ANNUAL PERFORMANCE PLAN 2019/20

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Innovating Tomorrow Together

science & technology
Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

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ANNUAL PERFORMANCE PLAN 2019/20

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3. CHAIRPERSON'S FOREWORD

Professor Edward Christian Kieswetter

The Technology Innovation Agency (TIA) plays an important part in the National System of Innovation. Its mandate is to support the development and exploitation of technology innovation in order to contribute to economic growth and ultimately impact the quality of life of all South Africans. The alleviation of poverty, unemployment and inequality is at the heart of this mandate.

To date R1,5bn has been allocated to TIA to support technology innovations and provide access to specialised technology infrastructure. FY2019/20 presents the fifth year of the current strategic cycle. It is therefore timely to assess how effectively TIA has lived up to its mandate.

Global Context

The advances in technology have placed unprecedented opportunities in the hands of ordinary people. The development of what is commonly referred to as the Fourth Industrial Revolution (FIR) is characterised by the merging of technologies in the physical, digital and biological domains. The presence of big data, artificial intelligence, algorithms, virtual and augmented reality exists within an interconnected world of computers, robots and machines that are capable of predictive analytics, automation and deep learning. The societal impact as yet is unknown as new business models emerge. The future world of work and jobs presents challenges of human irrelevance, but also opportunities previously unimaginable.

TIA is fortunate to be at the forefront of these developments and positioned to be a thought leader and catalyst in South Africa to navigate its own challenges and opportunities within the broader context of achieving the United Nations' Sustainable Development Goals (SDGs).

South African Context

We are still in a low growth environment that is unable to sustain job creation and poverty alleviation. The work within Science, Technology and Innovation (STI) cannot be underestimated as an important leading indicator in addressing our growth challenges. In real terms our Gross Domestic Expenditure on Research and Development has also slowed during the strategic cycle. If we are to change the trajectory, we need to comprehensively review our STI policies and funding. Particular emphasis must be placed on technology innovation within the bio-economy as well as manufacturing and mining.

The Minister of Science and Technology launched the STI White Paper in November 2018. It proposes:

i. Important policy shifts to address aspects such as transformation and inclusivity as well as strong linkages within the National System of Innovation (NSI);

ii. Strengthening the culture of innovation within government and society;

iii. Improving policy coherence and more effective budget and programme coordination within the NSI;

iv. Implementing monitoring and evaluation systems;

v. Creating a more enabling environment that advances innovation; and

vi. Developing local innovation ecosystems.

A strong emphasis of the STI White Paper is the investment in Small Medium & Micro Enterprises (SMMEs) and support to grassroots and social innovation projects. The provision of education at all levels should ensure that a healthy pipeline of PhD graduates is produced that is capable of addressing the needs of the economy.

The National Advisory Council on Innovation STI Indicator 2017 Report ranks South Africa relatively well in the Social Progress Index in terms of personal freedoms, personal rights and access to communication. Sadly, we rank low in nutrition, basic medical care, shelter, water and sanitation.

TIA embraces the policy ambition of the STI White Paper and plays an important role to support innovative solutions that place human dignity and societal well-being at the centre. We will increase our efforts to enable transformative innovation that positively impacts peoples' lives.

Operational Focus

This APP outlines key focus areas to advance the Bio-economy Strategy, Technology Stations and Commercialisation. A stronger funding bias is required to make progress in these areas. Building on our achievements to date, TIA will invest in the institutional capability and capacity to deliver on its mandate. In this regard, a clear sense of purpose, high employee engagement and robust performance management under an able leadership team will reflect explicitly in our work programme.

The success of TIA's work is ultimately reflected in the measurable impact it will have on the socio-economic landscape. Improvements in levels of nutrition and employment, as well as narrowing the inequality gap remain key, as we address the opportunities presented to us.

Conclusion

TIA plays a leading role in driving technology innovation. It relies on active partnerships within government as well as broader stakeholder groups and society. Committed to a culture of ongoing improvement, TIA will look to improve collaboration within the NSI in order to catalyse and promote transformative technology.

Professor Edward Christian Kieswetter
Chairperson of the Board

4. CEO'S FOREWORD

Mr Barlow Manilal

The APP for FY2019/20 sees the Agency approaching its final year within the five year Strategic Plan. As at the end of FY2018/19, TIA achieved an average performance on its strategic objectives of 88%. An amount of R1,4 billion was allocated towards the development of new technologies which led to over 266 knowledge products, processes and services being developed.

The results of an Economic Impact Assessment reveal that to date, TIA has made a Gross Domestic Product impact to the equivalent value of R2,1 billion with a total of 6 801 direct and indirect jobs being created. The EIA culminated in an economic multiplier of R3,55 of value created to the country for every R1,00 spent by TIA.

Currently, efforts are being directed towards scaling-up on all strategic programmes, and it is envisaged that a much broader impact would be realised as TIA begins to capitalise on its strategic partnerships within the NSI. The year-on-year growth in planned performance targets with an increased focus on customer satisfaction translates in our ambition for greater impact, accountability and teamwork within the NSI. Extensive effort has already been made to realise these improvements. We are confident that they will manifest positively and contribute to realising our mandate and purpose in a much more structured manner.

Global Context

TIA's performance to date is set against a background of a largely fluid technology environment which, since the approval of the Strategic Plan in FY2015/16, began evolving with emerging technology domains gathering pace and momentum at a rate previously not experienced. According to Gartner's top Strategic Trends Report, the Artificial Intelligence (AI) domain will lead digital change by transforming value chains within the business environment. It will enable the provision of enhanced software packages and applications and create platform services for analytics and algorithms models for extended services which will increase the competitiveness of companies.

To this end, we welcome the introduction of the Commission on the Fourth Industrial Revolution (FIR) launched by the President in February 2019, which will oversee the development of an enabling framework that will allow TIA to target its efforts in building a portfolio of technologies and capabilities to address the anticipated changes.

The application of such capabilities within the FIR context will contribute to improving the economic landscape in South Africa and globally. We also look forward to close collaboration with our sister entity, the Council for Scientific and Industrial Research (CSIR) that will be hosting the DST's Africa FIR Centre.

South Africa Context

The economy recorded a GDP growth of 0.8% during 2018. Given the high levels of unemployment especially amongst the youth, it is important that more is done to redress this. The STI White Paper launched by the Minister of Science and Technology is in the final stages of approval as Cabinet is currently reviewing the proposed framework. The paper provides for a heightened focus on inclusive innovation at grassroots level; investment in SMMEs that are developing new technologies and increased funding for social innovation projects. TIA has proactively aligned its innovation programmes to ensure that these will contribute to redressing the current flagging economic position.

Strategic Focus

For the FY2019/20, TIA will continue to accelerate its implementation of the bio-economy Strategy with R226,4m planned for new investments in Agriculture, Health, Environmental Management and Industrial Bio-technology.

The Technology Station Programme will focus on diffusion of emerging technologies and technology localisation to support industry in its quest for global competitiveness.

TIA will also strengthen its partnerships with the Small Enterprise Development Agency (SEDA) and other key strategic stakeholders by exploiting synergies and harnessing collective capabilities around technology incubation, acceleration and entrepreneurial development for greater commercialisation prospects.

TIA's introduction of the Marketing Readiness Level (MRL), Business Readiness Level (BRL) and other impactful funding instruments will enhance the previous focus on the Technology Readiness Level (TRL).

