculture Policy Action Plan (APAP) and the National Development Plan (NDP). The intention is to cover the Agricultural value chain for product development, with most of the activities currently residing in the research and early development phases. As the DST's role in the Bio-economy is for facilitation and coordination, it has become imperative for the DST to appoint an appropriate institution to manage its strategic interventions, from upstream, early stage part to downstream, late stage part of the value chains.

The TIA, by virtue of its mandate, supports Bio-economy interventions. Harmonising efforts between the DST and TIA will support a pipeline of interventions across the value chain and gain more traction from pooling of efforts and a synergistic approach to address gaps and challenges. Strategic intervention or priorities of the Agricultural bio-economy are broadly categorised into crop improvement, animal improvement and cross cutting areas and commodities to be supported under the Agriculture Bio-economy Programme as shown in the diagram below:



Agricultural Growth and employment potential⁷

Therefore, the intention is for TIA to manage the specific programmes on behalf of the DST and align all current and new initiatives to maximise impact going forward.

Industrial Biotechnology (IB)

There is currently no consolidated focus on the area of Industrial Bio-technology within TIA. The intent in the next FY is to develop, with DST, programmes in support of the Industry Bio-technology Sector. The majority of TIA's current support for IB is initiated by the Technology Platforms and the Seed Fund. A larger scale, more deliberate plan would need to be crafted and integrated into the Bio-Economy Workplan.

8.2 External Environment

8.2.1 Global Trends

According to the National Advisory Council on Innovation (NACI) STI indicators for FY2016/17, there are expressions of a World in Transition⁸ in terms of socio-technical change. Four main themes dominate the current discourse and these are namely:

1. Mega trends are evidenced in the emergence of megacities, the effect of climate change on the environment, unresolved geo-political tensions that are escalating the possibilities of new wars, amongst others;
2. Arising Grand Challenges that appear similar across the world with the need to address poverty, hunger, health and well-being, quality education and gender equality, amongst others;
3. Transforming innovations that are constantly evolving leading to disruption in market systems and which are beginning to impact on business models and supply chains; and lastly

⁷ Bureau for Agriculture Policy, 2011, in National Development Plan, 2011.

⁸ National Advisory Council on Innovation (NACI) STI indicators for FY2016/17.

4. Deep transitions in multiple socio-technical systems i.e. there are fundamental changes occurring in the social structure of the world together with the techno-economic framework and the shifts occurring in both has become more interconnected.

There are various indicators that the transition is gaining momentum, however the impact needs to be managed proactively as this could affect the performance of global economies of which South Africa is very much an integral player. As a funder and enabler of technology development, TIA must be agile in preparing for the transitions to enable the country to position itself competitively in response to the changes in the market.

8.2.2 Fourth Industrial Revolution

The term “The Fourth Industrial Revolution” has become common phrase conveying the magnitude of the technological changes underway. These changes have led to rise in the disruption of traditional value chains; shifts in government policies and changes to societal interactions. Progression thereof requires new ways of thinking from all stakeholders, including individuals, business executives, social influencers and policy-makers⁹. In particular, there is need for agility in contending with the change, matching the nimbleness, fluidity, flexibility and adaptiveness of the technologies themselves and the private-sector actors adopting them.

The Fourth Industrial Revolution is still in its early stages, and the potential of new technologies is far from fully understood. There are dynamics at play that allude to the fact that further disruption will emanate from the periphery of industries and organizations. There is need therefore to make concerted efforts to upskill the researchers and have them to embrace an entrepreneurial mindset.¹⁰

TIA is refining all its programmes to ensure that there are relevant and responsive to the evolving needs of the stakeholders in a bid to ensure that they have an enhanced quality of life in a sustainable, inclusive, technologically-driven future.

8.2.3 South African Innovation Landscape

The NACI STI indicators for FY2016/17 reveal that there is slower innovation activity occurring within the NSI landscape. This is evidenced by a decline in the number of patents granted by the US Patent and Trademark Office, down from 151 in 2013 to 144 in 2016.¹¹ Contributing factors to this decline may be attributed to a deficit in higher order skills in design, engineering, entrepreneurship and innovation management. Furthermore, data from the South African National Survey of Intellectual Property and Technology Transfer for Publicly Funded Research Institutions FY2010/11 to FY2014/15 reveals that the Offices of Technology Transfer (OTT), hosted at universities across the country, are under-resourced financially and that 53,5% staff employed have under four years¹² experience for an activity that needs at least 10 years’ experience in mainly IP protection strategies and commercialisation. The OTT’s are expected to comply with all statutory requirements of the IPR Act and make use of a manual system for filling disclosures which makes it difficult to record and report on the activities undertaken.

⁹ The urgency of shaping the Fourth Industrial Revolution Klaus Schwab 18 Jan 2018

¹⁰ The urgency of shaping the Fourth Industrial Revolution Klaus Schwab 18 Jan 2018

¹¹ Ibid.

¹² South African National Survey of Intellectual Property and Technology Transfer for Publicly Funded Research Institutions FY2010/11 to FY2014/15.

TIA has continued to accelerate its mandate by actively engaging with HEIs that continue to have a healthy appetite for the Seed Fund instrument in developing early stage research. To date from FY2014/15, the HEI portfolio has 101 active projects – with 50% on track and 48% contracted but not commenced. The delayed projects are approximately 2% (this is significantly down from the previous year’s 15%). The reasons for the delays are largely attributed to the need to comply with various institutions’ procurement policies. Through the glass project pipeline initiative, TIA will seek to strengthen linkages and formulate more capacity enhancing initiatives with the HEIs and OTTs in a bid to increase the throughput of research outputs that need support for further development.

8.2.4 Science Councils

Science Councils (SCs), such as the Medical Research Council (MRC), Agricultural Research Council (ARC) and Water Research Council (WRC), have sector-specific mandates in health, agriculture and water respectively. 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 basic research represents the most important activity.

The Annual Performance Plans for FY2017/18 for the above-mentioned Science Councils seem to denote that there is generation of research outputs that may need to be supported for commercialisation. For example, the MRC is working on the development of 30 new innovations in Natural Diseases, Devices, Vaccines and Therapeutics; the ARC is working on 22 new technologies to support smallholding farmers and the WRC is working on developing 23 new technologies for water management, 13 of which will be earmarked for commercialisation. TIA has begun to deepen its engagements with the named SCs with a view to create a pipeline for further funding of the innovations developed.

8.2.5 Technology Innovation Enablers

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 to develop innovative solutions for industry-specific needs. The outputs realised by the programme present an opportunity for TIA to collaborate with the THRIP programme by deploying its service offerings to ensure that the products developed are commercialised and supported to reach the market. In the year ahead, TIA will engage with the dti to better understand how the value proposition may serve in commercialising the technologies developed.

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. IPAP FY2017/18-FY2019/20 positions SPII as an enabling instrument to drive creation of new industries given the fact that the 4th Industrial Revolution and disruptive technologies do constitute a clear and present threat to the competitiveness of South African industries. Therefore, a more concerted approach is needed to optimise technology transfer and diffusion to commercialise ‘homegrown’ research and development to bolster key sectors of the economy.

In the year ahead, TIA would seek to leverage its technical expertise in collaboration with the dti SPII programme to enhance the support offered to industry for technology development. Doing so will de-risk commercialisation of innovations to attract higher levels of investment in the productive sectors of the economy directed at key sectors where the country has globally competitive industrial capabilities – e.g. fuel cells; beneficiation and technology-intensive commercialisation initiatives; mining capital equipment; liquid fuels and petrochemicals. Key to unlocking the economic potential in these sectors would be the understanding of the technology gaps in various value chains of the prioritised areas to align to the technologies TIA is developing. The improved coordination will build on existing efforts i.e. the Technology Localisation Programme thus ensuring industries remain competitive and thereby create opportunities for new and emerging black and female entrepreneurs to participate in the economy.

8.2.6 Economic Landscape

For the South African economy to advance along the trajectory set out in the NDP where it can address triple challenges, it will require a strong, coherent and effective NSI, working in a coordinated manner to achieve national priorities. Economic growth is expected to recover slowly, National Treasury is, however, confident that this will rebound over the medium term with mining, manufacturing and agricultural sectors recovering from previous levels of activity.”¹³ In the 2018 budget GDP growth is forecast to grow from 1.5 percent in 2018 to 2.1 percent by 2020.

TIA will continue to engage with the private sector in leveraging funding for projects that are ready for commercialisation. This will be prioritised for sectors outlined in the Government Nine Point Plan and IPAP FY2018/19-FY2019/20; namely Agriculture – agro-processing, Health – vaccines and Mining –beneficiation. This will support emerging SMMEs who are developing innovations to create new industries to realise shared and inclusive growth, encompassing transformation of ownership (equity); substantive management control; and an economic growth that focuses on value-addition and labour-intensity across value chains.

8.2.7 Technology Innovation Funding Landscape

The various actors within the NSI continue to provide risk funding for technology development with the view to progress projects across the innovation value chain. Due to fragmentation of the funding eco-system, however, there has been no cohesive traction generated in the commercialisation of such projects as funding mandates limit the extent to which the different actors may fund. The figure below shows the different funding instruments available in the technology development funding system, this has largely remained unchanged during the last three years:

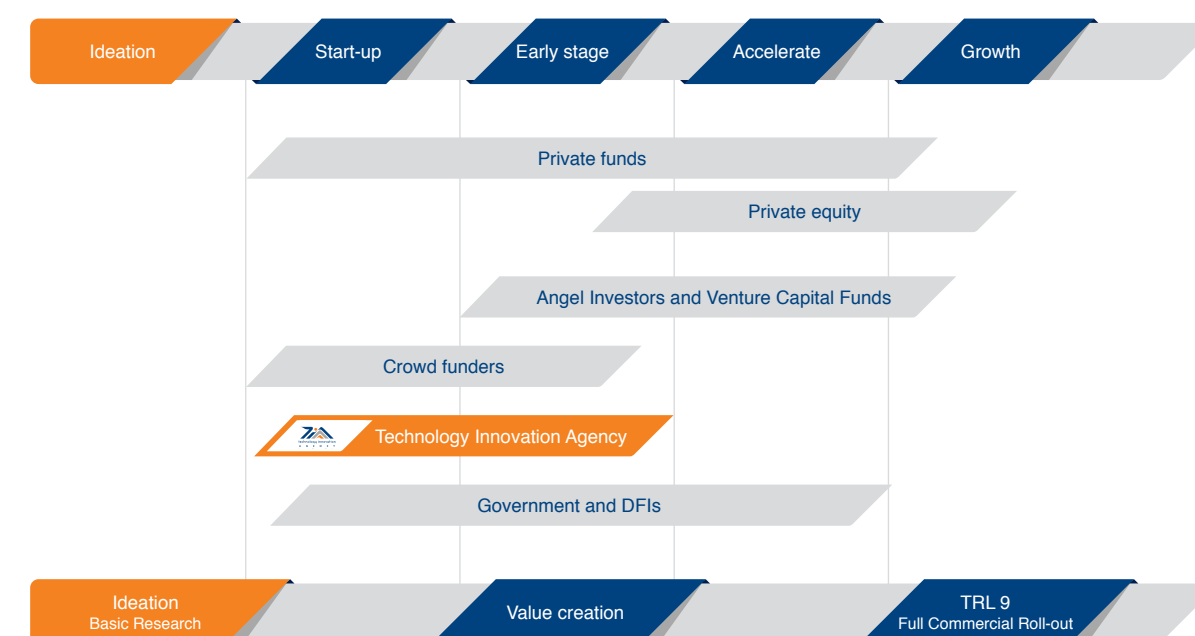


Figure 8 Technology Funding Landscape

According to the outcome of a workshop held in March 2017 and convened by Simodisa, Knife Capital and TIA, the reasons for technology-based start-ups being unable to succeed in commercialising their technology are that:

- Each funder along the innovation value chain has different risk appetite thresholds and given the substantial risk of technology-based projects, few projects are eligible for funding;
- Each funding institution is subject to red tape owing to the need to comply with the numerous regulations and policies which results in lengthy times for investment approval;
- There is little or no collaboration amongst the different funders within the technology eco-system. This is despite the progress made in the development of Venture Capital eco-systems to address the same. This is coupled with the rise of angel investment for technology-based projects in which there should be scope for increased engagement for developing cross institutional synergies. Moreover, Corporate Venturing¹⁴ is slowly entering the funding landscape. However, any investment for this segment would need a superior product or service that is serving a large enough market to attract their interest.

In most instances, the product/service is new and the market development process would not yet be fully mature to meet the requirements for market size quantification made therein. Furthermore, there are far too few successes in the country of tech based start-ups that have penetrated the market that would stimulate interest for technology diffusion. This alone undermines the confidence accessing risk funding, a much stronger engagement is needed in consolidating the funding ecosystem undergirded by an enabling funding framework that is geared towards inclusive growth and capacitating the productive sectors of the economy.

¹³ National Treasury Medium Term Budget Policy Statement dated 25 October 2017.

¹⁴ Corporate Venturing is when established companies source new investment opportunities.

8.2.8 IDC Technology Venture Capital (TVC) Fund

The purpose of the Industrial Development Corporation's (IDC) TVC Fund is to provide funding and business support to small companies at early stages of commercialisation (not development) of innovative products, processes and technologies across all sectors which have the potential to make a significant developmental impact on the South African economy. The fund is administered by the New Industries unit which promotes the establishment of new or emerging sectors in South Africa so as to ensure that the economy is ready to absorb work seekers in the future. The focus industries are namely in additive manufacturing, renewable energy, medical devices, and nanotechnology. For the year ended 31 March 2017, R227m was approved for new investments which represented a 52% increase from the previous year, this included R31.4m for black industrialists and R108m for youth-owned enterprises. It is envisaged that R345m would be approved for FY2018/19¹⁵. The commitment made by the IDC presents opportunities for commercialisation of projects within TIA's portfolio that have reached demonstration phase.

8.2.9 Entrepreneurs

According to the Q1 2017 report of the Small Enterprise Development Agency (SEDA), there has been a 11,2% growth in the number of SMME's in South Africa year on year from 2016Q1 to 2017Q1. Black-owned enterprises account for more than 90% of the increase in the ownership over the past year¹⁶. Despite the growth, most of the enterprises established are in the trade and accommodation, construction and financial services sector instead of technology sectors. TIA is collaborating with SEDA to develop the Centres for Entrepreneurship (CFE) Rapid Incubator Model which is supported by both the dti and Department of Small Business Development. The CFEs are intended to operationalise ideations at Technical Vocational Education and Training (TVET) colleges & HEIs, which mostly host TIA's Technology Stations and Bio-Platforms nationally.

The CFEs have rolled out a visual incubation programme that entails 18 monthly lessons. The programme is intended to upskill entrepreneurs, providing mentoring and accelerators through a pre-Seed Fund (approx. R10K-100K) as a conditional grant before they graduate and progress to the SEDA Technology Incubators and regional SEDA offices. Herein they will be provided with standard enterprise support valued at around R400K in a revolving loan instrument to kick start and establish their enterprises. The CEF programme also provides SEDA Technology Incubators a non-conventional operations fund and grants access to business evaluation tools (such as Growth Wheel, Canvas, Lean start-up and Finfind). The TIA Seed Fund has three incubators on board: Smart Exchange, SAVANT and Invotech as implementation partners that use the same tool towards Enterprise Development Interventions (EDI) to ensure that there is cohesive support for technology entrepreneurs.

¹⁵ Industrial Development Corporation (IDC) Annual Report 31 March 2017.

¹⁶ The Small, Medium and Micro Enterprise Sector of South Africa Quarterly Report 2017 |No1.

8.3 Internal Environment

8.3.1 Socio Economic Impact Assessment

TIA commissioned Urban-Econ Development Economists to conduct an Economic Impact Assessment (EIA) for FY2016/17. The overall purpose of the study was to determine the extent to which the Agency is realising its mandate and to assess the economic impact of the strategic programmes and operations¹⁷. The methodology used to assess the impact conducted was premised on the Social Accounting Matrix (SAM) which is used in the public sector as a reliable model for evaluating socio-economic performance for government programmes.