Operational Focus

To develop operating capacity that will enable the efficient and effective realisation of the planned outcomes, TIA will in the year ahead look into integrating its operational technology platforms and processes. In turn, the organisational structure will be realigned to ensure greater delivery of expected outputs whilst optimising cost management and value creation.

Way Forward

The Board, Executives and our colleagues from the DST will continue working on the strategic building blocks in crafting a new strategy for the next five year strategic cycle. This process will be iterative and will involve both external and internal stakeholders to ensure that there is a clear articulation of the planned performance in terms of expected outcomes. TIA will be positioned as a national competence and a key driver in deploying the very credible objectives of the new White Paper.

Mr Barlow Manilal
Chief Executive Officer

5. OFFICIAL SIGN-OFF

This Annual Performance Plan (APP), has been prepared in line with the National Treasury requirements. It elaborates on how the activities articulated for FY2019/20 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 annual performance 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 performance indicators over the MTEF cycle and quarterly indicators for the FY2019/20 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 stated strategic objectives.

It is hereby certified that this Annual Performance Plan:

i. Was developed by the management of TIA;

ii. Takes into account all the relevant policies, legislation and other mandates for which TIA is responsible; and

iii. Accurately reflects the performance measures TIA will endeavour to achieve over the FY2019/20.

Ms Jolanda Hechter
Acting Chief Financial Officer

Signature: 

Mr Barlow Manilal
Chief Executive Officer

Signature: 

Professor Edward Christian Kieswetter
Chairperson of the Board

Signature: 

Minister Mmamoloko Kubayi-Ngubane (MP)
Executive Authority

Signature: 

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PART A

STRATEGIC OVERVIEW


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6. UPDATED SITUATIONAL ANALYSIS

6.1 TIA'S PERFORMANCE ENVIRONMENT

6.1.1 CONTRIBUTION TO THE REALISATION OF THE OUTCOMES OF THE MEDIUM-TERM STRATEGIC FRAMEWORK 2014-2019

TIA has through its various programmes and activities contributed to the development of technologies that align to national priorities and DST policies and its bio-economy strategy. TIA, through its mandate and activities, contributes to most of these outcomes, as well as sub-outcomes defined under the overall MTSF outcomes.

Table 1: Contribution to the MTSF commitments undertaken by TIA in the 2014-2019 MTSF cycle

OUTCOME	SUB-OUTCOME	ACTION/COMMITMENT
Outcome 2: A long and healthy life for all South Africans.	**Sub-Outcome 8:** HIV, AIDS and TB prevented and successfully managed.	Attract both private and public sector funds to support health related Research, Development & Innovation (RDI) activities.

PROGRESS 2018/2019	PLANS 2019/2020
KwazuluKRISP, H3D, NMP and CPGR will support over 50 health related projects with emphasis on TB, malaria, HIV and cancer. KRISP, H3D, NMP, CPGR seek to attract R50 m to support health-related projects in areas such as TB, malaria and HIV. CPT Pharma achieved pilot scale production of API 1 (Active Pharmaceutical Ingredient). API 1, is expected to be used in the formulation of TB drugs.	**ARTI TB Diagnostics project team will;** • Initiate development and integration of micro fluidic cartridge and electrode coating together with third parties, and • Initiate clinical trials of the POC device. **MARTI Biologics (Pty) Ltd will;** • Complete viral inactivation study – assessment of viral safety of Osteogenic Bone Matrix (OBM) produced by Altis, • Initiate clinical trials to assess efficacy and safety of OBM in patients, • The CPT Pharma project team will during FY 19/20 focus on replicating processes developed in the production of more API's. and • ^{195m}Pt cisplatin project at NECSA will initiate activities in Work Package 2 that include; conducting limited Phase I/II trial to test safety, predictivecapability and develop the algorithm Quorus Biotech (Pty) Ltd. Health STA will facilitate the follow-on funding from IDC. Currently Quorus is in negotiations with IDC for follow-up on funding to support commercialisation of Bio-reactors developed by Quorus.

Table 1: Contribution to the MTSF commitments undertaken by TIA in the 2014-2019 MTSF cycle

OUTCOME	SUB-OUTCOME	ACTION/COMMITMENT
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 promoting the development of new industries.	Support existing SMMEs through technology and enterprise development services.
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.	Deploy platform infrastructure to support capacity development.

PROGRESS 2018/2019	PLANS 2019/2020
Conclude the feasibility assessment of expanding access of bio-manufacturing infrastructure and expertise to support product development among SMMEs. The programme, if successful, is envisioned to support over 30 SMMEs per annum. CPGR will partner with CiTi to launch OneBio, a life science incubator to provide support for life science-based business ideas. Supporting 11 beneficiaries through TIA's Small Enterprise Development Agency (SEDA) under the dti.	Support five existing beneficiaries through technology and enterprise development services.
The TIA/SEDA incubation programme for Youth Technology Innovation Programme (YTIP) projects include participation of four black women, who are receiving business development support and training.	YTIP will be designing an enterprise development programme to capacitate five projects; four of which are led by women.

Table 1: Contribution to the MTSF commitments undertaken by TIA in the 2014-2019 MTSF cycle

OUTCOME	SUB-OUTCOME	ACTION/COMMITMENT
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 just transition.	Promoting clean technology innovation. An Energy Efficiency Project - SAMAC Engineering Solutions – Total TIA planned/actual investment of R7,8 million. Support the development of green technologies such as bio-fuels. Deploy technologies for the reduction of waste and reclamation of soil and water. Support technology solutions that beneficiate waste. Support the NSI to harmonise bio-risk related regulations that protect the environment and people.

PROGRESS 2018/2019	PLANS 2019/2020
SAMAC – Planned investment of R1,1 million. By the end of 2018/19 all technology development activities should be complete with the next focus being commercialisation. Bio-safety will provide 20 thought leadership initiatives in bio-risk management. A Waste to Energy project − Nelson Mandela University Microalgae(NMU microalgae) has been fully developed and demonstrated. TIA, together with the project team will be engaging potential follow-on funders to fund the up-scaling of the project towards full commercialisation. A hydrogen and fuel cell 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 R36,2 million with co-investmentby MINTEK (Council for Mineral Technology) of R3,3 million; and University of Cape Town of R3,6 million. TIA is working closely with HyPlat to attract new investors who plan to acquire 51% shares in the business.	SAMAC – The focus for 2019/20 will be commercialisation.

6.1.2. CONTRIBUTION TO DST PROXY INDICATORS

To position STI within the framework of the NDP and the DST's priorities, 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 TIA 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 TIA's contribution to these:

Table 2: TIA's Contribution to DST Proxy Indicators

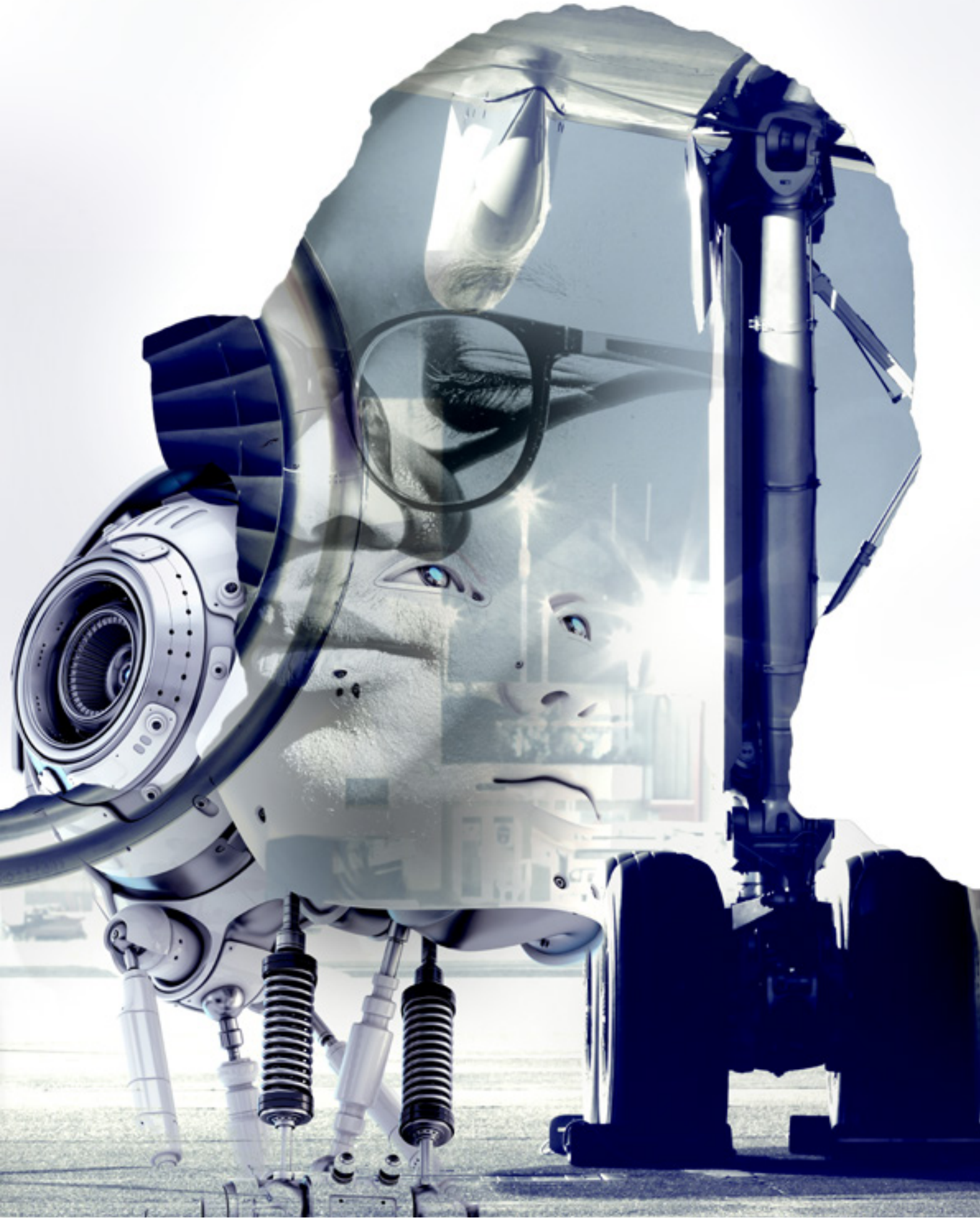
Technology Innovation Agency Contribution to the DST Strategic Outcome-Orientated Goals for FY2019/20		(Actual) TIA Contribution in FY2017/18	(Current) TIA Contribution in FY2018/19	(Estimated) TIA Contribution in FY2019/20
DST Strategic outcome-oriented goal 1	**Goal Statement:** Over the next five years, build on previous gains to create a responsive, coordinated and efficient NSI.			
Proxy Indicator 4:	By 2020, a tenfold increase in the rand value of partnerships between the DST and / or its entities and the private sector when compared to the investment level in partnerships in the 2013 financial year.	**R117m**	**R223m**	**R157m**
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 3:	4 200 graduates and students placed in science, engineering, technology and innovation (SETI) institutions between 2015 and 2020.	**100**	**100**	**100**
Proxy Indicator 4:	No less than 2 100 000 people reached annually through science engagement activities by 2020.	**15 000**	**15 000**	**15 000**

Table 2: TIA's Contribution to DST Proxy Indicators (continued)

Technology Innovation Agency Contribution to the DST Strategic Outcome-Orientated Goals for FY2019/20		(Actual) TIA Contribution in FY2017/18	(Current) TIA Contribution in FY2018/19	(Estimated) TIA Contribution in FY2019/20
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 2020, total additional revenue of at least R2 billion reported by firms and companies that are / or have received support from DST funded industrial development instruments since 2010.	**R 2,9bn**	**R 2,9bn**	**R 2,9bn**
Proxy Indicator 3:	By 2020, performance of 5 000 SMMEs enhanced through technology interventions funded by DST and its entities.	**2 800**	**3 360**	**3 840**
DST Strategic outcome-oriented goal 5	**Goal Statement:** Over thenext five years to accelerate inclusive development through scientific knowledge, evidence and appropriate technology.			
Proxy Indicator 4:	Between 2015 and 2020, technology-based investments by the DST to strengthen local economic development prospects in 10 municipalities.	**1**	**1**	**1**

6.1.3. REVIEW OF STRATEGIC RISK LANDSCAPE

Linked Objectives	Risk	Contributing Factor	Mitigation Action
Strategic Objective 1: To provide technology development funding and support in strategic high impact areas.	The risk that TIA will lose potential business owing to inadequate customer engagement and portfolio management.	Lengthy turnaround time.	Review of communication strategy and implement a Customer Relationship Management plan linked to stakeholder map and engagement plan.
	The risk that current economic conditions may significantly reduce opportunities to leverage additional funding from third parties to support technology development.	Impact of global geopolitical tensions on South Africa's economy.	Source and secure alternative technology development funding.
	The risk that TIA's investment portfolio does not perform owing the continual downstrea changes and deviation of projects with inadequate progress.	Deficient management of legacy project portfolio.	Quarterly Portfolio Review.
Strategic Objective 2: To provide thought leadership and an enabling environment for technology innovation in collaboration with other roleplayers.	The risk that TIA's shareholder may shift expectations regarding the performance levels of the organisation.	Low levels of strategic performance.	Initiate regular Bi-lateral meetings and aligning planning activities.
Strategic Objective 3: To develop an effective and efficient internal environment to successfully execute the strategy.	The risk that the TIA business value chain design is inadequate to support operations.	Legacy organisational design.	Review operational productivity and efficiency matrices. Re-align organisational structure.