1. Programme 1: Administration;
2. Programme 2: Innovation Funding and Pre-Commercialisation and Support (IFPCS); and
3. Programme 3: Innovation Enabling & Support (IES).

The overall Agency multiplier, i.e. the multiplying effect of the IFPCS, IES and Administration programmes, is provided next.

Table 6 TIA Multipliers FY2016/17

	Direct	Indirect	Induced	Total
Production	1.00	1.66	0.72	3.38 / R1.00
GDP	0.30	0.54	0.29	1.16/ R1.00
Employment	0.56	2.16	1.08	3.98/ R1m
Income	0.15	0.24	0.13	0.57/ R1.00
Tax	0.15	0.02	0.01	0.17/ R1.00

Source: Urban-Econ Calculations, 2017.

During FY2016/17, a R1.00 spend by the Agency, either through its operations or investment, had a total multiplying effect on the national economy of **R3.38**. Most of the sub-programmes have a lower multiplying effect than the Agency ranging from 2.5 to 3.60 with an average of 3.40. The weighted average multiplying effect of all sectors in the national economy is 3.60, which means that the Agency is just below the average national norm. In the year ahead TIA would provide increased support for technologies within the Biotechnology sector as this is high growth industry with potential for contribution to the national economy. The current total production multiplier is compared to the previous years in the following figure.

¹⁷ Technological Innovation Agency Economic Impact Assessment FY2016/17.

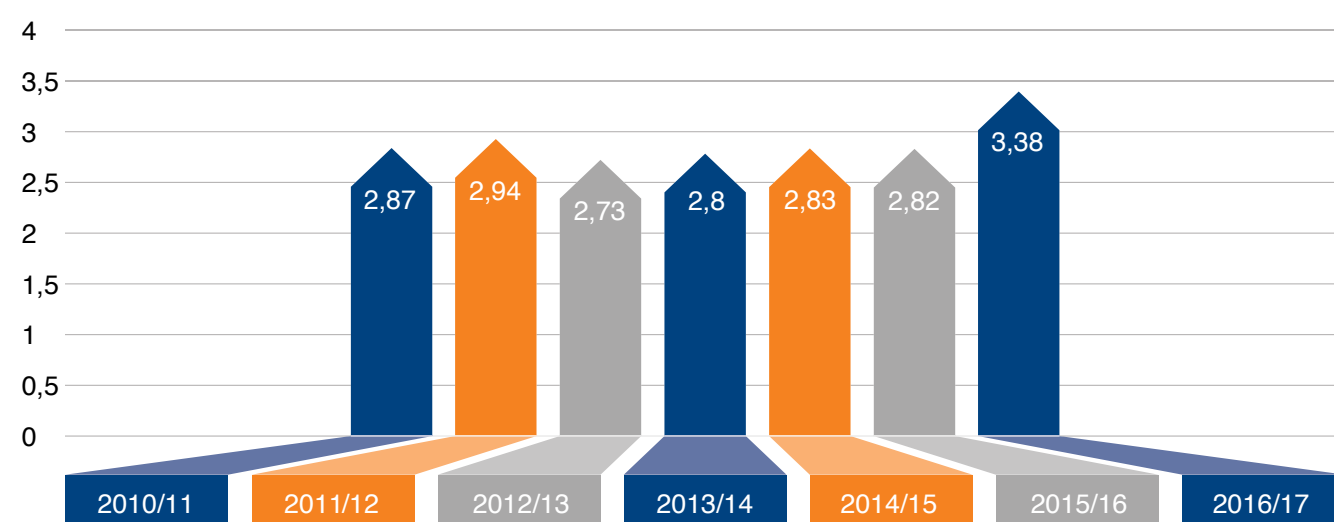


Figure 9 TIA Multipliers Comparison FY 2010/11- 2016/17

Source: Urban-Econ Calculations, 2017.

Overall, TIA's impact on the economy has been relatively constant from 2013/14 and has improved in the latest year. The trend in TIA's impact is seen to be higher in the latest year, which is likely due to the more accurate approach in the SAM modelling, based on the latest national SAM engagements with sub-programme managers, as well as more detailed financial data. Additionally, there may be a significant difference in the expenditure structure (i.e. spending proportion by sector) for the latest year. This is evidenced by the fact that in FY2016/17, the main sectors that TIA expenditure went to included Business Services; Transport and Communication; Trade and Accommodation; and Finance. These sectors have a greater multiplier effect than the core economic sectors and this may have caused a considerable change in the overall multiplier achieved by TIA.

The results revealed the following; overall it can be concluded that the Agency is well into achieving its mandated goals, where it stimulates economic development through its activities that enhance products, services and processes, in addition to increasing production and income, and creating job opportunities. Not only does the Agency provide funding support to innovations, but it also offers significant non-monetary support services in addition to the services related to its strategic roles. These services include validation and advisory services; skills development (particularly entrepreneurial); rural/peri-urban area development; and operational support. Its main goal of enhancing the quality of life in South Africa is also being realised through the growth in available incomes and through the technologies developed that directly influence living standards (e.g. health improvement projects).

8.3.2 Stakeholder Analysis

The last two financial years have seen tremendous shifts in Research, Development and Innovation (RDI) activity, the policy environment, technology entrepreneurship, the innovation funding landscape and the increasing role of the private sector in unleashing the potential of innovation to stimulate productivity and competitiveness. As a middle-income country, South Africa is witnessing dynamic innovation activity, yet it is characterised by paradoxes and contradictions typical of a dual economy.

In executing its mandate, TIA remains alert to these realities. Hence, its stakeholder engagement approach aims to navigate these, identifying opportunities to design interventions and leverage resources to accelerate activity where strong capabilities are evident and focus on capacity building in those areas where deliberate intervention is required. In this regard, a number of key developments that inform TIA's approach to stakeholder engagement are worth highlighting:

- a. The RDI activities in the higher education sector, Science Councils and Research Institutes have increased significantly as these entities are placing greater emphasis on driving their research output to market. The increasing drive to establish and strengthen Technology Transfer capacity at these institutions imply that TIA will increasingly position itself as the first partner of choice in technology commercialisation, yet driving a focused transformation agenda that aims to increase the participation of Previously Disadvantaged Individuals in innovation, innovation management and commercialisation management. TIA will thus continue to work closely with the Vice-Chancellors of RDI at the various institutions, strengthen partnerships with Science Councils, explore ways to increase the impact of the Seed Fund, implement the various Memoranda of Understanding with the South African Technology Network and Southern African Research and Innovation Management Association (SARIMA)
- b. Government has embraced science, technology and innovation as an important instrument in South Africa's economic policy mix towards economic growth, diversification and competitiveness. A range of government departments and institutions, both at national and provincial level, have identified innovation as a key policy instrument to accelerate service delivery and execution of strategic national projects. TIA will thus be engaging with these stakeholders, identifying opportunities to establish effective innovation programmes and supporting the various provincial governments to develop innovation strategies and implementing those that already exist.
- c. DST has initiated a number of strategic Institutional Reviews, including the NSI Review, of its entities, such as TIA. It has also launched the development of a new Decadal Plan and prepared the White Paper on Science, Technology and Innovation. Indications from these processes are that, at the centre of this discourse, is the need to strengthen the productivity of the ecosystem, with a focus on innovation that embraces inclusive development. The role of TIA will be in leading the development of a productive NSI, intensifying the innovation activity. TIA will thus continue to play a key role in these initiatives, providing consistent input, informed by its understanding of innovation activity and key technology trends.
- d. The DST has also launched a range of technology innovation programmes where TIA will work to integrate itself more meaningfully, identifying opportunities for technology innovation that are closely connected to its mandate. A few examples in this regard include, the Fluorochemicals Expansion Initiative; the Hydrogen Fuel Cells Technologies RDI Programme; Titanium Metal Powder; the Indigenous Knowledge-based Community Development projects and various sector-specific RDI Road-Map initiatives.
- e. DST, through its Strategic Plan 2015-2020, has set a goal to strengthen collaboration with the private sector to increase Gross Domestic Expenditure on Research and Development (GERD) from the current 0.8% to 1.5% of GDP by 2020. The various studies on STI-Indicators undertaken by NACI show that the contribution of the business sector to GERD over the last few years has been on the decline, from 58.9% in the FY2008/2009 to 45.9% in the FY2013/14¹⁸. Over the last few years, the Department has implemented several initiatives to encourage business

¹⁸ South African Science & Technology Indicators (NACI) Reports 2013 and 2015.

sector investment in R&D. These include, inter alia, implementing the R&D Tax Incentive Scheme; establishing the Sector Innovation Fund (SIF); and partnering with selected big local corporates and multinational companies to promote industry-led innovation initiatives.

- f. Partnerships with the private sector, therefore, hold immense potential for TIA as key sources of knowledge, innovations, funding and potential customers and platforms for driving a successful commercialisation agenda. In partnering with industry, closer coordination with the DST and the dti will be critical, particularly as the latter is more closely connected to industry, including industry associations, and manages a wide range of incentive schemes to support competitiveness and the revival of ailing industries. TIA will implement a focused “Industry Partnership Programme” that will serve as a blue-print from which to conceptualise and drive targeted initiatives to raise funds; establish industry/sector-specific innovation programmes; create channels for commercialisation of technologies; support innovation skills development and general enterprise development.
- g. Agenda 2063 is a strategic framework for the socio-economic transformation of the continent over the next 50 years. It builds on, and seeks to accelerate the implementation of past and existing continental initiatives for growth and sustainable development. Agenda 2063 has the following aspirations: an integrated continent, politically united and based on the ideals of Pan-Africanism and the vision of Africa’s Renaissance; an Africa of good governance, democracy, respect for human rights, justice and the rule of law; a peaceful and secure Africa; an Africa with a strong cultural identity, common heritage, shared values and ethics; an Africa whose development is people-driven, relying on the potential of African people, especially its women and youth, and caring for children; and Africa as a strong, united and influential global player and partner. These aspirations have priority areas which are aligned to the Sustainable Development Goals.
- h. Lastly, the Venture Capital industry remains one of the most difficult and intractable funding asset classes for technology innovation in South Africa. It is small; operates with limited mandates; remains largely in consolidation mode to drive investments from previous years; its interest is limited to post-revenue, cash-flow generating start-ups and displays little appetite towards early-stage innovations with no proven market traction record. VC around the world is known to bring much-needed market traction for good technologies, strong business acumen and mentorship capacity to the companies they invest in. TIA will keep on focusing on building working relationships with the VC community to support TIA’s Business Readiness and Market Readiness Level interventions. In the medium- to long-term, TIA will work to develop a working model with the VC community that acknowledges and locates its investment decisions squarely in the context of a developmental state and a possible joint-funding model that will incentivise greater VC participation in TIA’s portfolio. DST has initiated a process to establish a Sovereign Innovation Fund that will serve to crowd-in private sector investment, including VC as a mechanism to accelerate the commercialisation of promising South African technologies, including their international deployment. The imperative for this approach arises out of the necessity to intervene in an ecosystem characterised by high rates of attrition and start-up failure; a very small local venture and angel capital market; a risk-averse institutional investment environment and; the evident predatory behaviour of the international venture capital community that has identified South Africa as an incubator for promising high tech-start-up companies for recruitment to their home countries.

8.4 Organisational Environment

TIA will focus on developing the organisation as an employer of choice by creating and nurturing a culture of quality and high-performance through the development and growth of the Human Resource capacity; identifying and developing IT platforms that will enhance communication and effectiveness of every employee; analysing the business effectiveness and efficiency and defining business improvement plans across the organisation; managing information and knowledge; and providing a healthy, safe and secure office environment.

Transforming the culture of TIA towards a high-performance culture has been a very slow process due to a legacy system that was flouted with uncertainty, unfairness and inconsistency related to process execution, system utilisation and specifically the performance management system. The performance management system of TIA focused on the completion of the process rather than on empowering employees to achieve the expected results of the organisation. A transformational leadership void, poor integrated processes, silo execution and a lack of integrated information for decision-making have been the biggest challenges in transforming the culture of the organisation.

According to the World Economic Forum (WEF) report on “*The Future of Jobs*” (Jan 2016), on average more than a third of the desired core skill sets of most occupations will be comprised of skills that are not yet considered crucial to the job today. This will require a transformational approach to the management of Human Capital by building flexible, broad and proactive systems for job profiling, performance management and career development, moving away from the more transactional approach of hierarchical silo organisational structures to more collaborative and integrated team oriented structures, where job profiles are flexible enough to support an agile response to environmental customer and stakeholder needs and requirements. The performance management system must focus more on empowering employees to achieve the expected results and manage the associated risks, developing career paths that can respond to the new skills and competency required for technology and enterprise development. A more outward planning approach is becoming more important to address the demands of inventors, innovators and entrepreneurs.

The various business units in TIA’s Corporate Services will focus on how to redesign itself and implement a service delivery approach aligned to becoming a partner to the business, understanding the needs of the organisation as well as the demands from customers and stakeholders in the NSI and the transformation required by TIA. Therefore, the orientation of HR, IT, Facilities and Management Services is one of responsiveness to both immediate and long-term business needs, providing both operational excellence and strategic insight. The focus for FY2018/19 will be on:

- a. Developing a more flexible and agile workforce that will be responsive to the continuous change required by a modernising organisation and an increasingly challenging NSI eco-system.
- b. Optimising the organisational structure and associated job profiles by enhancing the integration between IFPCS and IES through the development of a value chain and process management measurement approach.
- c. Entrenching a high-performance culture within the organisation through the transformation of the performance management system, and the implementation of TIA Competency Framework used in all elements of talent management from talent attraction and talent retention to performance management;

- d. Continuous business process improvement by adopting the ISO 9001 Quality Management System with a focus on customer satisfaction;
- e. Implement and maintain a healthy, safe and secure office environment that will support and nurture the development of an innovative, creative and high-performing workforce;
- f. Full implementation of Integrated Business intelligence – to develop a single performance management and decision-making dashboard, extracting and collating information from functional systems.
- g. Optimisation of the technology and information architecture to enhance and/or automate Strategic Planning, Monitoring & Evaluation (M&E) and Stakeholder Management.

TIA seeks to inculcate a high-performance culture by redesigning the organisational processes and create a lean organisational structure. The lean organisational design will require a mind-set shift and collaborative approach in the execution of TIA mandate. Therefore, a three-year transformation plan will be developed to identify the relevant organisational cultural values and behavioural norms required to support implementation of a fluid and lean organisational structure. In addition, job analysis and evaluation will be conducted to ensure that the job profiles and performance objectives are aligned to the redesigned organisational process. This will include a change management strategy that will facilitate transition from the current to the desired organisation. The competency framework will be redesigned to encapsulate the emerging organisational capabilities and competencies. Ultimately, TIA will develop a Resource Plan that will capacitate the fluid, lean and agile organisational structure.

8.5 Description of Strategic Planning Process

TIA started its planning process for FY2018/19 in July 2017. The process was managed by the Planning, Risk, Intelligence, Monitoring and Evaluation (PRIME) unit which reviewed the international and domestic political, technological, economic and social landscape and formulated scenarios to inform the strategic planning context.

The first engagement was from 17-19 July 2017 with the Board and TIA Executives in which critical consideration was given to the operating environment: voice of the shareholder; voice of the stakeholder; key programme outcomes and performance management. During October and November 2017, a weeklong operational planning session was held with each program and sub-program to inform the strategic outputs for the following financial period. The outputs were consolidated in the preparation of this Annual Performance Plan.

A meeting was held on 8 November 2017 in which the TIA executive management team engaged with the DST officials to reflect on the first draft of the Annual Performance Plan and to refine the inputs into the second draft based on the comments received on the first draft. The DST's comments on the second draft were incorporated into the final draft and submitted in January 2018 for consideration by the Minister of Science of Technology.