6.1.4. PROGRESS IN REALISING TIA'S STRATEGIC OUTCOME-ORIENTED GOALS

SUMMARY OF STRATEGIC PERFORMANCE FY2015/20

i. Overall Business Performance FY2015/16 to FY2018/19*

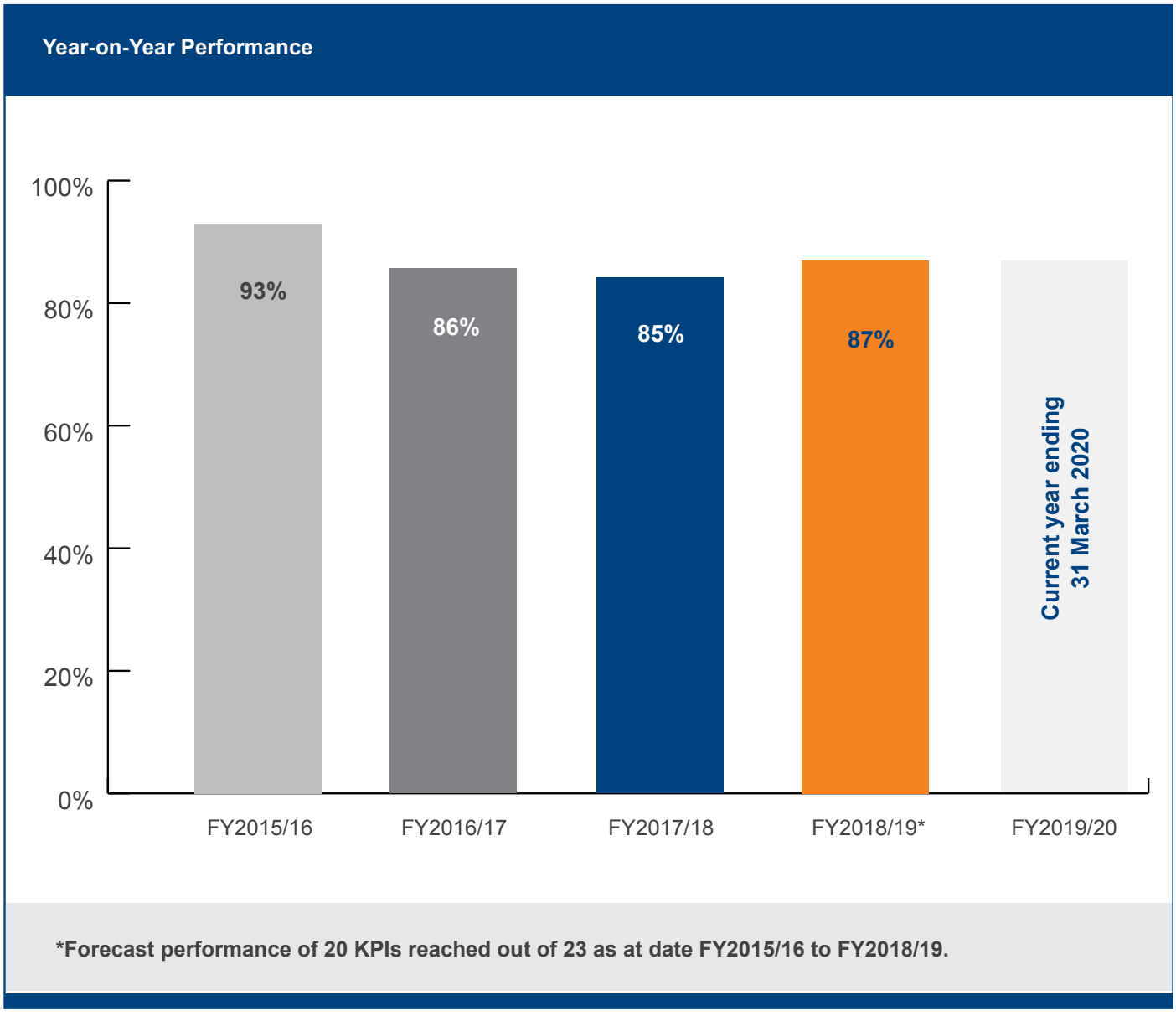


Figure 1: Overall Business Performance FY2015/16 to FY2018/19.

ii. Performance against Strategic Objectives FY2015/16 to FY2018/19*

Performance against Strategic Objectives: FY2015/16 to FY2018/19			
Strategic Period FY2015/16 to FY2019/20	**Strategic Objective 1**	**Strategic Objective 2**	**Strategic Objective 3**
	To provide technology development funding and support in strategic, high-impact areas.	To provide thought leadership and an enabling environment for technology innovation in collaboration with other role-players.	To develop an effective and efficient internal environment to successfully execute the strategy.
FY2015/16	**100%**	**100%**	**79%**
FY2016/17	**75%**	**100%**	**80%**
FY2017/18	**75%**	**95%**	**60%**
***FY2018/19**	**100%**	**94%**	**50%**
***Forecast performance of 20 KPIs reached out of 23 as at date FY2015/16 to FY2018/19.**			

Figure 2: Performance against Strategic Objectives FY2015/16 to FY2018/19.

To position the activities of TIA within the framework of the NDP and other DST priorities. The Strategic Plan is structured around three strategic outcome-oriented goals that drive the initiatives of TIA over the remaining period:

These goals are:

i. **Goal 1:** To support the commercialisation of technological innovations;

ii. **Goal 2:** To increase infrastructure access for technology development, and

iii. **Goal 3:** To stimulate an agile and responsive NSI.

In performing against these goals for the strategic period ending FY2019/20, the cumulative performance from FY2015/16 to FY2017/18 is as follows:

i. More than 238 innovation products were developed;

ii. A total of R1,1 billion was disbursed to support the development of new technological innovations; and

iii. Over 7 258 SMMEs were supported.

These resulted in a contribution of R2,1 billion in terms of GDP to the national economy and led to 6 801 jobs being created with a resultant Economic Impact Multiplier score of R3,55 per R1,00 expended by TIA. The progress made in achieving the goals is detailed in the following section.

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 in FY2019/20 intends to disburse R392 million for various technology development projects and initiatives. This is against expenditure of invested R309 million in FY2017/18, and an estimated R346 million in FY2018/19, with an average of 70% of these funds invested in enabling innovation through the provision of technology infrastructure to innovators.

TIA's performance is in direct response to the gaps identified downstream within the innovation value chain where there is insufficient capacity to localise innovations developed. The remaining period to the end of the strategic cycle, will see the deployment of the Glass Pipeline initiative which will strengthen TIA partnerships to progress innovations and leverage third party funding with key institutional and private sector funders.

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Key indicator 1.1: Number of technologies, processes or services advancing by one or more TRL's

Strategic Target FY2015/20	Cumulative Planned Performance FY2015/16 - FY2017/18	Cumulative Actual Performance FY2015/16 - FY2017/18	Year-to-date Variance	Status[2]
102	44	92	+48	Target Exceeded

Of TIA's total portfolio funded in FY2017/18, 34 projects advanced by one or more Technology Readiness Levels with some reaching demonstration stage. This is an increase three from the 31 projects realised for the same indicator in FY2016/17 twenty seven being realised in FY2015/16) due to the contribution of the Seed Fund Programme. The moderate increase is attributed to the decline in the number of applications approved during FY2017/18.

To improve on this, Calls for applications have been scheduled in FY2018/19 to ensure that there is a steady pipeline of projects for consideration. Twenty eight technologies are estimated to progress along the innovation value chain in FY2018/19 while a total of 30 are planned for FY2019/20. For the remaining period, much emphasis would be placed on improving the quality of the portfolio through strengthened internal processes that support the progression of ideas.

Key Indicator 1.2: Number of innovation project outputs taken up in the market

Strategic Target FY2015/20	Cumulative Planned Performance FY2015/16 - FY2017/18	Cumulative Actual Performance FY2015/16 - FY2017/18	Year-to-date Variance	Status[3]
51	28	49	+21	Target Exceeded

In FY2017/18, TIA facilitated the commercialisation of 19 innovations compared to an estimated 11 in FY2018/19. The slight decrease represents the maturity level of the TIA portfolio whereby projects have all reached the technology demonstration phase. Despite the decline, the performance reflects an active demand for innovations supported. For the remaining strategic period, TIA is on track to realise the strategic target of 51 as 11 technologies in FY2019/20 are planned for commercialisation with a year remaining of the strategic cycle.

2. The performance levels reported related to the period 1 April 2015 to 31 March 2018. The performance achieved in FY2018/19 period ending 31 March 2019 will be reported on the 30th May 2019.
3. The performance levels reported related to the period 1 April 2015 to 31 March 2018. The performance achieved in FY2018/19 period ending 31 March 2019 will be reported on the 30th May 2019.

Key Indicator 1.4: Amount of Income recognised

Strategic Target FY2015/20	Cumulative Planned Performance FY2015/16 - FY2017/18	Cumulative Actual Performance FY2015/16 - FY2017/18	Year-to-date Variance	Status[4]
R 665,3m	R 363,1m	R 331,6m	-R31,5m	91% in progress

To support technology development and pre-commercialisation activities, TIA has put plans in place for the FY2019/20 to raise additional income of R154 million. This is against an amount of R 67 million realised in FY2017/18 and an estimated R108 million in FY2018/19. The decrease in funding raised is attributed to prevailing economic conditions in the corresponding years.

Goal 2 – Increase infrastructure access for technology development

Key Indicator 2.1: Number of knowledge innovation products produced as a result of TIA funding and support programmes

Strategic Target FY2015/20	Cumulative Planned Performance FY2015/16 - FY2017/18	Cumulative Actual Performance FY2015/16 - FY2017/18	Year-to-date Variance	Status[5]
350	159	238	+79	Target Exceeded

TIA, through its network of 18 Technology Stations and eight Technology Platforms, provides access to expertise and high-end infrastructure for the development of technologies. 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 though the value chain.

In FY2019/20, a total of 100 technologies and knowledge innovation products such as prototypes, patents, technology demonstrators and technology transfer packages are targeted to be supported from these facilities. This is against an estimate of 91 being realised in FY2018/19.

FY2017/18 saw 98 new knowledge products being developed; this is an increase of 53% from the FY2016/17 which saw 64 knowledge products developed. The continued investment into innovation enablement infrastructure and seed funding for HEIs and SMMEs has contributed to the progress. Each of these supported a range of projects to develop technology demonstrators in various scientific and technological disciplines. Plans are underway to increase the operating capacity of the technology infrastructure and aligning these closer to industry.

4. The performance levels reported related to the period 1 April 2015 to 31 March 2018. The performance achieved in FY2018/19 period ending 31 March 2019 will be reported on the 30th May 2019.
5. The performance levels reported related to the period 1 April 2015 to 31 March 2018. The performance achieved in FY2018/19 period ending 31 March 2019 will be reported on the 30th May 2019.

Key Indicator 2.3: Number of SMMEs receiving technology support

Strategic Target FY2015/20	Cumulative Planned Performance FY2015/16 - FY2017/18	Cumulative Actual Performance FY2015/16 - FY2017/18	Year-to-date Variance	Status[6]
14 200	7 000	7 258	+258	Target Exceeded

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. A total of 3 840 SMMEs are targeted to be assisted during FY2019/20 against an estimated 3 360 in FY2018/19. Reflecting on the performance of the programme during FY2017/18, it can be noted that a total of 2 800 SMMEs were supported in comparison to 2 261 in FY2016/17 and 2 197 in FY2015/16.

From those supported in FY2017/18, 1 475 were Previously Disadvantaged Individuals (PDIs); 1 092 were youth; 794 were black women and 11 were disabled people. The continued performance from these programmes highlights the ongoing demand for such services. For the remaining strategic period, additional technical services would be added to the overall service mix in order to bolster the level of expertise offered to SMMEs.

6. The performance levels reported related to the period 1 April 2015 to 31 March 2018. The performance achieved in FY2018/19 period ending 31 March 2019 will be reported on the 30th May 2019.

Goal 3 – Stimulate an agile and responsive NSI

Over the strategic period to date, TIA has made concerted efforts to align itself with key partners in the NSI. Including multiple engagements with main and sub-actors within the ecosystem. Key among these is the knowledge-generating community of Higher Education Institutions (HEIs), Science Councils (SCs) 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.

Key Indicator 1.3: Amount of Additional funding attracted into TIA's portfolio

Strategic Target FY2015/20	Cumulative Planned Performance FY2015/16 - FY2017/18	Cumulative Actual Performance FY2015/16 - FY2017/18	Year-to-date Variance	Status[7]
R 551m	R 247m	R 397,3m	+R 150,3m	Target Exceeded

TIA's portfolio also continued to attract interest from third parties that have invested a total of R117,2 million for FY2017/18 in comparison to R182,2 million in FY2016/17. This represents a 36% decrease from the previous financial year, which is attributed to the current economic conditions that have led to a reduction in opportunities to raise funding from third parties.

In the face of the flagging economic environment it is estimated that R147 million will be raised during FY2018/19. For the FY2019/20 TIA plans to raise R160 million to augment the funding availed in support of funded projects through mobilisation of strategic partnerships across the innovation value chain over the remainder of the strategic period.

Key Indicator 2.5: Number of Technology Innovation initiatives undertaken by TIA

Strategic Target FY2015/20	Cumulative Planned Performance FY2015/16 - FY2017/18	Cumulative Actual Performance FY2015/16 - FY2017/18	Year-to-date Variance	Status[8]
124	44	152	+108	Target Exceeded

TIA participated in various thought leadership initiatives to inform the national discourse on innovation. For FY2017/18, 69 strategic engagements were undertaken which is 23% higher in comparison to 56 in the previous financial year. Forty six initiatives are targeted for FY2018/19 with a marginal increase to 47 planned for FY2019/20.

The continued increase in activity is because of concerted efforts to position TIA as a thought leader within the broader NSI. The technology landscape is largely fluid and sustained dialogue is needed in that stakeholders are apprised about latest developments.

7. The performance levels reported related to the period 1 April 2015 to 31 March 2018. The performance achieved in FY2018/19 period ending 31 March 2019 will be reported on the 30th May 2019
8. The performance levels reported related to the period 1 April 2015 to 31 March 2018. The performance achieved in FY2018/19 period ending 31 March 2019 will be reported on the 30th May 2019

6.1.5.A. TIA'S CONTRIBUTION TO THE BIO-ECONOMY STRATEGY

The DST approved the Bio-economy Strategy in 2013. Over the past period, TIA has supported the implementation of the strategy based on its portfolio in Agriculture and Health. The strategy covers a wider set of areas inclusive of agriculture, health, industrial bio-tech and Indigenous Knowledge Systems (IKS). The Health and Agriculture portfolios have a long history of funding, but need to be refocussed in line with the strategic priorities of the Department of Health, the Medical Research Council (MRC), the Department of Agriculture, Forestry and Fisheries, together with the Agricultural Research Council (ARC) and the agricultural industries.

This realignment will be a major focus for TIA during FY2019/20 so that TIA can identify the priorities and opportunities where maximum impact can be made in funding technologies that can reach the market and be taken up by the relevant stakeholders. This will involve a significant level of liaison with the stakeholders and partners in these two areas, and constitutes two of TIA's strategic roles as connector and facilitator.

Over the last two years, the DST has transferred several strategic innovation programmes that fall within the scope of the bio-economy as specific contracted programmes. These are amongst others, Agriculture Bio-technology Innovation Programme; Forestry Genomics Molecular Programme; South Africa Bio-design Initiative and the Strategic Industrial Bio-innovation Programme.

In FY2019/20, there will be intensified efforts to execute initiatives within existing Agriculture and Health focus areas that form part of the core grant, and an increase in momentum to implementing the contracted programmes.

Planned performance FY2019/20

Key enabling interventions are aimed to facilitate a coherent policy and funding environment encompassing greater dialogue within the ecosystem. These improved measures in coordination and alignment will endeavour to:

i. Identify gaps in sector development to facilitate development of technology road maps as required;

ii. Better support the bio-entrepreneur;

iii. Facilitate advocacy and lobbying on key regulatory and incentive matters, and

iv. Enable up and downstream institutional capacity building at bio-entrepreneurial level to contribute to industry competitiveness.