9. PLANNED STRATEGIC INITIATIVES

In executing its strategy therefore, TIA's approach for the financial year will continue to be framed within the three high performance drivers of "Teamwork", "Impact" and "Accountability", pursuing specific programmes to anchor TIA's mandate deliberately with government programmes, increasing industry participation, increasing greater coordination and collaboration amongst NSI players and stimulating a culture of innovation within the NSI. In so doing, the Agency will pay particular attention to several key principles underpinning its strategy:

- a. A **transformation agenda** that seeks to increase the participation of previously disadvantaged individuals in the NSI;
- b. An **inclusive innovation agenda** that leads to impact on rural communities, the township economies and improvements in service delivery all of which should help TIA to respond to the needs of the poor (the Inclusive Innovation Development (IID) programme); and
- c. The **full deployment of the TIA mandate** that extends TIA's reach to all sectors beyond the traditional biotech and industrial sectors.

The tables below articulate how each strategic programme will contribute to this: ¹⁹



¹⁹ The planned initiatives are currently being formulated and would be finalised by January 2018.

Table 7 Programme 1 Administration FY2018/19 Planned Strategic Initiatives

Name of Programme	Programme Objectives	TIA Performance Driver	Transformative Initiatives	Transactional Initiatives
Administration – Corporate Services	Develop a working environment that is conducive to continuous change.	Teamwork Role clarification and alignment of job profiles to the overall strategic objective of the organisation.	Building a service orientated partnership model with business and employees. Establish cross-programme objectives.	Create job profiles that are more broad and flexible. Leadership development across the whole organisation (Leading oneself, leading others, leading the organisation through change).
		Impact Implement impact outcomes into the Performance Management System.	Implement change initiatives that will ensure buy-in towards the development of a high-performance culture that will have a transformational impact on the NSI. Build business intelligence and market intelligence capacity.	Implement the current defined Talent Strategy Initiatives e.g. succession planning and mentorship programme. Implementation of Business Intelligence tool that will provide on-time and on-line management information for improved decision-making.
		Accountability Develop an improved Performance Management System.	Develop a service-orientated Performance Management System that will measure performance on-time based on the impact of the service on the recipient of the services through 360 measurement tools.	Calibrate individual performance indicators to Annual Performance Plan indicators. Replace annual performance scoring to bi-quarterly performance assessment and scoring.

Table 8 Programme 2 Innovation Funding and Pre-Commercialisation FY2018/19 Planned Strategic Initiatives

Name of Programme	Programme Objectives	TIA Performance Driver	Transformative Initiatives	Transactional Initiatives
Innovation Funding and Pre-Commercialisation Support (IFPCS)	To fund and support the development of technology-based products and services and their commercialisation in an effective and efficient manner.	Teamwork Engagement with follow-on funders.	Integrate and have all funding instruments in one programme. Incorporate the funding requirements of the Innovation Funding and Pre-Commercialisation Support (IFPCS) funding instruments into the criteria of upstream funders. TIA pro-actively engages with Development Finance Institutions (DFIs) and partners with them in co-investment in technology development and pre-commercialisation activities.	Implement the “Transition of Projects from Investment Enabling & Support (IES) to IFPCS” model. Hold a yearly conference/workshop to determine which projects from the R&D conducting institutions IFPCS can consider for funding.
			TIA proactively identifies which Internal Development Finance Institutions (IDFIs) to partner with and when and determines the terms of such partnership.	TIA continues to be responsive to invitations by IDFI to co-invest and/or co-implement programmes such as the Global Clean Innovation Programme (GCIP). TIA continues to have an incidental relationship with Venture Capital in South Africa.
	Optimise the outputs and outcomes from technology development and pre-commercialisation activities.	Accountability As such, any law, legislation and regulations that have the potential to impact negatively on innovation would impact TIA the most.	TIA needs to build capacity to research and determine points of change in legislation, National Policies and Regulations that negatively impact on its mandate.	Participate in any change of legislation, National Policies and Regulations that affect TIA as invited by the initiating government department or institution.

Table 9 Programme 3 Innovation Enabling and Support FY2018/19 Planned Strategic Initiatives

Name of Programme	Programme Objectives	TIA Performance Driver	Transformative Initiatives	Transactional Initiatives
Innovation Enabling Support Programmes (IES)	The IES Programme's purpose is to enable and stimulate a culture of innovation in the NSI with an aim to build a vibrant and enabled ecosystem.	Teamwork	Working interactively on a combination of financial and non-financial programmatic interventions designed with stakeholder engagement and validation.	
		Impact	<p>Create leading genome-scale Next Generation Sequencing offering in Africa.</p> <p>Build premiere Precision Medicine process-solution and value proposition for research, translational and diagnostics markets in Africa.</p> <p>Boost Genomics capacity in Africa through quality services and collaborative projects.</p>	<p>The impact of improved meat quality on the SA economic indicators is favourable in terms of trade for export with a premium classification of livestock as a result of breeding by gene selection.</p> <p>Position TIA as the SEDA- endorsed GCIP accelerator model nationally for acceleration rollout for all SEDA incubators.</p>
		Accountability Build capacity in local institutions to improve the investor readiness of tech innovation start-ups.		<p>Identify the individual capacity to be developed in each incubator</p> <p>Contract GCIP international and local trainers to develop and facilitate training of staff in the methodology.</p>

9.1 Strategic Stakeholder Engagement Initiatives

The table below outlines the planned engagements for FY2018/19

Table 10 Planned Strategic Stakeholder initiatives FY2018/19

Focus Area	Activities	Indicator	Reporting Timelines
Hub & Spoke Model	Stakeholder consultations with various national Departments and affected stakeholders for establishment of targeted innovation programmes	6 partnerships established	Quarterly
	Leverage partnerships with SOE's to implement technology innovation programmes	Partnerships established with 3 SOEs.	Quarterly
	Establish partnerships with selected industry associations to implement targeted industry-specific innovation programmes	2 industry-specific partnerships	Quarterly
Glass Pipeline Model	Implement <i>backward integration</i> partnerships programme with HEIs, Science Councils and selected industry partners	80 technologies supported	Quarterly
	Establish <i>forward Integration</i> partnerships to leverage third party funding with key institutional and private sector funders	R50m raised in Third Party Funding	Quarterly
International Partnerships	Promote the internationalisation and market access for TIA supported projects	30 projects promoted	Quarterly
	Leverage resources investment into STI through challenge-led innovation programmes	3 partnerships established	Quarterly
	Implement initiatives to promote innovation in the African continent	5	Quarterly

Focus Area	Activities	Indicator	Reporting Timelines
International Partnerships	Facilitate TIA's membership of key international networking platforms	Membership secured	Annually
Thought Leadership	Launch TIA Network Fridays programme as a monthly event to promote collaboration in the NSI	8 events	Quarterly
	Organise and host one Signature Conference (e.g. Innovation Bridge) to promote match-making amongst NSI players	1	Annually
	Establish subject specific Thematic Networks on selected key technology areas	4	Monthly
Marketing & Communications	Undertake roadshows in rural communities and townships to showcase TIA's capabilities and promote a culture of innovation	20 communities reached	Quarterly
	Launch promotional campaign to increase awareness about TIA's offerings to key stakeholders	1 m customers reached	Quarterly
	Launch a campaign to communicate TIA's success stories through electronic and print media	50 stories	Quarterly
	Showcase TIA's success through the Parliament Connect Programme	3 initiatives	Quarterly

10. OVERVIEW OF THE FY2018/19 BUDGET AND MTEF ESTIMATES

TIA has made significant adjustments over the last couple of years to accommodate the reduction in MTEF allocations. The Agency has restructured and realigned the staff structure to accommodate the financial challenges, and is constantly making a bigger impact as demonstrated by the result of the independent economic impact assessment. The aspirational strategic objectives and the challenges set by the new Board does, however, impose certain pressure on the budget and the capacity within the entity. These challenges are captured in more detail below:

10.1 Administration costs

The total administration and employee costs reduced from R211m in FY2013/14 to R189.7m in FY2018/19, decreasing the efficiency ratio²⁰, from 36% to 35% in the same period. The efficiency ratio was introduced to control budget allocations for administration and project disbursements. The approved ratio of 70/30 (ie 70% of the total budget received is to be allocated for developing innovations, and 30% is to be used for administration costs), was readjusted to 65/35 to allow for additional staff resources to enable the Agency to reach the growth targets in the following three years.

Administration costs reduced by 24% from R94m in FY2013/14 to R71m in FY2018/19 due to cost reductions and savings in consultancy fees, rental costs, utilities and IT-related costs. Employee costs will slightly increase from R117m in FY2013/14 to R118m in FY2018/19. To enhance efficiency, TIA is currently embarking with a Work Study process to evaluate the productivity, to recommend improvements in processes and structure and to indicate the ideal number of staff required for each business unit.

10.2 Investment funding

The plan is to disburse R102m towards Innovation Funding and Pre-Commercialisation towards technology development. This will be paid to technology development agreements committed in previous financial years which when aggregated will utilise around 60% and the remaining 40% will be allocated to new projects that will be assessed through the application and due diligence process.

An amount of R136m is allocated for the Innovation Enabling Funding where TIA will continue to support the strategic programmes and sub-programmes. The Innovation Enabling programmes are funded through the Bio-economy allocation from the DST amounting to R91m and TSP allocation amounting to R38m. The balance of the amount will be sourced through contract specific income and other income.

A further amount of R108m will be allocated to specific contracts with R21m allocated towards IFPCS and R86m towards IES.

The Bio-economy allocation received is R165m and will be distributed according with the Bio-economy work plan. The Agency will fund a further R37m through funding derived from other income.

²⁰ The definition of efficiency ratio is administration costs as a percentage of total expenditure.

10.3 Other income

The entity will continue to focus on obtaining other sources of income to support all strategic programmes. This will be done through specific contracted funds from the DST and other government institutions and through partnerships with the private sector. A new business unit, namely Corporate Relations and Strategic Engagements, which will be fully operational in 2018/19, was created to focus on leveraging partnerships which would lead to additional income streams for the agency.



Table 11 TIA MTEF Budget FY2018/19 to FY2019/20 as per Allocation Letter

	2018/19			2019/20			2020/21		
	Baseline	Bio-economy	TSP	Baseline	Bio-economy	TSP	Baseline	Bio-economy	TSP
	R'000	R'000	R'000	R'000	R'000	R'000	R'000	R'000	R'000
Funding:									
Allocation letter	216 305	165 678	38 339	217 858	185 516	40 486	229 840	195 719	42 713
Other Income	79 470	36 813	-	112 069	40 931	-	144 855	63 144	-
	295 775	202 491	38 339	329 927	226 447	40 486	374 695	258 863	42 713
Utilisation									
	295 775	202 491	38 339	329 927	226 447	40 486	374 695	258 863	42 713
Administration									
Support and infrastructure cost	177 590	12 104	-	188 197	12 879	-	198 704	13 686	-
Human Resources	69 840	1 210	-	73 982	1 331	-	77 636	1 446	-
	107 750	10 894	-	114 216	11 547	-	121 068	12 240	-
IFPCS									
	44 215	57 804	-	38 125	70 008	-	43 674	74 955	-
IES									
Technology Platforms	9 000	89 270	38 339	16 605	85 560	40 486	18 317	94 222	42 713
Technology Station Programme	-	55 270	-	-	57 465	-	-	62 000	-
ISD	-	-	38 339	-	-	40 486	-	-	42 713
YTIP	-	5 000	-	-	5 000	-	-	6 000	-
TICP	-	3 000	-	-	3 000	-	1 000	3 000	-
Seed fund	6 500	10 000	-	9 605	7 395	-	9 311	8 688	-
GCIP	-	14 000	-	6 000	9 000	-	6 000	10 000	-
Thought leadership	1 500	2 000	-	-	3 700	-	1 466	2 534	-
	1 000	-	-	1 000	-	-	540	2 000	-
Consortium based/Specific funding	64 970	43 313	-	87 000	58 000	-	114 000	76 000	-
Surplus/ (Deficit)	-	-	-	-	-	-	-	-	-

Table 12 Overview of 2017/28 Budget and MTEF Estimates and Expenditure Trends

R'000	Audited outcome		Estimate	MTEF Estimates		
Programme	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Administrative	130 470	134 275	154 351	189 694	201 076	212 390
IFPCS	126 333	113 448	97 769	102 019	108 133	118 629
IES	252 424	351 692	196 581	136 609	142 651	155 253
Specific contracted: IFPCS	-	-	10 156	21 657	29 000	38 000
Specific contracted: IES	-	-	40 626	86 626	116 000	152 000
Total	509 227	599 415	499 483	536 605	596 860	676 272
Goods and services	46 913	45 601	54 452	71 050	75 313	79 082
Compensation of employees	83 557	88 674	99 899	118 644	125 763	133 308
Transfers	378 757	465 140	345 132	346 911	395 784	463 882
Total	509 227	599 415	499 483	536 605	596 860	676 272

The *expenditure* trends of TIA are given below (extract of the Estimates of National Expenditure)

Table 13 Vote expenditure trends by Programme and economic classification

R'000	Annual budget	Audited outcome	Annual budget	Audited outcome	Annual budget	Estimate	Outcome/Annual budget average (%)
Programme	2015/16	2016/17	2017/18	2014/15 - 2017/18			
Administrative	141 659	130 470	159 675	134 275	154 351	154 351	91%
IFPCS	183 606	126 333	148 942	113 448	97 769	97 769	91%
IES	168 045	252 424	207 791	351 692	196 581	196 581	174%
Specific contracted: IFPCS	-	-	-	-	-	10 156	
Specific contracted: IES	-	-	-	-	-	40 626	
Total	493 310	509 227	516 408	599 415	448 701	499 483	

*The Administrative costs were managed below budget due to cost savings mainly in travel, consultant, depreciation and IT costs. Staff costs further contributed to the saving due to TIA appointing fewer employees when compared to the approved structure caused by challenges in finding the right people at the right cost for the Agency. Further challenges were experienced with an outdated structure that did not support the ambitions of the Agency. These savings, together with the IFPCS disbursing less than what was planned for, was allocated to the IES division to stimulate future technology innovation.

Table 14 Entity Budget

Efficiency ratio	Audit outcome 2016/17 R' 000	Audit outcome 2015/2016 R' 000	Estimate 2017/18 R' 000	Budget 2018/19 R' 000	Budget 2019/20 R' 000	Budget 2020/21 R' 000
Administration	130 470	134 275	154 351	189 694	201 076	212 390
Support and infrastructure cost	46 913	45 601	54 452	71 050	75 313	79 082
Human Resources	83 557	88 674	99 899	118 644	125 763	133 308
Investments	378 757	465 140	345 132	346 911	395 784	463 882
Innovation Funding and Pre Commercialisation and support	126 333	113 448	97 769	102 019	108 133	118 629
Innovation Enabling and support	252 424	351 692	196 581	136 609	142 651	155 253
New initiatives/Specific contracts	-	-	50 782	108 283	145 000	190 000
- IFPCS	-	-	10 156	21 657	29 000	38 000
- IES	-	-	40 626	86 626	116 000	152 000
Total expenditure	509 227	599 415	499 483	536 605	596 860	676 272
Total funding	462 929	492 455	499 483	536 605	596 860	676 272
Allocation from DST	385 188	382 364	396 732	420 322	443 860	468 272
Additional income target	60 385	94 500	92 751	108 283	145 000	190 000
Interest income	17 356	15 591	10 000	8 000	8 000	18 000
Surplus/Deficit	-46 298	-106 960	-	-	-	-
Capex allocation:		7 000	7 000	7 000	7 000	7 000

10.4 Budget Allocation per Programme

Table 15 Budget outlined per Programme 1 Administration

R'000	Audited outcome		Estimate	MTEF Estimates		
Programme	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Administrative	130 470	134 275	154 351	189 694	201 076	212 390
Goods and services	46 913	45 601	54 452	71 050	75 313	79 082
Compensation of employees	83 557	88 674	99 899	118 644	125 763	133 308
				189 694	201 076	212 390

Table 16 Budget outlined per Programme 2 Innovation Funding and Pre-Commercialisation

R'000	Audited outcome		Estimate	MTEF Estimates		
Programme	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
IFPCS	126 333	113 448	97 769	102 019	108 133	118 629
Specific contracted	-	-	-	21 657	29 000	38 000
Respresented by Transfers	126 333	113 448	97 769	123 676	137 133	156 629

Table 17 Budget outlined per Programme 3 Innovation Enabling and Support

R'000	Audited outcome		Estimate	MTEF Estimates		
Programme	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Technology Platforms	67 118	76 485	56 112	55 270	57 465	62 000
Technology Station Programme	83 433	123 740	81 969	38 339	40 486	42 713
Innovation Skills Development	21 154	16 458	5 000	5 000	5 000	6 000
Youth Technology Innovation	5 249	15 871	5 000	3 000	3 000	4 000
Technology Innovation Programmes	4 344	40 110	16 500	16 500	17 000	18 000
Seed Fund	70 297	71 958	29 000	14 000	15 000	16 000
GCIP			1 000	3 500	3 700	4 000
Thought Leadership	829	7 070	2 000	1 000	1 000	2 540
Specific contracted initiatives	-	-	40 626	86 626	116 000	152 000
Total	252 424	351 692	237 207	223 235	258 651	307 253
Respresented by Transfers	252 424	351 692	237 207	223 235	258 651	307 253

PART B: PROGRAMME AND SUB-PROGRAMME PLANS

11. PROGRAMME 1: ADMINISTRATION

11.1 Strategic Overview

The Corporate Services Division is an internal support function with the employee as its primary customer. The purpose of the Division is to create an enabling environment for the development of a high-performance culture by nurturing and growing the Human Resource capacity; identifying and developing an IT platform that will enhance communication and the effectiveness of every employee; building TIA knowledge management architecture for preservation and management of TIA's intellectual assets: knowledge and information; and providing a healthy, safe and secure office environment.