TIA's bio-economy implementation for FY 2019/20 considers the budget allocation of R186 million with associated deliverables for the baseline MTEF allocation, in comparison to previous years' funding.

Table 3: Bio-economy five year picture

Bio-economy five year picture	2014/15 Actual outcome R'000	2015/16 Actual outcome R'000	2016/17 Actual outcome R'000	2017/18 Actual outcome R'000	2018/19 Forecast R'000
Allocation Letter	155 428	157 253	153 141	156 048	165 678

RING-FENCED PROGRAMMES

Health

The overall priority areas are listed below with a range of activities already in place in areas such as medical devices (including diagnostics), drug discovery and development, as well as nuclear medicines. Major initiatives in the FY2019/20 cycle will include the implementation of the Medical Devices Cluster and the Active Pharmaceuticals Cluster, and the involvement of the Centre for Proteomic and Genomic Research (CPGR), Metabolomics Platform and the Kwazulu-Natal Research and Innovation Sequencing Platform (KRISP) (in particular) in the Precision Medicine initiative in collaboration with the MRC.

Technology Platforms Programme

The purpose of the platforms are to provide high-tech specialised research services and development support to the academic and commercial sectors. Bio-science is one of the prominent activities in the platforms, undertaken in support of the bio-economy.

The Technology Platforms Programme (TPP) has a long history in TIA and the precursor agencies. There are currently eleven platforms, distributed around South Africa, with several different models of governance and with different focus areas including, genomics, proteomics, metabolomics, drug discovery, whole body imaging, and bio-processing.

Planned performance FY2019/20

In FY2019/20, the direction and focus of the platforms will be reviewed for optimisation of outputs. This will necessitate the determination of appropriate business models for the individual platforms, while also allowing the review of the strategic positioning of the platforms in the overall Bio-economy Strategy.

Table 4: Bio-economy Focus Areas FY2019/20

Bio-economy Focus Area	TIA Strategic Implementation in FY2019/20
Health	• Medical Devices and Diagnostics • Digital Health • Bio-pharmaceuticals • Active Pharmaceutical Ingredients • Drug Discovery • Nuclear Medicines • Precision Medicines
Indigenous Knowledge Systems	• African Traditional Medicines • Nutraceuticals • Cosmeceuticals
Industrial Bio-technology	• Bio-manufacturing • Microbial Bio-prospecting Initiative • Industrial Bio-catalysis Initiative • Bio-refinery and bio-processing

Agriculture, Forestry and Fisheries

There are already substantial, focussed areas of activity in these sectors, with the Beef and Dairy Genomics Programmes reaching the end of phase 1 funding; the Animal Health Cluster[9] reaching its eighth year of funding; the transfer of several field crops programmes (wheat, maize and soybeans) into TIA from the DST under the ABIPP programme; and through the transfer of the Forestry Molecular Genetics (FMG) group into TIA as a cluster. The work to develop an Aquaculture Cluster/Programme is ongoing, and will reach a stage of funding projects during FY2019/20, which should provide significant impetus to an industry that has previously developed very slowly.

Table 4: Bio-economy Focus Areas FY2019/20 (continued)

Bio-economy Focus Area	TIA Strategic Implementation in FY2019/20
Agriculture (e.g. ABIPP)	• Plant Health and Reproduction • Animal Health, Nutrition and Breeding • Post-Harvest Technologies • Agriculture Bio-economic Partnership Programme • Oilseeds and Oilseed Products • Aquaculture • Agri-Parks Initiatives
Natural Resources	• Water Security and Bio-remediation of Domestic and Industrial Waste Water • Waste Management and Beneficiation; Bio-leaching and Bio-metallurgy

Environmental

South Africa loses 32 per cent of its water through water leakages costing R8 billion per annum. The business unit has embarked on various water leakages initiatives. The Tshwane Municipality will be used as a pilot to implement various technologies and implement water behavioural changes. Once the pilot has proven successful, this programme will be rolled out to other metropolitan areas.

On waste management and beneficiation, the Business unit is funding the Durban University of Technology with project involving the production of sustainable and environmental friendly micro-algal technology package to produce bio-fuel with the simultaneous treatment of tertiary effluent.

9. A programme constitutes a collection of similar but different projects, whereas a Cluster is made up of several institutions/entities collectively working together as a multi-stakeholder vehicle to achieve a common innovation objective in a coherent manner, thus removing duplicity and simultaneously strengthening cohesiveness in the NSI as a national priority, stimulating innovative technology development from national to local government levels.

Environmental

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Technology Innovation Clusters

The cluster approach represents a major opportunity for the strategic alignment of Full Value Chains within the bio-economy. Current examples include the Beef and Dairy Genomics Programmes and the Animal Health Cluster. Alignment of research, development and commercialisation in accordance with the needs of the industries has been key to its implementation. Central to the successful progress of these clusters is the involvement of industry partners in the activities and funding of the clusters. The Beef Genomics Cluster is expected to move to a fully funded industry model after the second phase of funding from TIA. It is currently funded by industry partners to the tune of 70% of the total budget.

Planned performance FY2019/20

New clusters, in the FY2019-20 cycle, will include the Medical Devices Cluster, the Active Pharmaceuticals Cluster and the Forest Molecular Genetics (FMG) Cluster (FMG was previously funded directly by the DST).

Over and above the baseline allocation, the DST has contracted TIA to undertake the following programmes to support the realisation of its Bio-economy Strategy.

SPECIFIC CONTRACT PROGRAMMES

Strategic Industrial Bio-Innovation Programme (SIIP)

The programme commenced during quarter 3 of FY2018/19 and is envisaged to be completed by 31 March 2021.

The objective of the programme is to prioritise and support research, development and innovation in biological processes to produce goods and services. These could be applied to enhance water and waste management practices in support of a green economy. In addition, the programme will build capacity in the fields of environmental and industrial bio-technology.

Planned performance FY2019/20

The SIIP investment will be directed towards the following strategic outcome-oriented goals:

Table 5: Industrial Bio-Innovation Programme Key Performance Indicators FY2019/20

Strategic outcome-oriented goal	Increased knowledge generation
Goal Statement	During the two-year implementation period, SIIP seeks to generate knowledge outputs and application products in different research focus areas of the industrial bio-economy.
Proxy Indicators	**Proxy indicator 1**: 9 prototypes, 1 technology demonstrator, 2 technology packages and filing of 2 patents. **Proxy indicator 2:** 44 publications generated in ISI-accredited research journals between 2018-2020.

Table 5: Industrial Bio-Innovation Programme Key Performance Indicators FY2019/20 (continued)

Strategic outcome-oriented goal	Human capital development
Goal Statement	Within phase I of implementation, SIIP seeks to train high-level graduates (Masters and PhD).
Proxy Indicators	**Proxy indicator 1:** 26 postgraduate students will be supported between 2019/20 within the SIIP initiative.

The prime aim is to develop an artificial/constructed wetland system that is capable of treating wastewater to acceptable levels (according to the National Water Act no. 36 of 1988 of South Africa) before disposing to open water areas.

Wetlands act as a filtrate, which in turn breaks down contaminants in run-off and industrial water from various sources. The activity prevents elevated internal nutrient overload or contamination, which may result in algae blooms and fish mortality, or that would make water unsuitable for human consumption.

Wetlands, whether it be natural or artificial, have the ability of forming an oasis for both humans as well as wildlife. Benefits include improved water quality of surrounding rivers and dams, landscape enhancement for communities, increased fish and wildlife habitat (i.e. ecosystem improvement) as well as recreational and educational activities.

Enzyme technologies from indigenous microbial diversity have a rich natural biodiversity across various biomes which serve as a source of enzymes for various applications, including reagent enzymes for use in molecular biology applications. As cross-cutting tools, the reagents market could contribute to human health, food security and industrial themes of the bio-economy.

The project objectives include research and development of the current pipeline of enzymes, including Intellectual Property (IP) and freedom to operate reviews, development of technology packages for specific enzyme genes and further engineering to develop enzymes into market ready products.

Enzyme and microbial technology is used for exploitation of microbial enzymes for valorisation of waste chicken feathers and other proteinaceous agro-industrial wastes.

South Africa has a vast agricultural sector that generates large amounts of waste, and disposal of waste is problematic due to shortages of landfill space and their contribution to green-house gas emissions. The project objective is to explore high-value enzymes from microbial resources. The intent is to beneficiate certain agro-waste biomass, such as chicken feathers, into functional peptides for use in animal feed supplements to improve nutrient release in food and dairy industries; and other economically viable products. This would contribute to waste management, development of high value products and focus on a new sector for economic benefit.

The allocated amount for the project is R18,1 million.

i. For FY2019/20 R8,8 million,
ii. For FY 2020/21 R9,3 million, and
iii. A 5% management fee for TIA is included.

Agriculture Bio-economy Innovation Partnership Programme (ABIPP)

ABIPP is now strategically working on a food security initiative – a Soybean Food and Nutrition Programme. The current agreement with the Oil and Protein Seeds and Development Trust (OPDT) is for a period of three years:

i. To conduct an Awareness Training on Soybean nutrition as an alternate staple source of protein food;

ii. Train communities on agriculture practices and techniques to achieve good soybean yields, and

iii. Facilitate SMME development and Agro-processing techniques for candidates interested in starting their own small-holding agro-businesses.

Of the total number of people trained from 20 communities that benefited from the programme, 11 are women from African Cooperative Action Trust (ACAT) and Ethembeni Trust from Uthukela and uKhahlamba Districts in Kwa-Zulu Natal. The programme has been piloted in a couple of rural areas of KwaZulu-Natal, Eastern Cape, Free State and Gauteng. A total of R900 000 has been invested to date as the government's portion by DST while OPDT contributed R442 000. An additional R1,4 million is planned for investment during FY2018/19. Co-funding to the same amount is expected from OPDT as per the existing agreement, as co-funding under this programme from OPDT is 50/50 with the DST (now TIA) funding.

Planned performance FY2019/20

Current efforts are mainly directed towards the establishment of the Bio-Innovation Aquaculture Programme, as well as the Agro-processing Pilot projects of indigenous niche commodities: Marula, Honeybush, and Cape Aloe, with the IDC, ARC and CSIR being lead partners. The Bio-Innovation Aquaculture Programme is being initiated from scratch, with the most effort spent on mobilisation of key stakeholders, consultations and organising of workshops to identify thematic areas to focus investment effort on technology innovation and development for the aquaculture industry.

Table 6: Agriculture Bio-economy Innovation Partnership Programme Disbursements

Strategic Innovation Bio-Industrial Programme (SIIP)	
First tranche (Year 1 – 2017/18)	R 5 550 290
Second tranche (Year 2 – 2018/19)	R 19 550 809
Third tranche (Year 3 – 2019/20)	R 19 550 809
TOTAL	**R 44 651 908**

South African Bio-Design Initiative (SABDI)

This is a special project created by the DST to co-ordinate and support high-end skills development in the strategic and emerging life sciences areas of functional genomics, structural and synthetic biology disciplines.

SABDI has a strong transformative element and seeks to promote the understanding, design and re-engineering of life systems at the level of molecules, cells and organisms to create and/or develop products and processes useful to humanity. By allowing the four essential and complementary techniques to grow and cross-pollinate, SABDI evolves novel synergies resulting in solutions not achievable by applying each of the disciplines individually.

Supporting Bio-entrepreneurship

Entrepreneurs are found across many sectors. What distinguishes a bio-entrepreneur from any other, is the particular interest in the bio-science which in itself is fraught with uncertainty and high risks. TIA encourages such bio-entrepreneurs to become involved in its bio-economy programmes, whether through existing projects, predictive calls, investment applications or participation in joint bio-development projects, especially at the various platforms. Under its Innovation Skills Development (ISD) Programme, TIA has four bio-entrepreneurial skills development initiatives. These are: (1) the Gauteng Accelerator Programme (GAP) undertaken in collaboration with The Innovation Hub (TIH) and the Emory University of Georgia, USA; (2) the Swiss training programme; (3) the Newton Fund, UK; and (4) the Royal Engineering Academy (RAEng), UK. (To note: the activities under sub-items (2), (3) and (4) are not solely bio-related, as other sectors are also covered.) Bio-entrepreneurship finds expression within KPI 2.3 (technology support to SMMEs).

THE TOTAL RING-FENCED AMOUNT AWARDED TO SABDI IS R25M. THUS FAR, R21M HAS BEEN COMMITTED TOWARDS FOUR APPROVED PROJECTS

6.1.5.B. CONTRIBUTION OF THE TECHNOLOGY STATIONS PROGRAMME (TSP)

The Technology Stations Programme supports innovation activities related to precision manufacturing solutions, virtual prototyping, simulation and analysis, process computational predictions and machine connections.

The TSP is rolled out nationally with partners to respond to the need for the next generation "hybrid" public-private tech-incubators that undertake advanced manufacturing, automation and machine data processing, test beds and the use of alternative materials and processes. This type of hybrid public-private technology based incubator will contribute to the competitiveness of firms both small and large.

There are key weaknesses that prohibit commercialisation for entrepreneurs who are serviced by government via enabling incubators and accelerators, this is attributable to:

i. Encouraging entrepreneurship by recognising international talents / overseas based skills and exposure.

ii. Developing new industries: IP-knowledge driven and new scientific exploitation. The IP Survey has reflected commercialisation aspect (i.e. 7-2-1 sharing) to be weak for public funded development.

iii. Ecosystem for innovative enterprises to be build next to top universities.

iv. Community/Municipality and youth development based programmes towards underserved municipalities as guided by the Institute of Race Relations comfort / deprivation index measures.

v. Governance and Management: big business involvement required trust not the *"red tape"* lengthy processes that do not provide value.

Planned Performance

During FY2019/20, TIA will undertake assessments of all those SMMEs supported by TIA; the impact of TSP's support, growth in business, jobs, profitability, sustainability and location within private firms. Economic clustering and collaborations in bio-technology are essential in clarifying innovation and science which are people-oriented.

A cluster approach that is informed by the incubation development method can enable the exploration and hybrid models for speedy scientific and technology achievements which are transformational. The Government requires entities in the STI environment to render broad-based support to SMMEs, for example through walk-in support at Technology Stations.

Furthermore, in the FIR, the Technology Stations efforts will be focused on diffusion of emerging technologies that will shape the realisation of the bio-economy to effectively integrate solutions in medical devices, renewable energy technologies, artificial intelligence, simulation, precision farming and agro-processing in the Technology Stations' activities to respond to poverty and inequality.

For the FY2019/20, the Technology Stations will introduce technologies for transformative business applications into the programme to scale up the automation and data exchange in manufacturing technologies within the Technology Stations' network. It is anticipated that this introduction will increase the programme's agility, adaptability, responsiveness and increase collaborative initiatives.