The Corporate Service Division, therefore, contributes directly to the Strategic Objective (SO) 3: *To develop an effective and efficient internal environment to successfully execute the strategy* and has defined the following objectives:

- To build and capacitate an organisational structure that will provide the appropriate capability and capacity aligned to execute TIA strategy.
- To develop a high-performance culture by providing integrated HR services that will attract, develop and retain motivated, committed and competent staff.
- To establish a secure and cost-effective Information Technology environment that will enable access and availability of relevant data, records and information to all.
- To establish a facilities management and physical security management capability that will ensure compliance to all health, safety and environmental legislation and policies.
- To identify and recommend areas of business improvement through the provisioning of business analysis services including business process re-engineering, knowledge management and implementation of a Quality Management System.

Programme Objective	Risk Description	Mitigation Action
To build and capacitate an organisational structure that will provide the appropriate capability and capacity aligned to execute TIA strategy.	Inability to attract and retain key staff	Review Employee Value proposition Optimise Talent review process by: <ul style="list-style-type: none"> Implementing dual career path development Implementing succession planning Optimising the trainee programme
To develop a high-performance culture by providing integrated HR services that will attract, develop and retain a motivated, committed and competent workforce.	Failure to implement adequate and appropriate HR services/initiatives that will contribute to the development of a high-performance culture	Conduct annual remuneration benchmark to ensure TIA maintain a competitive and market-related remuneration and reward framework Conduct annual talent review Implementation of the competency framework for recruitment, training and development and career planning
To establish a secure, cost-effective and well-run IT operation that is recognised for its responsiveness, flexibility, and effectiveness.	Lack of access to and availability of technology infrastructure and information to enable the business of TIA	Manage and optimise the application portfolio to support the business operations requirements and business information needs e.g. CRM, M&E system and Document Management solutions

To establish a facilities and security management capability that will ensure compliance to all health, safety and environmental legislation and policies.	Lack of providing healthy, secure and safe office space	Ensure full compliance to the OHS Act Implementation of physical security services and access control in accordance with MISS and MPSS
To identify and recommend areas of business improvement through the provision of business analysis services including business process re-engineering, work-study and the implementation of quality management initiatives.	Poor availability of information, records and documentation	Implementation of the work-study recommendations Maintenance and update of the ISO 9001 certification Implementation and optimisation of the integrated Business Intelligence Solution

STRATEGIC OBJECTIVE 3: To develop an effective and efficient internal environment to successfully execute the strategy ¹							
DST Strategic Outcome	Outputs	Performance Indicator	Strategic Target 2015-2020	Audited/ Actual Performance 2016/17	Estimated performance 2017/18	Medium-Term Targets	Forecast
Strategic focus area 1: To optimise its financial resources and implement initiatives for business and investment process improvement							
Strategic Outcome-Oriented Goal 1: A responsive, coordinated and efficient NSI	Efficient and effective investment management processes	3.1 Investment approval turnaround time	14 Weeks	12 Weeks and 2 days	16 Weeks	15 Weeks	14 Weeks
		3.2 Amount of funds utilised for projects and programmes as a percentage of the total actual expenditure	70%	77%	68%	65%	69%

STRATEGIC OBJECTIVE 3: To develop an effective and efficient internal environment to successfully execute the strategy.							
Performance Indicators		Reporting period	Annual target	Quarterly targets			
				Quarter 1	Quarter 2	Quarter 3	Quarter 4
Strategic focus area 1: To optimise its financial resources and implement initiatives for business and investment process improvement							
3.1	Investment approval turnaround time	Quarterly	15 Weeks	15 Weeks	15 Weeks	15 Weeks	15 Weeks
3.2	Amount of funds utilised for projects and programmes as a percentage of the total actual expenditure	Quarterly	65%	5%	15%	22%	23%

12. PROGRAMME 2: INNOVATION FUNDING AND PRE-COMMERCIALISATION AND SUPPORT

12.1 Strategic Overview

The Innovation Funding and Pre-Commercialisation Support Programme will continue to provide both financial and non-financial support to projects that have the dual objective of developing, new, improved, novel or/and innovative products (includes products, services and processes) with the intention to have them commercialised.

In order to do that efficiently, the programme will intensify the review of its processes to ensure that it achieves its objectives within a customer-friendly amount of time while providing the appropriate amount of rigour in the processing of projects.

The IFPCS programme seeks to drive the following initiatives in a bid to strengthen the division's offering:

12.1.1 Co-Investment with DFIs in most projects/programmes

As part of the continuing drive to optimise downstream integration, the programme will seek to ensure that most projects in the TIA portfolio are co-invested with other DFIs (Development Finance Institutions), such as the IDC, NEF, Venture Capital, etc. This will facilitate the downstream integration between TIA and the DFIs' funding instruments.

12.1.2 Transition of Projects from IES to IFPCS Innovation Funding and Pre-Commercialisation Support – Internal Upstream Integration

In the outgoing year, 2017/18, an emphasis was placed on the integration of TIA technology development and pre-commercialisation activities with those of institutions that fund and conduct activities upstream and downstream of the TIA mandate. Several meetings were held with such institutions and a working model has been put in place, where annually, discussions will be held to review the effectiveness of the integration efforts. These institutions include the CSIR (Council for Scientific and Industrial Research), MINTEK (Council for Mineral Technology), NECSA (Nuclear Energy Corporation of South Africa), the ARC (Agriculture Research Council), and the WRC (Water Research Council). These efforts will continue into the future with the intention to institutionalise them.

A model for the integration which provides the modalities has been developed. Within the present organisational structure, TIA will put in place and implement a process and a procedure to deliberately facilitate and manage the transition of projects from the upstream funding instruments such as the Seed Fund to the downstream funding instruments such as the TDF and the PCSF.

12.1.3 Rapid Innovation/Finance Fund

This financial instrument, which has been set up in the previous year, will be consolidated and when opportune ramped up. It is envisaged lessons learnt from implementation that will provide insight on how the fund can be continually improved for optimum impact.

12.1.4 Focused Investment: Chosen Industries and Value Chain

TIA investments in projects fall within various parts of the value chain in a particular technology area of choice. Going forward, TIA will strive towards absolute alignment of all funding instruments and programmes such that they reinforce one another by funding projects in the selected/chosen industry sectors (clusters) technological areas, and value chains.

12.1.5 Focused and dedicated management of investments in the Commercialisation Phase

TIA mandate, from the perspective of the IFPCS, is only primarily fulfilled when the projects being funded culminate in the successful commercialisation of the product developed. Hence projects that have reached their investment objectives and are in their post-investment phase, must be managed through an adequately resources and capable team. In this regard, a review of the management of such projects will be conducted to inform how dedicated resources can be put in place to ensure optimum management and extraction and protection of TIA return on investments in projects in this phase.



Department Strategic Objective	Risk Description	Mitigation Action
To fund and support the development of technology-based products and services and their commercialisation in an effective and efficient manner.	Project Failures: Generic investment risks on all projects.	Adequate resources required for better, dedicated Project Monitoring and post-investment.
	Inadequate Capacity of Deal Teams: Inadequate number of internal experts on technology, commercialisation, legal and IP issues relating to investments under consideration.	Focus all activities of current Deal Teams solely on this activity and urgently fill vacancies in bottleneck areas such as IP and Legal. Obtain external and temporary additional resources for due diligence. Separate Corporate and Investment legal resources such that there can be dedicated legal resources for investments.
	Inadequate Project Pipeline.	Active portfolio mining of projects from science councils, HEI Technology Transfer Offices (TTOs) etc.
To foster vertical integration of TIA's activities in the innovation ecosystem (NSI).	Upstream integration: Projects in upstream institutions are not ready or do not fit TIA's requirements.	Pro-actively clarify the criteria TIA uses to evaluate projects' eligibility for funding and communicate this interactively with the institutions before applications are lodged with TIA. Review Standard Operating Procedures for processing projects and ensure that they are fit-for-purpose and give TIA the desired results. Have briefing sessions to explain TIA processes and criteria for project selection. Influence performance indicators for universities to move towards or incorporate innovation outcomes.

	Downstream integration: TIA funded projects are not suitable or ready for funding by downstream institutions.	Ensure that the criteria for the up-take and funding of the commercialisation of projects from TIA by downstream DFIs are communicated, clarified and agreed to with the DFIs pro-actively.
Optimise the outputs and outcomes from technology development and pre-commercialisation activities whilst optimising the funding process and the spending of available funds.	Under-disbursement of allocated funds: Not able to disburse funds as planned due to a weak pipeline or projects not meeting milestones put as conditions for disbursements.	Build a very strong pipeline of eligible projects from various sources. Obtain external and temporary additional resources for due diligence. Master the attrition rate of projects and plan accordingly for an adequate pipeline.
	Projects funded yield developed technologies that are not commercialisable.	Ensure an effective commercial due diligence process and evaluation system; and Develop a support system for the projects funded.
To form collaborative relationships for co-investment with interested parties in the NSI.	Limited co-investment by other investors in TIA projects. TIA absorbing 100% risk in investments.	Pro-actively lobby and solicit co-investment in TIA projects by potential private and public investors. Put in place a process/system for the specific management and monitoring of this activity. Co-investment makes TIA-funded projects more attractive to investors for follow-on funding.
	Investment approval turnaround time is longer than the allowed maximum.	Always look for ways of shortening the approval turnaround time. Pro-actively engage potential applicants and workshop, where practical, to ensure understanding of the requirements; and Obtain external resources where necessary to ameliorate internal resource constraints.
Optimise the outputs and outcomes from technology development and pre-commercialisation activities.		

	Key staff resigning from the Department. Slow pace of recruitment processes.	Work with HR to ensure the speeding up of the recruitment process even for temporary or staff seconded to TIA.
	Lack of attractiveness of TIA's offer to potential recruits.	TIA HR to ensure that the recruitment process is efficient and remuneration is market-related. HR to rely on appropriate and sector-relevant benchmarks.
Develop and create robust processes to ensure rigour in the processing of projects requesting funding from TIA.	The need for rigour may result in prolonging approval turnaround times.	Ensure that there is a balance between rigour and speed in decision-making. Develop processes stratified in accordance with the risk of exposure for TIA.
	Delegation of authority may not allow expedited processes for the speedy approval of projects.	Review the DoA to ensure that it enables any endeavour to expedite the processing of projects.

12.3 Programme 2 - Innovation Funding and Pre-Commercialisation MTEF Performance Indicators and Targets for FY2018/19

STRATEGIC OBJECTIVE 1: To provide technology development funding and support in strategic, high-impact areas.							
DST Strategic Outcome	Outputs	Performance Indicator	Strategic Target 2015-2020	Audited/ Actual Performance 2016/17	Estimated performance 2017/18	Medium-Term Targets	Forecast
Strategic Outcome- Oriented Goal 4: Using knowledge for economic development	Progress in the development of technology	1.1 Number of technologies, processes or services advancing by one ² or more TRL levels ³	51	11	13	14 15	15
	Products, Processes, Services and Start-up Companies;	1.2 Number of innovation project outputs taken up in the market	43	9	10	7 ⁴ 8	9
	Positive technology-balance of payment; Economic growth; Improved quality of life						
Strategic Outcome- Oriented Goal 5: Knowledge utilisation for inclusive development	Increasing co-investment and leveraging of TIA funds	1.3 Amount of additional funding attracted into TIA's portfolio ⁵	R327m	R97.6m	R66m	R94m R100m	R110m
	Products, Processes, Services and Start-up Companies	1.4 ⁶ Amount of income recognised ⁷	n/a ⁸	n/a	n/a	R24m R30m	R36m

STRATEGIC OBJECTIVE 2: To provide thought leadership and an enabling environment for Technology Innovation in collaboration with other role-players.									
DST Strategic Outcome	Outputs	Performance Indicator	Strategic Target 2015-2020	Audited/ Actual Per- formance 2016/17	Estimated performance 2017/18 2018/19	Medium-Term Targets		Forecast	
						2019/20	2020/21		
Strategic Outcome-Oriented Goal 1: A responsive, coordinated and efficient NSI	Creation of employment and employment opportunities	2.1 ⁹	Number of knowledge innovation products produced as a result of TIA funding and support programmes, consisting of:	8 ¹⁰	n/a	4	4	4	
		2.1b	Intellectual Property	n/a	n/a	4	4	4	
	Innovation skills development	2.5	Number of Technology Innovation initiatives undertaken by TIA, consisting of:	n/a	n/a	5	9	13	
		2.5a	Conference papers	n/a	n/a	0	0	1	
		2.5b	Presentations	n/a	n/a	2	2	2	
Strategic Outcome-Oriented Goal 4: Using knowledge for economic development	Innovative product, processes and services supporting economic growth	2.5c	Policy recommendations	n/a	n/a	0	1	1	
		2.5d	Panel discussions	n/a	n/a	3	3	5	
		2.5e	Position papers	n/a	n/a	0	1	1	
		2.5f	Publications	n/a	n/a	0	0	1	
		2.5g	Think tanks	n/a	n/a	0	1	1	
		2.5h	Keynote addresses (speeches)	n/a	n/a	0	1	1	

12.4 Programme 2 - Innovation Funding and Pre-Commercialisation Quarterly Performance Indicators and Targets for FY2018/19

STRATEGIC OBJECTIVE 1: To provide technology development funding and support in strategic, high-impact areas.									
No	Performance Indicators	Reporting period	Annual target	Quarterly targets					
				Quarter 1	Quarter 2	Quarter 3	Quarter 4		
1.1	Number of technologies, processes or services advancing by one or more TRL levels	Quarterly	14	1	3	5	5		
1.2	Number of innovation project outputs taken up in the market	Quarterly	7	1	1	2	3		
1.3	Amount of additional funding attracted into TIA's portfolio	Quarterly	R94m	R19m	R21m	R24.5m	R29.5m		
1.4	Amount of income recognised	Quarterly	R24m	R2m	R4m	R6m	R12m		

STRATEGIC OBJECTIVE 2: To provide thought leadership and an enabling environment for Technology Innovation in collaboration with other role-players.							
No	Performance Indicators	Reporting period	Annual target	Quarterly targets			
				Quarter 1	Quarter 2	Quarter 3	Quarter 4
2.1	Number of knowledge innovation products produced because of TIA funding and support programmes, consisting of:	Quarterly	4	1	1	1	1
2.1b	Intellectual Property	Quarterly	4	1	1	1	1
2.5	Number of Technology Innovation initiatives undertaken by TIA, consisting of:	Quarterly	5	1	1	1	2
2.5a	Conference papers	Quarterly	0	0	0	0	0
2.5b	Presentations	Quarterly	2	0	1	0	1
2.5c	Policy recommendations	Quarterly	0	0	0	0	0
2.5d	Panel discussions	Quarterly	3	1	0	1	1
2.5e	Position papers	Quarterly	0	0	0	0	0
2.5f	Publications	Quarterly	0	0	0	0	0
2.5g	Think tanks	Quarterly	0	0	0	0	0
2.5h	Keynote addresses (speeches)	Quarterly	0	0	0	0	0

12.5 Programme 2 - Innovation Funding and Pre-Commercialisation MTEF Performance Indicators, Annual and Quarterly Targets for FY2018/19 per indicator per unit

Performance Indicator		Quarterly targets 2018/19				Medium-Term Targets		Forecast
		Quarter 1	Quarter 2	Quarter 3	Quarter 4	2018/19	2019/20	2020/21
1.1	Number of technologies, processes or services advancing by one or more TRL levels	1	3	5	5	14	15	15
Energy		0	0	1	1	2	2	1
Information Communication Technology		0	1	1	0	2	2	2
Advanced Manufacturing		0	0	1	1	2	2	2
Natural Resources		0	1	1	1	3	3	6
Agriculture		1	1	0	1	3	3	4
Health		0	0	1	1	2	3	0
1.2	Number of innovation project outputs taken up in the market	1	1	2	3	7	8	9
Energy		1	0	0	0	1	2	2
Information Communication Technology		0	0	0	1	1	1	2
Advanced Manufacturing		0	1	1	0	2	2	2
Natural Resources		0	0	1	0	1	1	1
Agriculture		0	0	0	1	1	1	1
Health		0	0	0	1	1	1	1

1.3	Amount of additional funding attracted into TIA's portfolio	R19m	R21m	R24.5m	R29.5m	R94m	R100m	R110m
Energy		R2m	R2.5m	R4m	R5.5m	R14m	R16m	R18m
Information Communication Technology		R2m	R2.5m	R3m	R4.5m	R12m	R12m	R14m
Advanced Manufacturing		R2m	R3m	R2.5m	R2.5m	R10m	R9m	R11m
Natural Resources		R3m	R3m	R4m	R5m	R15m	R16m	R18m
Agriculture		R6m	R6m	R6m	R7m	R25m	R26m	R27m
Health		R4m	R4m	R5m	R5m	R18m	R21m	R22m
1.4	Amount of income recognised	R2m	R4m	R6m	R12m	R24m	R30m	R36m
Energy		R0m	R1m	R2m	R0m	R3m	R4m	R6m
Information Communication Technology		R0m	R2m	R0m	R2m	R4m	R4m	R6m
Advanced Manufacturing		R0m	R0m	R2m	R2m	R4m	R4m	R6m
Natural Resources		R2m	R1m	R1m	R2m	R6m	R6m	R6m
Agriculture		R0m	R0m	R1m	R2m	R3m	R6m	R6m
Health		R0m	R0m	R0m	R4m	R4m	R6m	R6m
2.1 Number of knowledge innovation products produced as a result of TIA funding and support programmes, consisting of:								
2.1b	Intellectual Property	1	1	1	1	4	4	
Energy		0	1	0	1	2	1	
Information Communication Technology		0	0	0	0	0	1	
Advanced Manufacturing		0	0	1	0	1	0	

Natural Resources		0	0	0	0	0	0	1
Agriculture		1	0	0	0	1	0	0
Health		0	0	0	0	0	0	1
2.5 Number of Technology Innovation initiatives undertaken by TIA, consisting of:								
2.5a	Conference papers	0	0	0	0	0	0	0
Energy		0	0	0	0	0	0	0
Information Communication Technology		0	0	0	0	0	0	0
Advanced Manufacturing		0	0	0	0	0	0	0
Natural Resources		0	0	0	0	0	0	0
Agriculture		0	0	0	0	0	0	0
Health		0	0	0	0	0	0	0
2.5b	Presentations	0	1	0	1	2	2	0
Energy		0	1	0	1	2	2	0
Information Communication Technology		0	0	0	0	0	0	0
Advanced Manufacturing		0	0	0	0	0	0	0
Natural Resources		0	0	0	0	0	0	0
Agriculture		0	0	0	0	0	0	0
Health		0	0	0	0	0	0	0
2.5c	Policy recommendations	0	0	0	0	0	1	0
Energy		0	0	0	0	0	1	0

Information Communication Technology	0	0	0	0	0	0	0	0	0	0
Advanced Manufacturing	0	0	0	0	0	0	0	0	0	0
Natural Resources	0	0	0	0	0	0	0	0	0	0
Agriculture	0	0	0	0	0	0	0	0	0	0
Health	0	0	0	0	0	0	0	0	0	0
2.5d	1	0	0	1	1	1	1	3	3	0
Energy	0	0	0	0	1	1	1	1	1	1
Information Communication Technology	1	0	0	0	0	0	0	1	1	1
Advanced Manufacturing	0	0	0	1	0	0	1	1	1	1
Natural Resources	0	0	0	0	0	0	0	0	0	0
Agriculture	0	0	0	0	0	0	0	0	0	0
Health	0	0	0	0	0	0	0	0	0	0
2.5e	0	0	0	0	0	0	0	0	1	0
Energy	0	0	0	0	0	0	0	0	1	1
Information Communication Technology	0	0	0	0	0	0	0	0	0	0
Advanced Manufacturing	0	0	0	0	0	0	0	0	0	0
Natural Resources	0	0	0	0	0	0	0	0	0	0
Agriculture	0	0	0	0	0	0	0	0	0	0
Health	0	0	0	0	0	0	0	0	0	0
2.5f	0	0	0	0	0	0	0	0	0	0
Publications	0	0	0	0	0	0	0	0	0	0

Energy	0	0	0	0	0	0	0	0	0	0
Information Communication Technology	0	0	0	0	0	0	0	0	0	0
Advanced Manufacturing	0	0	0	0	0	0	0	0	0	0
Natural Resources	0	0	0	0	0	0	0	0	0	0
Agriculture	0	0	0	0	0	0	0	0	0	0
Health	0	0	0	0	0	0	0	0	0	0
2.5g	0	0	0	0	0	0	0	0	1	0
Energy	0	0	0	0	0	0	0	0	0	0
Information Communication Technology	0	0	0	0	0	0	0	0	0	0
Advanced Manufacturing	0	0	0	0	0	0	0	0	0	0
Natural Resources	0	0	0	0	0	0	0	0	0	0
Agriculture	0	0	0	0	0	0	0	0	0	0
Health	0	0	0	0	0	0	0	0	1	1
2.5h	0	0	0	0	0	0	0	0	1	0
Energy	0	0	0	0	0	0	0	0	0	0
Information Communication Technology	0	0	0	0	0	0	0	0	0	0
Advanced Manufacturing	0	0	0	0	0	0	0	0	0	0
Natural Resources	0	0	0	0	0	0	0	0	0	0
Agriculture	0	0	0	0	0	0	0	0	1	1
Health	0	0	0	0	0	0	0	0	0	0

13. PROGRAMME 3: INNOVATION ENABLING AND SUPPORT

13.1 Department Strategic Overview

TIA **Innovation, Enabling and Support** (IES) provided a cluster and collaborations-based approach ideally needed for better interpretation on principles and practices that balance:

- a** incubation team compositions with
- b** mass customisation; and
- c** pre-industrialisation manufacturing (MRL),
- d** technology and/or products (TRL) and
- e** business models (BRL) for our beneficiaries to be successful in innovation to markets.

Thought Leadership Interventions for enabling an ecosystem

Systematic interventions for an enabling environment: Skills profile for the future and capacity development; National platforms coordination; Consortia, Clustering and PPPs; Advocacy, policy guidance and enabling publications; Marketing and Exposure; and Governance and Regulation for Certifications.

Beyond the funding Gaps:

Today, there is widespread recognition of the need to extend the approach in ways that will further improve knowledge exchange and the impact of public research capacities. Innovators and tech-based enterprises face specific issues and concerns, which differ from those of larger companies with funding opportunities and a network with well-established professional support systems. It has been observed that in South Africa there is a poor culture of collaborative research that requires improvement of flexibility to adopt innovative business models to develop and grow and thereby enhance SMMEs contribution to the economy.

The potential for effective partnering between knowledge-based institutions and government agencies (including TIA and SMMEs) will depend on the following factors:

- Visibility of the SET expertise: it is extraordinarily difficult to identify skills and talent;
- Excellence: in Science and Technology (as key motivator) and in interdisciplinary skills;
- Proximity: being within reach creates a dynamic ecosystem, development infrastructure and service provision;
- Strategic engagement between organisations: other strategic thought leadership engagements that will enhance the facilitator, connector and enabler roles.

The basic aim and desired output of the proposed IES Operationalisation approach in FY2018/19 is to enhance the ability of the all TIA programmes to boost the SMME's innovativeness, growth and competitiveness through access to high-end technology and equipment, infrastructure and relevant skills, expertise and technological support in a clustering concept.

Enterprise Development Support for NSI

The IES has a revised focus on Enterprise Development Support (EDS) initiatives strengthening critical thinking capabilities within the NSI to enable the progression of technologies from proof of concept stage through to pre-commercialisation (from TRL level 3-8). It also wishes to build commercialisation capabilities for the Technology Transfer and Commercialisation activities within TIA, its Investees, Technology Transfer Offices and the wider NSI. This initiative has the direct intention of developing scientists and engineers through a mentored specialised internship that comprises experiential learning, formal training and dedicated mentoring support for each candidate. The programme is tailored to fast track candidate development in a two-year timeframe.



IES Division	Risk funds and programmes contributed to	Activities and Commitments of TIA
INNOVATION Funding Support:	Seed Fund (SF)	Direct investment in technology spin-off companies to be incubated in new Industrial Clusters with coordination, collaborations and networking strength. Facilitating the localisation and export (GCIP 2.0) of linkage mentors and potential business partners for take-off agreements.
Business ENABLING Services: Enterprise Development Support (EDS)	ISD, GCIP, YTIP and Thought Leadership	Technology Entrepreneurship, Markets Evaluations, Acceleration, assisting in the identification/early-stage innovative local technologies for nurturing, offering critical thinking skills. The Internship Programme is imbedded for IP and Innovation management, business (Technology Entrepreneurship) and technical skills (SETIIP)
Technology SUPPORT Services:	Technology Platforms and TSP	The Technology Station and Biotech Platform nationally provides development infrastructure and SET expertise to HIEs for Idea to Prototypes and Product Development, Minimum Viable Products (MVP), Technology Demonstrators and Piloting to evaluate techno-economics for scale-up and market entry strategies.

13.2 Programme 3: Innovation Enabling and Support MTEF Performance Indicators and Targets for FY2018/19

STRATEGIC OBJECTIVE 1: To provide technology development funding and support in strategic, high-impact areas.						
DST Strategic Outcome	Outputs	Performance Indicator	Strategic Target 2015-2020	Audited/ Actual Performance 2016/17	Estimated performance 2017/18	Medium-Term Targets 2018/19 2019/20 2020/21
Strategic Outcome-Oriented Goal 4: Using knowledge for economic development	Progress in the development of technology	1.1 Number of technologies, processes or services advancing by one or more TRL levels	51	20	13	14 15 16
	Products, Processes, Services and Start-up Companies; Positive technology-balance of payment; Economic growth; Improved quality of life	1.2 Number of innovation project outputs taken up in the market	8 ¹¹	n/a	n/a	4 4 4

Strategic Outcome-Oriented Goal 5: Knowledge utilisation for inclusive development	Increasing co-investment and leveraging of TIA funds	1.3	Amount of additional funding attracted into TIA's portfolio	R224m	R84.6m	R47m	R53m	R57m	R72m
	Products, Processes, Services and Start-up Companies	1.4	Amount of income recognised	n/a	n/a	n/a	R84.3m	R115m	R154m

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

DST Strategic Outcome	Outputs	Performance Indicator	Strategic Target 2015-2020	Audited/ Actual Performance 2016/17	Estimated performance 2017/18	Medium-Term Targets		Forecast 2020/21
						2018/19	2019/20	
Strategic Outcome-Oriented Goal 1: A responsive, coordinated and efficient NSI	Creation of employment and employment opportunities	2.1	342	64	83	87	96	113
		Number of knowledge innovation products produced as a result of TIA funding and support programmes, consisting of:						
	Innovation skills development	2.1a	n/a	25	42	46	49	57
		2.1b	n/a	10	9	6	8	10
		2.1c	n/a	17	30	33	36	40
Strategic Outcome-Oriented Goal 3: Human capital development	Innovative product, processes and services supporting economic growth	2.1d	n/a	12	2	2	3	6
		Technology transfer packages	n/a	12	2	2	3	6
Strategic Outcome-Oriented Goal 3: Human capital development	2.2	Number of knowledge innovation products produced by TIA supported programmes receiving additional funding ¹²	122	25	27	30	33	36

		2.3	Number of Small, Medium, and Micro Enterprises receiving technology support ¹³	14 200	2 261	2 800	3 360	3 840	4 000
Strategic Outcome-Oriented Goal 4: Using knowledge for economic development		2.4	Number of PDI owned SMMEs assisted as a percentage of total SMMEs supported, receiving funding, and support and/or technology services from TIA. ¹⁴	69%	64.4%	65%	67%	69%	75%
Strategic Outcome-Oriented Goal 4: Using knowledge for economic development	Creation of employment and employment opportunities	2.5	Number of Technology Innovation initiatives undertaken by TIA, consisting of:	97	56	31	32	34	41
		2.5a	Conference papers	2	0	1	1	1	1
	Innovation skills development	2.5b	Presentations	40	21	10	10	12	14
		2.5c	Policy recommendations	2	2	1	1	0	1
	Innovative product, processes and services supporting economic growth	2.5d	Panel discussions	16	8	7	6	7	6
		2.5e	Position papers	1	0	1	1	0	1
		2.5f	Publications	4	5	1	1	1	1
		2.5g	Think tanks	31	19	9	11	13	16
		2.5h	Keynote addresses (speeches)	1	1	1	1	0	1

13.3 Programme 3 Innovation Enabling and Support Performance Indicators and Targets for FY2017/18

STRATEGIC OBJECTIVE 1: To provide technology development funding and support in strategic, high-impact areas.									
No	Performance Indicators	Reporting period	Annual target	Quarterly targets					
				Quarter 1	Quarter 2	Quarter 3	Quarter 4		
1.1	Number of technologies, processes or services advancing by one or more TRL levels	Quarterly	14	2	3	3	6		
1.2	Number of innovation project outputs taken up in the market	Quarterly	4	1	1	1	1		
1.3	Amount of additional funding attracted into TIA's portfolio	Quarterly	R53m	R1.5m	R14.5m	R16m	R21m		
1.4	Amount of income recognised	Quarterly	R84.3m	R10m	R10m	R20m	R44.3m		

STRATEGIC OBJECTIVE 2: To provide thought leadership and an enabling environment for Technology Innovation in collaboration with other role-players.									
Performance Indicators		Reporting period	Annual target	Quarterly targets					
				Quarter 1	Quarter 2	Quarter 3	Quarter 4		
Number of knowledge innovation products produced as a result of TIA funding and support programmes, consisting of:		Quarterly	87	9	20	24	34		
Prototypes developed		Quarterly	46	7	11	13	15		
Intellectual Property		Quarterly	6	0	0	1	5		
Technology demonstrators developed		Quarterly	33	2	9	10	12		
Technology transfer packages		Year-end	2	0	0	0	2		
Number of knowledge innovation products produced by TIA supported programmes receiving additional funding		Quarterly	30	3	5	10	12		

Performance Indicator		Quarterly targets 2018/19				Medium-Term Targets		Forecast
		Quarter 1	Quarter 2	Quarter 3	Quarter 4	2018/19	2019/20	2020/21
1.1	Number of technologies, processes or services advancing by one or more TRL levels	2	3	3	6	14	15	16
Youth Technology Innovation Programme		0	0	0	0	0	0	0
Technology Innovation Cluster Programme		0	0	0	0	0	4	4
Technology Platforms Programme		0	0	0	1	1	1	2
Seed Fund Programme		0	1	1	2	4	5	5
Innovation Skills Development Programme		0	0	0	0	0	0	0
Technology Stations Programme		2	2	2	3	9	5	5
1.2	Number of innovation project outputs taken up in the market	1	1	1	1	4	4	4
Youth Technology Innovation Programme		0	0	0	0	0	0	0
Technology Innovation Cluster Programme		0	0	0	0	0	0	0
Technology Platforms Programme		0	0	0	0	0	0	0
Seed Fund Programme		1	1	1	1	4	4	4
Innovation Skills Development Programme		0	0	0	0	0	0	0
Technology Stations Programme		0	0	0	0	0	0	0
1.3	Amount of additional funding attracted into TIA's portfolio	R1.5m	R14.5m	R16m	R21m	R53m	R57m	R72m

Youth Technology Innovation Programme	R0m	R0m	R0m	R0m	R0m	R0m	R0m	R2m
Technology Innovation Cluster Programme	R0.5m	R0.5m	R1m	R1m	R1m	R3m	R0m	R0m
Technology Platforms Programme	R1m	R14m	R15m	R20m	R50m	R57m	R60m	
Seed Fund Programme	R0m	R0m	R0m	R0m	R0m	R0m	R0m	
Innovation Skills Development Programme	R0m	R0m	R0m	R0m	R0m	R0m	R0m	
Technology Stations Programme	R0m	R0m	R0m	R0m	R0m	R0m	R10m	
1.4	Amount of income recognised	R10m	R10m	R20m	R44.3m	R84.3m	R115m	R154m
Youth Technology Innovation Programme	R0m	R0m	R0m	R1m	R1m	R1m	R1m	R2m
Technology Innovation Cluster Programme	R0m	R0m	R1m	R1m	R2m	R2m	R2m	R3m
Technology Platforms Programme	R0m	R0m	R1m	R1m	R2m	R2m	R2m	R3m
Seed Fund Programme	R0m	R0m	R4m	R6m	R10m	R10m	R10m	R15m
Innovation Skills Development Programme	R0m	R0m	R1m	R1m	R2m	R2m	R2m	R3m
Technology Stations Programme	R0m	R0m	R13m	R20m	R33m	R33m	R34m	
The Strategic Engagements and Corporate Relations Unit ¹⁵	R10m	R10m	R0m	R14.3m	R34.3m	R65m	R94m	
2.1 Number of knowledge innovation products produced as a result of TIA funding and support programmes, consisting of:								
2.1a	Prototypes Developed	7	11	13	15	46	49	57
Youth Technology Innovation Programme		2	3	2	3	10	11	13
Technology Innovation Cluster Programme		0	0	0	0	0	0	0
Technology Platforms Programme		1	2	3	3	9	11	14
Seed Fund Programme		0	0	0	0	0	0	0

Innovation Skills Development Programme	0	0	0	0	0	0	0	0	0	0	0	0
Technology Stations Programme	4	6	8	9	27	27	30					
2.1b Intellectual Property	0	0	1	5	6	8	10					
Youth Technology Innovation Programme	0	0	0	2	2	3	4					
Technology Innovation Cluster Programme	0	0	0	0	0	0	0					
Technology Platforms Programme	0	0	0	1	1	2	3					
Seed Fund Programme	0	0	1	2	3	3	3					
Innovation Skills Development Programme	0	0	0	0	0	0	0					
Technology Stations Programme	0	0	0	0	0	0	0					
2.1c Technology demonstrators developed	2	9	10	12	33	36	40					
Youth Technology Innovation Programme	0	0	0	0	0	0	0					
Technology Innovation Cluster Programme	0	3	3	3	9	9	10					
Technology Platforms Programme	2	3	4	6	15	18	19					
Seed Fund Programme	0	0	0	0	0	0	0					
Innovation Skills Development Programme	0	0	0	0	0	0	0					
Technology Stations Programme	0	3	3	3	9	9	11					
2.1d Technology transfer packages	0	0	0	2	2	3	6					
Youth Technology Innovation Programme	0	0	0	0	0	0	0					
Technology Innovation Cluster Programme	0	0	0	1	1	2	3					

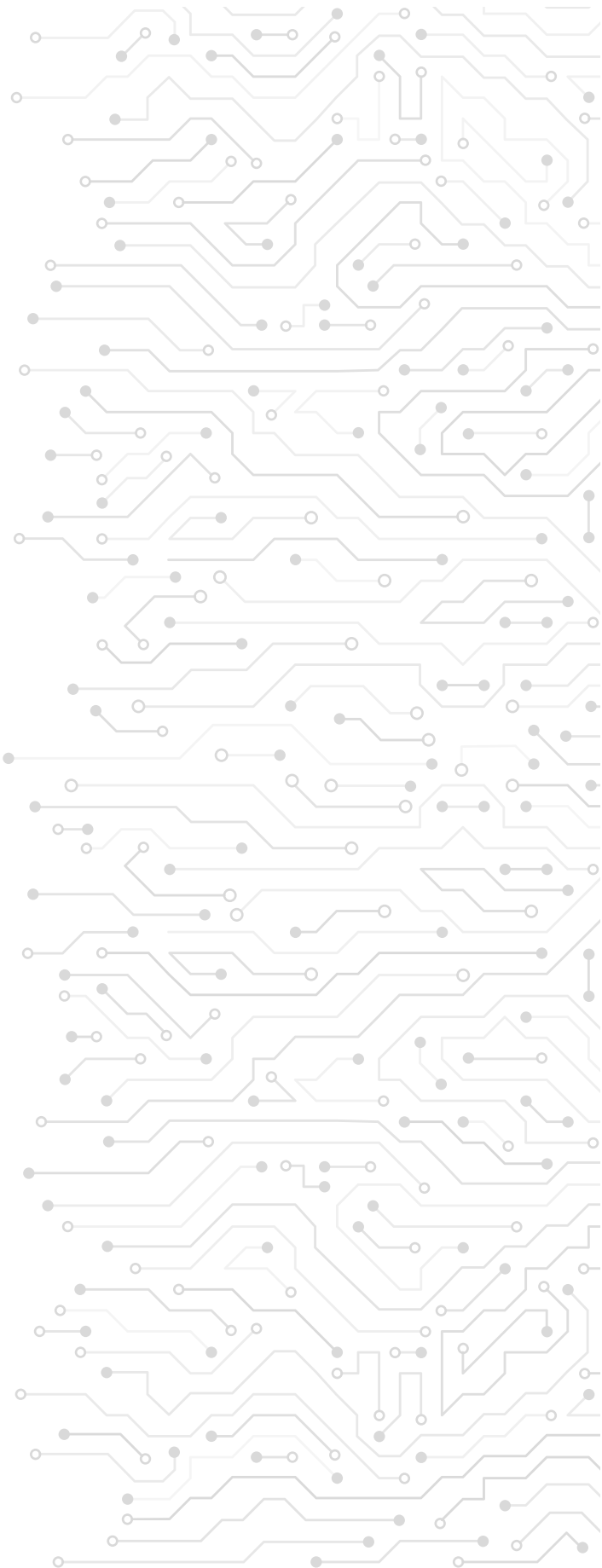
Technology Platforms Programme	0	0	0	0	0	0	0	0	0	0	0	0
Seed Fund Programme	0	0	0	0	0	0	0	0	0	0	0	0
Innovation Skills Development Programme	0	0	0	0	0	0	0	0	0	0	0	0
Technology Stations Programme	0	0	0	0	0	0	0	0	0	0	0	0
2.2 Number of knowledge innovation products produced by TIA supported programmes receiving additional funding	3	5	10	12	30	33	36					
Youth Technology Innovation Programme	0	0	0	0	0	5	6					
Technology Innovation Cluster Programme	0	1	2	2	5	6	6					
Technology Platforms Programme	0	0	1	1	2	8	8					
Seed Fund Programme	1	1	2	2	6	6	7					
Innovation Skills Development Programme	0	0	0	0	0	0	0					
Technology Stations Programme	2	3	5	7	17	8	9					
2.3 Number of Small, Medium, and Micro Enterprises receiving technology support	840	840	840	840	3 360	3 840	4 000					
Youth Technology Innovation Programme	0	0	0	0	0	0	0					
Technology Innovation Cluster Programme	0	0	0	0	0	0	0					
Technology Platforms Programme	0	0	0	0	0	0	0					
Seed Fund Programme	0	0	0	0	0	0	0					

Innovation Skills Development Programme	0	0	0	0	0	0	0	0	0	0
Technology Stations Programme	840	840	840	840	840	3 360	3 840	4 000		
2.4	Number of PDI owned SMMEs assisted as percentage of total SMMEs supported, receiving funding, and support and/or technology services from TIA.	10%	17%	20%	20%	67%	69%	75%		
Youth Technology Innovation Programme		0%	0%	0%	0%	0%	0%	0%		
Technology Innovation Cluster Programme		0%	0%	0%	0%	0%	0%	0%		
Technology Platforms Programme		0%	0%	0%	0%	0%	0%	0%		
Seed Fund Programme		0%	0%	0%	0%	0%	0%	0%		
Innovation Skills Development Programme		0%	0%	0%	0%	0%	0%	0%		
Technology Stations Programme	10%		17%	20%	20%	67%	69%	75%		
2.5 Number of Technology Innovation initiatives undertaken by TIA, consisting of:										
2.5a	Conference papers	0	0	0	1	1	1	1		
Youth Technology Innovation Programme		0	0	0	0	0	0	0		
Technology Innovation Cluster Programme		0	0	0	0	0	0	0		
Technology Platforms Programme		0	0	0	1	1	1	1		
Seed Fund Programme		0	0	0	0	0	0	0		
Innovation Skills Development Programme		0	0	0	0	0	0	0		
Technology Stations Programme		0	0	0	0	0	0	0		

2.5b	Presentations	0	0	4	6	10	12	14		
Youth Technology Innovation Programme		0	0	2	2	4	5	6		
Technology Innovation Cluster Programme		0	0	0	0	0	0	0		
Technology Platforms Programme		0	0	1	2	3	3	4		
Seed Fund Programme		0	0	1	2	3	4	4		
Innovation Skills Development Programme		0	0	0	0	0	0	0		
Technology Stations Programme		0	0	0	0	0	0	0		
2.5c	Policy recommendations	0	0	0	1	1	0	1		
Youth Technology Innovation Programme		0	0	0	0	0	0	0		
Technology Innovation Cluster Programmes		0	0	0	0	0	0	0		
Technology Platforms Programme		0	0	0	0	0	0	0		
Seed Fund Programme		0	0	0	0	0	0	0		
Innovation Skills Development Programme		0	0	0	1	1	0	1		
Technology Stations Programme		0	0	0	0	0	0	0		
2.5d	Panel discussions	1	0	0	5	6	7	6		
Youth Technology Innovation Programme		0	0	0	0	0	0	0		
Technology Innovation Cluster Programme		0	0	0	0	0	0	0		
Technology Platforms Programme		0	0	0	3	3	4	5		
Seed Fund Programme		0	0	0	0	0	0	0		
Innovation Skills Development Programme		0	0	0	0	0	0	0		

Technology Stations Programme		1	0	0	0	2	3	3	1
2.5e	Position papers	0	0	0	1	1	0	1	1
Youth Technology Innovation Programme		0	0	0	1	1	0	1	1
Technology Innovation Cluster Programme		0	0	0	0	0	0	0	0
Technology Platforms Programme		0	0	0	0	0	0	0	0
Seed Fund Programme		0	0	0	0	0	0	0	0
Innovation Skills Development Programme		0	0	0	0	0	0	0	0
Technology Stations Programme		0	0	0	0	0	0	0	0
2.5f	Publications	0	0	0	1	1	1	1	1
Youth Technology Innovation Programme		0	0	0	0	0	0	0	0
Technology Innovation Cluster Programme		0	0	0	0	0	1	0	0
Technology Platforms Programme		0	0	0	1	1	0	1	1
Seed Fund Programme		0	0	0	0	0	0	0	0
Innovation Skills Development Programme		0	0	0	0	0	0	0	0
Technology Stations Programme		0	0	0	0	0	0	0	0
2.5g	Think tanks	0	2	4	5	11	13	16	16
Youth Technology Innovation Programme		0	0	0	0	0	0	0	0
Technology Innovation Cluster Programme		0	0	0	0	0	12	13	13
Technology Platforms Programme		0	2	4	5	11	1	3	3
Seed Fund Programme		0	0	0	0	0	0	0	0

Innovation Skills Development Programme	0	0	0	0	0	0	0	0	0
Technology Stations Programme	0	0	0	0	0	0	0	0	0
2.5h	Keynote addresses (speeches)	0	0	0	1	1	0	1	1
Youth Technology Innovation Programme		0	0	0	0	0	0	0	0
Technology Innovation Cluster Programme		0	0	0	1	1	0	1	1
Technology Platforms Programme		0	0	0	0	0	0	0	0
Seed Fund Programme		0	0	0	0	0	0	0	0
Innovation Skills Development Programme		0	0	0	0	0	0	0	0
Technology Stations Programme		0	0	0	0	0	0	0	0



14. STRATEGIC OUTCOMES LINKED TO KEY PERFORMANCE INDICATORS

Strategic Objective 1		To provide technology development funding and support in high impact areas			
Rationale for objective		1.1 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			
Impact	Government Outcome	DST Strategic Outcome	TIA Strategic Outcome	Outputs	Performance Indicators
Employment	Outcomes 4: Decent employment through inclusive economic growth	Strategic Outcome-oriented Goal 4: Using knowledge for economic development	Strategic Outcome-oriented Goal 1: Support the commercialisation of technological innovations	Products, Processes, Services and Start-up Companies	Number of technologies, processes or services advancing by one or more TRL levels
GDP	Outcome 5: A skilled and capable workforce to support an inclusive growth path	Strategic Outcome-oriented Goal 5: Knowledge utilisation for inclusive development		Progress in the development of technology	Number of innovation project outputs taken up in the market
Production Multiplier					Amount of additional funding attracted into TIA's portfolio
Estimated Leveraged Funds	Outcome 6: An efficient, competitive and responsive infrastructure network			Positive technology balance of payment; Economic growth; Improved quality of life.	Amount of income recognised
Successful Investment Revenue					
Income				Increasing co-investment and leveraging of TIA funds	

Strategic Objective 2		To provide thought leadership and an enabling environment for technology innovation in collaboration with other role-players			
Rationale for objective		2.1 To provide leadership within the NSI on technology innovation and improved alignment to the Agency's mandate 2.2 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			
Impact	Government Outcome	DST Strategic Outcome	TIA Strategic Outcome	Outputs	Performance Indicators
Employment	Outcomes 4: Decent employment through inclusive economic growth	Strategic Outcome-oriented Goal 1: A responsive, coordinated and efficient NSI	Strategic Outcome-oriented Goal 2: Increase access to technology infrastructure	Creation of employment and employment opportunities	Number of knowledge innovation products produced (prototypes developed, Intellectual Property, technology demonstrators and technology transfer packages) as a result of TIA funding and support
Production Multiplier	Outcome 5: A skilled and capable workforce to support an inclusive growth path	Strategic Outcome-oriented Goal 3: Human capital development		Innovative products, processes and services supporting economic growth	Number of knowledge innovation products produced by TIA-supported programmes receiving additional funding
Estimated Leveraged Funds				Sustaining of struggling sectors through introduction of new technologies	Number of Small, Medium, and Micro Enterprises receiving technology support
Beneficiaries	Outcome 6: An efficient, competitive and responsive infrastructure network	Strategic Outcome-oriented Goal 4: Using knowledge for economic development			Number of PDI-owned SMMEs assisted as a percentage of total SMMEs supported receiving funding, and support and/or technology services from TIA
					Number of Technology Innovation initiatives (e.g. conference papers, presentations and posters; policy recommendations and panel discussions)

Strategic Objective 3		To develop an effective and efficient internal environment to successfully execute the strategy			
Rationale for objective		3.1 To optimise its financial resources and implement initiatives for business and investment process improvement 3.2 To develop a culture of high performance and innovation amongst employees			
Impact	Government Outcome	DST Outcome	TIA Outcome	Outputs	Performance Indicators
Employment	Outcomes 4: Decent employment through inclusive economic growth Outcome 5: A skilled and capable workforce to support an inclusive growth path	Strategic Outcome-oriented Goal 1: A responsive, coordinated and efficient NSI	Strategic Outcome-oriented Goal 3: To stimulate an agile and responsive NSI	Efficient and effective investment management processes Highly motivated, committed and competent TIA staff A high-performance customer centric culture	Investment approval turnaround time Amount of funds utilised for projects and programmes as a percentage of the total actual expenditure

15. MEDIUM-TERM TARGETS

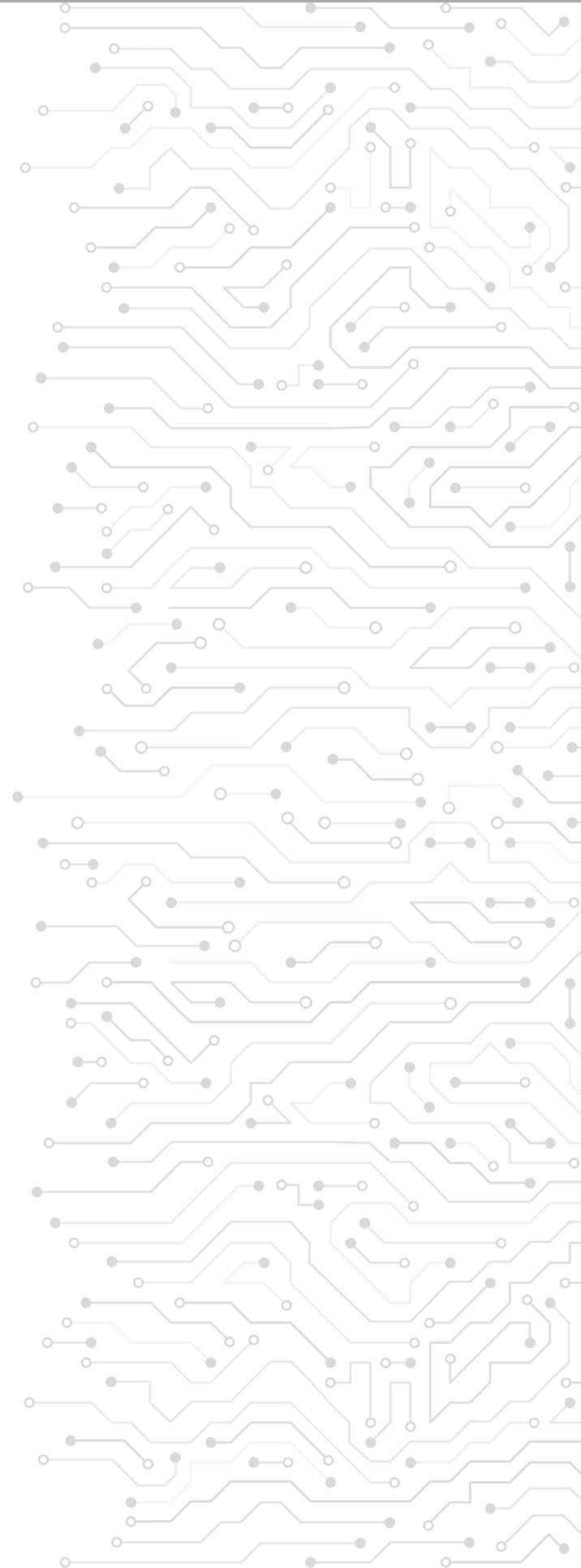
STRATEGIC OBJECTIVE 1: To provide technology development funding and support in strategic, high-impact areas.										
DST Strategic Outcome	Outputs	Performance Indicator	Strategic Target 2015-2020 ¹⁶	Audited/Actual Performance			Estimated per-formance 2017/18	Medium-Term Targets		Forecast
				2014/15	2015/16	2016/17		2018/19	2019/20	
Strategic Outcome-oriented Goal 4: Using knowledge for economic development	1.1	Number of technologies, processes or services advancing by one or more TRL levels ¹⁷	102 ¹⁸	8	27	31	26	28	30	31
	1.2	Number of innovation project outputs taken up in the market ¹⁹	51	6	9	21	10	11	12	13
Strategic Outcome-oriented Goal 5: Knowledge utilisation for inclusive development	1.3	Amount of additional funding attracted into TIA's portfolio ²⁰	R551m	R201m	R97.9m	R182.2m	R113m	R147m	R157m	R182m
	1.4	Amount of income recognised ²¹	R665.3m ²²	R76.0m	R153.8m	R110.9m	R141.8m	R108.3m ²³	R154m	R190m

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

DST Strategic Outcome	Outputs	Performance Indicator	Strategic Target 2015-2020	Audited/Actual Performance			Estimated performance 2017/18	Medium-Term Targets		Forecast
				2014/15	2015/16	2016/17		2018/19	2019/20	
Strategic Outcome-Oriented Goal 1: A responsive, coordinated and efficient NSI	Creation of employment and employment opportunities Innovation skills development	2.1 Number of knowledge innovation products produced as a result of TIA funding and support programmes, consisting of:	350	38	76	64	83	91	100	117
		2.1a Prototypes developed	n/a ²⁴	n/a	38	25	42	46	49	57
	Innovative products, processes and services supporting economic growth	2.1b Intellectual Property	n/a	n/a	9	10	9	10	12	14
		2.1c Technology demonstrators developed	n/a	n/a	27	17	30	33	36	40
	2.1d Technology transfer packages		n/a	n/a	2	12	2	2	3	6

Strategic Outcome-Oriented Goal 3: Human capital development	2.2 Creation of employment and employment opportunities	Number of knowledge innovation products produced by TIA supported programmes receiving additional funding ²⁵	122	8	8	25	27	30	33	36
			14 200	2 188	2 197	2 261	2 800	3 360	3 840	4 000
Strategic Outcome-Oriented Goal 4: Using knowledge for economic development	2.3 Innovation skills development	Number of Small, Medium, and Micro Enterprises receiving technology support ²⁶	69%	0	Measure defined and targets set	64.4%	65%	67%	69%	75%
			124	0	27	56	31	37	43	54
	2.4 Innovative products, processes and services supporting economic growth	Number of PDI owned SMMEs assisted as a percentage of total SMMEs supported, receiving funding, and support and/or technology services from TIA. ²⁷	124	0	27	56	31	37	43	54
			124	0	27	56	31	37	43	54
	2.5 Number of Technology Innovation initiatives undertaken by TIA, consisting of:		124	0	27	56	31	37	43	54
			124	0	27	56	31	37	43	54

	2.5a	Conference papers	n/a ²³	n/a	0	0	1	1	1	2
	2.5b	Presentations	n/a	n/a	10	21	10	12	14	16
	2.5c	Policy recommendations	n/a	n/a	0	2	1	1	1	2
	2.5d	Panel discussions	n/a	n/a	7	8	7	9	10	11
	2.5e	Position papers	n/a	n/a	0	0	1	1	1	2
	2.5f	Publications	n/a	n/a	1	5	1	1	1	2
	2.5g	Think tanks	n/a	n/a	9	19	9	11	14	17
	2.5h	Keynote addresses (speeches)	n/a	n/a	0	1	1	1	1	2



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

DST Strategic Outcome	Outputs	Performance Indicator	Strategic Target 2015-2020	Audited/Actual Performance			Estimated per-formance 2017/18	Medium-Term Targets		Forecast	
				2014/15	2015/16	2016/17		2018/19	2019/20		
Strategic focus area 1: To optimise its financial resources and implement initiatives for business and investment process improvement											
Strategic Outcome-Oriented Goal 1: A responsive, coordinated and efficient NSI	Efficient and effective investment management processes	3.1	Investment approval turnaround time	14 Weeks	0	11 Weeks and 3 days	12 Weeks and 2 days	16 Weeks	15 Weeks	14 Weeks	14 Weeks
		3.2	Amount of funds utilised for projects and programmes as a percentage of the total actual expenditure	70%	70%	72%	77%	68%	65%	67%	69%

16. QUARTERLY TARGETS

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

No	Performance Indicators	Reporting period	Annual target	Quarterly targets			
				Quarter 1	Quarter 2	Quarter 3	Quarter 4
1.1	Number of technologies, processes or services advancing by one or more TRL levels	Quarterly	28	3	6	8	11
1.2	Number of innovation project outputs taken up in the market	Quarterly	11	2	2	3	4
1.3	Amount of additional funding attracted into TIA's portfolio	Quarterly	R147m	R20.5m	R35.5m	R40.5m	R50.5m
1.4	Amount of income recognised	Quarterly	R108.3m	R12m	R14m	R26m	R56.3m

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

No	Performance Indicators	Reporting period	Annual target	Quarterly targets			
				Quarter 1	Quarter 2	Quarter 3	Quarter 4
2.1	Number of knowledge innovation products produced as a result of TIA funding and support programmes, consisting of:	Quarterly	91	10	21	25	35
2.1a	Prototypes developed	Quarterly	46	7	11	13	15
2.1b	Intellectual Property	Quarterly	10	1	1	2	6
2.1c	Technology demonstrators developed	Quarterly	33	2	9	10	12
2.1d	Technology transfer packages	Year-end	2	0	0	0	2
2.2	Number of knowledge innovation products produced by TIA-supported programmes receiving additional funding	Quarterly	30	3	5	10	12
2.3	Number of Small, Medium, and Micro Enterprises receiving technology support	Quarterly	3 360	840	840	840	840

2.4	Number of PDI owned SMMEs assisted as a percentage of total SMMEs supported, receiving funding, and support and/or technology services from TIA	Quarterly	67%	10%	17%	20%	20%
2.5	Number of Technology Innovation initiatives undertaken by TIA, consisting of:	Quarterly	37	2	3	9	23
2.5a	Conference papers	Year-end	1	0	0	0	1
2.5b	Presentations	Quarterly	12	0	1	4	7
2.5c	Policy recommendations	Year-end	1	0	0	0	1
2.5d	Panel discussions	Quarterly	9	2	0	1	6
2.5e	Position papers	Year-end	1	0	0	0	1
2.5f	Publications	Year-end	1	0	0	0	1
2.5g	Think tanks	Quarterly	11	0	2	4	5
2.5h	Keynote addresses (speeches)	Year-end	1	0	0	0	1

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

No	Performance Indicators	Reporting period	Annual target	Quarterly targets			
				Quarter 1	Quarter 2	Quarter 3	Quarter 4
3.1	Investment approval turnaround time	Quarterly	15 Weeks	15 Weeks	15 Weeks	15 Weeks	15 Weeks
3.2	Amount of funds utilised for projects and programmes as a percentage of the total actual expenditure	Quarterly	65%	5%	15%	22%	23%

ANNEXURE A1: TECHNOLOGY READINESS LEVELS (TRL)				
Relative Technology Development level	TRL	Level Definition	Description (Biomedical & Engineering Projects ²³)	Key Question for Stage Pass
Basic technology research	1	Basic research (Basic principles)	Basic science research. Not focused on a specific application Principles observed and reported (published papers) to characterise new technologies.	Have basic principles been observed and reported/published?
	2	Concept formulation (Technology concept)	Some practical applications identified. Materials or processes required confirmed. Technology concept/hypothesis formulated. Research plans and protocols are developed, peer reviewed and approved.	Has a concept application been formulated? Analytical models or simulations developed?
				Could be considered for funding by TIA in due course.
				Could be considered for funding by TIA in due course.

ANNEXURE A1: TECHNOLOGY READINESS LEVELS (TRL)				
Feasibility research	3	Critical function or proof of concept established (Initial proof of concept)	Laboratory measurements validate analytical predictions of separate technology elements. Hypothesis tested, alternative concepts explored and critical technologies and components supporting biological/ vaccines /drug candidate constructs have been identified and evaluated for eventual development of candidate countermeasure. Agent challenge studies are conducted to support models based on presumed disease conditions. Research scale process initiated and evaluated under limited studies to identify sites and mechanism of action. Potential correlates of protection for vaccines have been identified and initial physical/chemical characterisation of constructs. Initial drug candidates have been characterised in pre-clinical studies.	Has analytical and experimental and/or characteristic proof of concept been provided? Have Biologicals /vaccines /drug construct candidates been demonstrated in limited in vitro and in vivo research models (product development component)?
				All activities within this level are eligible for funding.

ANNEXURE A1: TECHNOLOGY READINESS LEVELS (TRL)

Technology development	4	Validation in the laboratory environment (Integrated components validation in a laboratory environment).	Design and development of laboratory components. Test results confirm design and meet technical performance criteria. Hypothesis refined under non-GLP formulation using rigorous experimental design. Exploratory study of critical technologies performed to integrate into candidate biologic/vaccine constructs such as environmental milieu, route/methods of administration, proposed production/ purification methods, further physical/ chemical characterisation. Candidate biologic/vaccine constructs are evaluated in animal model(s) to identify and assess safety and toxicity, biological effects, adverse effects and side effects. Assays, surrogate markers, and endpoints to be used during non-clinical and clinical studies are identified to evaluate and characterise candidate biologic / vaccine constructs.	Has a “breadboard unit” or “test tube model” or “design” or “model” been demonstrated in a laboratory environment/ controlled conditions? Have non-GLP formulation, dose, pharmacokinetic, safety and efficacy studies been demonstrated in defined laboratory/ animal model (product development component)?	All activities within this level are eligible for funding.
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ANNEXURE A1: TECHNOLOGY READINESS LEVELS (TRL)

	5	Laboratory scale, validation in relevant environment. (Integrated components validation in a relevant environment)	Validation under relevant operational conditions, mimicked in the laboratory (non-clinical).	Has a “breadboard unit” or “test tube model” or “design” or “model” performance been demonstrated in a relevant environment or context? Have candidate vaccine/ biological batches been produced under cGMP conditions? (cGMP conditions must be achieved by developing the process and product behind the process.) Have research results of pilot lots conveyed a draft technical data pack confirmed by reviewers? Is there sufficient data on candidate drug, biologic, vaccine to compile an IND application?	All activities within this level are eligible for funding.
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ANNEXURE A1: TECHNOLOGY READINESS LEVELS (TRL)

		Non-clinical and preclinical research studies involving well-defined data collection and analysis systems with pilot lots of candidate biologics/vaccines produced under cGLP conditions.		
		Research results with pilot lots provide a basis to propose a potency assay, develop a manufacturing process amenable to cGMP-compliant pilot lot production, identifying and demonstrating proof of concept for a surrogate efficacy marker in an animal model(s) applicable to predicting protective immunity in humans, and demonstrating preliminary safety and efficacy against an aerosol challenge in a relevant animal model. Conduct cGLP safety and toxicity studies in animal model systems. Identify endpoints of clinical efficacy or its surrogate in animal models that may be applicable to predicting protective immunity in humans. Conduct studies to evaluate immunogenicity, as well as pharmacokinetics and pharmacodynamics when appropriate stability studies are initiated. The resultant draft data package will form the basis of an FDA IND application.		
		Resultant documentation in the draft technical data package contains data from animal pharmacology and toxicology studies, proposed manufacturing information, and clinical protocols suitable for Phase 1 clinical testing.		

ANNEXURE A1: TECHNOLOGY READINESS LEVELS (TRL)

Technology demonstration	6	Integrated prototype system verified in operational environment (System/ subsystem model or prototype demonstration in a relevant environment)	<p>Prototype demonstration in an operational environment.</p> <p>cGMP pilot lot batches must be produced for Phase 1 clinical testing. The process and product must be robust and repeatable.</p> <p>Phase 1 clinical trials are conducted to demonstrate safety of candidates in a small number of human subjects under carefully controlled and intensely monitored clinical conditions. Evaluation of immunogenicity and/or pharmacokinetics and Pharmacodynamics data to support design of Phase 2 clinical trials. Surrogate efficacy models are validated.</p>	<p>Has a prototype been demonstrated in a relevant environment or context?</p> <p>Is the Phase 1 data compliant with safety requirements to proceed to Phase 2 clinical studies?</p> <p>Do conclusions thus far show any requirements for further product development? Are there any requirements for further process development?</p>	All activities within this level are eligible for funding.
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ANNEXURE A1: TECHNOLOGY READINESS LEVELS (TRL)					
System commissioning	7	<p>Integrated pilot system demonstrated in operational environment</p> <p>(System prototype demonstration in an operational environment)</p>	<p>Integrated full-scale pilot system demonstrated in an operational environment or site.</p> <p>Phase 2 safety and immunogenicity trials are conducted. Product immunogenicity and biological activity (e.g. preliminary evidence of efficacy) are determined. Product final dose, dose range, schedule, and route of administration are established from vaccine immunogenicity and biologic activity and, when necessary, from clinical pharmacokinetics and pharmacodynamics data.</p> <p>Phase 2 clinical trials completed. Data are collected, presented, and discussed with appropriate regulatory body at pre-Phase 3 in support of continued development of the biologics / vaccines. Clinical endpoints and/or surrogate efficacy markers and test plans agreed on.</p>	<p>Has a prototype unit been demonstrated in the operational environment?</p> <p>Is there an approved Phase 3 clinical study plan?</p>	<p>All activities within this level are eligible for funding. Funding level for clinical trials will be subject to limits per project.</p>
	8	<p>System incorporated in commercial design</p> <p>(Actual system completed and qualified through test and demonstration)</p>	<p>Actual product completed and qualified through certifications, tests and demonstrations (pre-commercial demonstration).</p> <p>Implementation of expanded Phase 3 clinical trials or surrogate tests to gather information relative to the safety and effectiveness of the candidate biologic/ vaccine. Trials are conducted to evaluate the overall risk-benefit of administering the candidate product and to provide an adequate basis for product labelling.</p>	<p>Has an identical system been demonstrated on an operational environment in a different configuration?</p> <p>Has clinical safety and efficacy been demonstrated?</p>	

ANNEXURE A1: TECHNOLOGY READINESS LEVELS (TRL)				
			<p>Process validation is completed and followed by lot consistency/reproducibility studies. Clinical trial feedback used to validate manufacturing product process. Pre-BLA (Biologics License Application) meeting with respective regulatory body for BLA preparation and submission.</p>	<p>Have manufacturing/production processes been validated? (Reiterations on the product and process development components are revisited.)</p>
				<p>Has the BLA been submitted and received regulatory body approval?</p>
System operations	9	Proven system and ready for full commercial deployment	<p>Product proven ready through successful operations in operating environment and ready for full commercial deployment.</p> <p>Actual system operated over the full range of expected conditions.</p>	<p>Has an identical unit been successful on an operational environment in an identical configuration?</p>
		(Actual system proven through successful operations)	<p>The pharmaceutical (i.e. biologic or vaccine) or medical device can be distributed/marketed. Post-marketing studies (non-clinical or clinical) may be required and are designed after agreement with the appropriate regulatory body and post-marketing surveillance commences.</p>	<p>Has unit been completed and qualified through test and demonstration?</p> <p>Has the post market surveillance commenced according to regulatory body requirements?</p>
Could be considered for funding by TIA in due course				

ANNEXURE A2: LIST OF ACRONYMS

ACRO	African Clinical Research Organisation
AMTS	Advanced Manufacturing Technology Strategy
ARC	Agriculture Research Council
AVG	Automated Guided Vehicle
ATS - CPUT	Agri-foods Technology Station – Cape Peninsula University of Technology
ASSAf	Academy of Science of South Africa
BAKM	Business Analysis & Knowledge Management
BFS	Bankable Feasibility Study
BIDC	Bio-manufacturing Industry Development Centre
BiODX	Biological Chemical Technologies (Pty) Ltd
CAD	Computer-Aided Design
CCDI	Cape Craft and Design Institute
CEO	Chief Executive Officer
CEIP	Centre for Engineering Innovation and Production
CHIETA	The Chemical Industries Education and Training Authority
C.O.J.E.D.I	City of Joburg Educating Digital Intern Programme
CPGR	Centre for Proteomic and Genomic Research
CPSI	Centre for Public Service Innovation
CPT	Pharma Chemical Process Technologies
CPUT	Cape Peninsula University of Technology
CSFE	Continuous Supercritical Fluid Extraction
CSIR	Council for Scientific and Industrial Research
CRO	Chief Risk Officer
CUBIC	Cape University Body Imaging Centre
CUT	Central University of Technology
DCTS-NMMU	Downstream Chemicals Technology Station – Nelson Mandela Metropolitan University
DD	Due Diligence
DIY	Do It Yourself
DPSS	Diode Pumped Solid State
DRDLR	The Department of Rural Development and Land Reform
DSBD	Department of Small Business Development
DST	Department of Science and Technology
DUT	Durban University of Technology
ECDC	Eastern Cape Development Corporation
EIA	Economic Impact Assessment
EWSETA	Energy and Water Sector Education and Training Authority

ESN	Enterprise Social Network
EXCO	Executive Committee
FEED	Department of Economy and Enterprise Development
FMS	Fund Management Systems
FY	Financial Year
GAP	Gauteng Accelerator Programme
GMO	Genetically Modified Organisms Act
GMS	General Management System
CPGR	Centre for Proteomic & Genomic Research
GCIP	Global Cleantech Innovation Programme
GEF	Global Environment Facility
GFIA	Global Forum for Innovation in Agriculture
GIT	Green Iron Technology
GPT	Geo Pollution Technologies
GRAP	Generally Recognised Accounting Practice
H3D	Drug Discovery and Development Centre
HEI	Higher Education Institution
HIV	Human Immunodeficiency Virus
HR	Human Resources
HySA	Hydrogen South Africa
iBATECH	Indigenous Botanical Adjuvant Technology
IAC	Internal Assessment Committee
IAT-SU	Institute for Advanced Tooling – Stellenbosch University
IAT-TUT	Institute for Advanced Tooling – Tshwane University of Technology
IAT-WSU	Institute for Advanced Tooling – Walter Sisulu University
ICT	Information and Communications Technology
IDC	Industrial Development Corporation
IDF	Identity Development Fund
IE&S	Innovation Enabling and Support
IFC	Investment Framework Committee
IFPCS	Innovation Funding and Pre-Commercialisation and Support
IIA	Internal and Investment Audit
Invo Tech	Innovation Technology Business Incubator
IP	Intellectual Property
IPAP	Industrial Policy Action Plan
IPT	Integrated Pricing-label Technology
IRBA	Independent Regulatory Board of Auditors

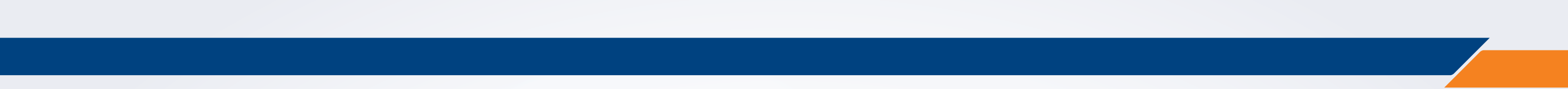
ISD	Innovation Skills Development
ISO	International Organisation of Standardisation
IT	Information Technology
IWWT	Institute of Water and Wastewater Technology
JICA	Japan International Cooperation Agency
JS	Jonker Sailplanes
KPI	Key Performance Indicator
KZN	KwaZulu-Natal
LATS-UL	Limpopo Agro-food Technology Station – University of Limpopo
LEDET	Limpopo Economic Development, Environment and Tourism
LMNO	Lithium Manganese Nickel Oxide
LPG	Leak Proof Green
m	Million
MADCap	Men of African Descent and Cancer of the Prostate
M&E	Monitoring and Evaluation
MCTS-UJ	Metal Casting Technology Station – University of Johannesburg
MMV	Medicines for Malaria Venture
MoU	Memorandum of Understanding
MP	Member of Parliament
MRI	Magnetic Resonance Imaging
MTEF	Medium-Term Expenditure Framework
MTSF	Medium Term Strategic Framework
MUT	Mangosuthu University of Technology
NACI	National Advisory Council for Innovation
NASAC	Network of African Science Academies
NCRST	National Commission on Research, Science and Technology
NCSA	Natural Carotenoids South Africa (Pty) Ltd
NDP	National Development Plan
NECSA	South African Nuclear Energy Corporation SOC Limited
NH1-MSap	Neo & Hollo's 1 st Monitoring Solar Submersible pump
NIPMO	National Intellectual Property Management Office
NMMU	Nelson Mandela Metropolitan University
NMR	Nuclear Magnetic Resonance
NRF	National Research Foundation
NSI	National System of Innovation
NT	National Treasury
NWGA	National Wool Growers Association

NWU	North West University
NYDA	National Youth Development Agency
OVI	Onderstepoort Veterinary Institute
PDI	Previously Disadvantaged Individuals
PDTS-CUT	Product Development Technology Station – Central University of Technology
PEETS-UJ	Process, Energy and Environmental Engineering Technology Station – University of Johannesburg
PFMA	Public Finance Management Office
PRIME	Planning, Risks, Intelligence, Monitoring & Evaluation
PPP	Public Private Partnership
PSF	People Systems and Facilities
R&D	Research and Development
RCIPS	Research Contracts & Intellectual Property Services
RDA	Regional Development Agencies
RDP	Reconstruction and Development Programme
RSDTS-VUT	Rural & Sustainable Development Technology Station – Vaal University of Technology
RSDTS-VUT	Rural & Sustainable Development Technology Station – Vaal University of Technology
SA	South Africa
SABS	South African Bureau of Standards
SAICA	South African Institute of Chartered Accountants
SAENSE	Screening Applications and Exploring Novelty in Specialised Environments
SANEDI	South African National Energy Development Institute
SARIMA	South African Research & Innovation Management Association
SASRI	South African Sugar Research Institute
SATN	South African Technology Network
SBD	Settle Bed Detector
SC	Science Centre
SF	The Seed Fund Programme
SEDA	Small Enterprise Development Agency
SETIIP	Science Engineering and Science Engineering and Technology Industry Internship Proposals
SHIP	Strategic Health Innovation Partnerships
Sliek	Sliek Vitamin Supplements (Pty) Ltd
SMART	Specific, Measurable, Attainable, Relevant and Time-bound
SME	Small Medium Enterprise
SMME	Small Medium & Micro Enterprises
Solar PACES	Solar Power and Chemical Energy Systems
SO	Strategic Objective
SOEs	State Owned Enterprises

SSRC	Strategic Stakeholder Relations and Communication
STA	Strategic Technology Area
STI	Science, Technology and Innovation
STIAS	Stellenbosch Institute for Advanced Study
SU	Stellenbosch University
SWET	Stellenbosch Wind Energy Technologies
TB	Tuberculosis
TDS	Titsetso Development Solutions
TIA	Technology Innovation Agency
TIHMC	The Innovation Hub Management Company
TIP	Technology Innovation Programme
TCIPS	Technology Cluster Innovation Programmes
TPP	Technology Platforms Programme
TRL	Technology Readiness Level
TS	Technology Station
TSC-MUT	Technology Station in Chemicals & Chemistry – Mangosuthu University of Technology
TSC-TUT	Technology Station in Chemicals – Tshwane University of Technology
TSCT-CPUT	Technology Station in Clothing and Textiles – Cape Peninsula University of Technology
TSE-TUT	Technology Station in Electronics – Tshwane University of Technology
TSMPT-VUT	Technology Station in Material and Processing Technologies – Vaal University of Technology
TSP	Technology Stations Programme
TUK	Technology University of Kenya
TUT	Tshwane University of Technology
TTO	Technology Transfer Office
UCT	University of Cape Town
UFS	University of Free State
UK	United Kingdom
UNIDO	United Nations Industrial Development Organisation
UWC	University of Western Cape
VUT	Vaal University of Technology
WHC	Wits Health Consortium
Wits	University of the Witwatersrand – Johannesburg
Xsit	X Sterile Insect Technique (Pty) Ltd
YTD	Year to date
YTIP	Youth Technology Innovation Programme

(Footnotes)

- Three of the KPIs have been changed from corporate indicators to management indicators for SO3.
- Indicator changed for FY2018/19 to be one or more TRL movement and not two.
- This may include innovation projects that have reached demonstration stage (TRL 7).
- Indicator contribution will be from Programme 2 and Programme 3 for FY2018/19.
- This includes funding from the shareholder, co-funding, from a third party and any additional funding leveraged for completion of the innovation project.
- This indicator has been divided between Programme 2 and Programme 3 and will no longer be reported under Programme 1.
- This is to be interpreted as a measure for the income received for return on investments from any of TIA funding instruments i.e. loan, royalty grants and/or equity sale. Wording changed from received to recognised as per GRAP standard.
- This Performance Indicator breakdown had only been implemented in FY2018/19 and no longer reported only under Programme 1.
- This indicator has been divided between Programme 2 and Programme 3 and will no longer just be reported under Programme 3 from FY2018/19.
- The Performance Indicators in this table for Strategic Objective 2, had only been divided between Programme 2 and Programme 3 from FY2018/19.
- This indicator will be reported under Programme 2 and Programme 3 and no longer just under Programme 2 from FY2018/19.
- TIA funded programmes that, as a result of their execution, give rise to third party funding, co-funding and/or co-development.
- Technology support is defined as technical oriented services to SMMEs/Businesses to be competitive in related sectors of manufacturing to accelerate the exploitation of technology.
- This may include individuals who have received assistance to enable them to operate as SMMEs.
- New unit in TIA which will only contribute to KPI 1.4.
- This figure originates from the Amended Strategic Plan. The Strategic Plan contains targets only which when added gives u the R671.2m. The APP has to show alignment with the Strategic Plan hence the fact that a calculation of the APP figures will differ
- This may include innovation projects that have reached demonstration stage (TRL 7).
- Reasons are provided in the “Amendment to TIA Strategic Plan” for the increase of the targets throughout all three strategic objectives.
- Innovation project outputs are defined as the technologies or processes or services that have attracted commercial or industrial application interest from external parties. This Performance Indicator’s focus is on commercialisation
- This includes funding from the shareholder, co-funding, from a third party and any additional funding leveraged for completion of the innovation project.
- This is to be interpreted to be a measure for the income received for return on investments from any of TIA funding instruments i.e. loan, royalty grants and/or equity sale.
- Target for FY2018/19 has decreased, therefore 2015/2020 Strategic Target has decreased.
- From FY2018/19 this indicator will come from Programme 2 and Programme 3 and no longer from Programme 1.
- This Performance Indicator breakdown had only been implemented in FY2015/16.
- TIA funded programmes that, as a result of their execution, give rise to third party funding, co-funding and/or co-development.
- Technology support is defined as technical oriented services to SMMEs/Businesses to be competitive in related sectors of manufacturing to accelerate the exploitation of technology.
- This may include individuals who have received assistance to enable them to operate as SMMEs.
- This Performance Indicator breakdown had only been implemented in FY2015/16.
- All the level definitions in brackets are the definitions used in the STA “progress report template”





Central Office

Switchboard: +27 (0) 12 472 2700

Postal Address: P.O. Box 172,
Menlyn,
Pretoria,
0063

Physical Address: TIA House,
83 Lois Avenue,
Menlyn,
Pretoria,
0181

Western Cape Regional Office

Switchboard: +27 (0) 21 442 3780

Postal Address:
P.O. Box 13372
Mowbray
Cape Town
7705

Physical Address:
4th floor
Central Park
Black River Business Park
Fir Road
Observatory
Cape Town
7925

KwaZulu-Natal Regional Office

Switchboard: +27 (0) 31 271 4500

Postal Address:
P.O. Box 30603,
Mayville,
Durban,
4058

Physical Address:
4th Floor,
102 Stephen Dlamini Road
(previously Essenwood road),
Musgrave,
Durban,
4062

www.tia.org.za