6.1.5.C. CONTRIBUTION OF TIA COMMERCIALISATION OUTPUTS

In reviewing the nature of commercialisation trends in the NSI, data from NIPMO has revealed that the R&D conversion and traction to commercial utilities over the past seven years, sits at a low rate of 8.7% and this is largely due to (i) lack of industry/market relevance of the R&D outputs and (ii) failure to meet user requirements (iii) the amount of time it takes for the technology to be market ready (e.g. in the pharma sector it could take no less than 10 years) and (iv) lack of funding capital expenditure (CAPEX) for new products (pre-revenue) Start-ups / Businesses.

Pipeline of publicly financed Intellectual Property (since 2 August 2010) **1 409 disclosures**	**Of which have a granted Intellectual Property Right** **243 disclosures (21.2%)**	**Of which have been commercialised** **122 disclosures (8.7%)**
Exclusive Licenses **78**	**Licenses granted to SMMEs / B-BBEE Status** **41**	**Revenue received by institutions from commercialised Intellectual Property** **> R 10,6 million**
OTT Support Fund funding to date **R 104,3 million**	**Number of institutions that have received support** **28 Institutions and 2 regional offices**	**Number of highly specialised technology transfer posts created** **132**
Intellectual Property Fund disbursement to date **R 139,0 million**	**Number of Institutions that has received support** **24 Institutions**	

Figure 3: Seven (7) year R&D outputs and commercialisation 2011-2017.

Planned performance FY2019/20

In FY2019/20, from the current portfolio of projects, 11 technologies within the IFPCS portfolio are earmarked for commercialisation. The deployment of these technologies will contribute to economic growth through the creation of new industries.

In addition, TIA also assists innovators to secure funding from companies, venture capital firms, donor funding and development finance institutions for the commercialisation of products, services and processes developed through TIA's support. For the year ahead, a targeted amount of R140m is estimated to be leveraged from third parties that will co-invest with TIA to develop and commercialise innovations.

TIA has strategic relationships with upstream and downstream funders to support de-risking the technology developed and enterprises established by the innovators. The commercialisation progression will be further enhanced through a dedicated process of Market and Business Readiness Levels scrutiny, assessment of (MRL and BRL) and preparing to enhance sustainable launch of start-up commercial ventures.

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6.1.6. ANALYSIS OF EXTERNAL ENVIRONMENT

The Organisation for Economic Co-operation and Development (OECD) Science Technology and Innovation Outlook 2016 Report outlines the emergence of deep socio-economic, political, environmental and technological trends which are shaping the interaction of global economies and societies.

These developments are multi-dimensional and highly complex in their evolution and are projected to affect the direction and pace of future technological changes and STI policies.

The key areas of concern:

i. The impact of climate change, ageing societies and growing digitalisation which are beginning to influence the scope, scale and pace of future innovation demand,

ii. The level of activity within emerging technology domains is resulting in increased competition for talent in developed regions resulting in skill deficiencies in developing regions,

iii. The regulatory and policy framework of national government is unresponsive to the nature of technological change. This has resulted in the erosion of social cohesion and exacerbated processes in resource allocation for service delivery,

iv. Emerging technologies are disrupting societies resulting in uncertain outcomes relating to job security for the labour force in traditional value chains, and

v. Government expenditure on R&D is constrained by the balance between investing in an unpredictable STI future and the policy imperatives to redress the immediate economic conditions.

In contending with the changing technological landscape, according to the OECD Science, Technology and Industry Scoreboard 2017, it can be observed that mobility, cloud computing, the Internet of Things (IoT), Artificial Intelligence (AI) and big data analytics are among the most important technologies in the digital economy today. Collectively they are enabling a future of “smart everything”, and empowering businesses, consumers and society. The pace and scale of the emerging global transitions underpin the need to understand the complex and inter-connectedness of the innovation ecosystem to position TIA’s strategic programmes as a catalyst in encouraging interaction amongst the various roleplayers within the NSI.

Fourth Industrial Revolution (FIR)

The emergence of exponential technologies has led to various engagements between academia, industry and government with respect to the level of readiness of the country to contend with Artificial Intelligence (AI), the Internet of Things (IoT) and big data. The FIR is spurring the development of new production techniques and business models that will fundamentally transform manufacturing processes. Both the speed and the scope of technological change, combined with the emergence of other trends, add a layer of complexity to the already challenging task of developing and implementing industrial strategies that promote productivity and inclusive growth.

According to the National Advisory Council on Innovation (NACI) 2017 STI Indicators, from 2006 to 2016, there had been 3 874 publications related to FIR disciplines with most of these relating to nanotechnology robotics, artificial intelligence and 3D-printing. The research institutions contributing to this are the University of KwaZulu-Natal (UKZN), the Centre for Scientific and Industrial Research (CSIR), the University of Johannesburg (UJ) and the National Research Foundation (NRF), demonstrating that the country has the knowledge capacity to contend with this megatrend.

TIA supports the efforts of the DST and other partners in the NSI to respond to this emerging paradigm via the development of a long-term STI plan of action for socio-economic development. The Departments of Trade and

Industry, Telecommunications and Postal Services are collectively leading government-wide efforts to develop a strategic response to the FIR.

South African Innovation Landscape

The 2017 Global Innovation Index Report, which measures the innovation performance of 127 countries and economies using a scale of 81 indicators and scores each country based on innovation input and outputs, revealed that South Africa's ranking dropped to 57th (out of 127 countries) from 54th (out of 128 countries) in 2016. This was mainly attributed to declining innovation input performance in terms of human capital, research and institutions. This is despite a moderate improvement in the innovation outputs in terms of knowledge, technology and creative outputs.

This further outlines the case for the implementation of TIA's Glass Pipeline initiative which aims to promote porous boundaries between the researchers and the market through enabling a singular view of innovation activity in the NSI. This aligns with the STI White Paper which argues for improving coordination across research institutions and funding agencies.

The NACI STI indicators for FY2017/18 reveal that 2016 marked the highest number of patents granted by the United States Patent Office (USPTO). The number of patents awarded was 160 in comparison to 151 the previous year. The patents were awarded to private sector companies, individual citizens and a modest number from HEIs. Despite the increase, it should be noted that Japan has over 50,000 patents granted annually which seems lofty in comparison to South African patents granted. This reinforces the case for TIA to capacitate all downstream actors with the NSI with the necessary instruments to support an increase in the number of patents granted. The case is further sustained by the observations made in the Technology Transfer Survey of FY2014/15 which revealed that the Offices of Technology Transfer (OTT), hosted at universities across the country, are under-resourced financially and that more than half of all staff employed have less than four years experience.

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. 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.

Science Councils

Science Councils constitute key partners in the generation of market-oriented research from which TIA draws its investment pipeline. South Africa has at least ten of these, with sector-specific mandates such as in health, agriculture, energy, space and water. TIA continues to work in collaboration with each of these and has, in some cases, signed formal agreements to promote seamless transfer of promising innovation projects into the TIA funding cycle. These partnerships also seek to promote exchange of information, establishment of multidisciplinary evaluation teams under a structured framework to maximise utilisation of available skills in the NSI.

Economic Landscape

The economic outlook over the medium-term for FY2019-2021 suggests that growth will remain subdued owing to slower global demand emanating from escalating trade tensions.

These tensions pose a risk to the economy as they may result in lower commodity prices, volatile crude oil prices and weaker local currency which may lead to slightly tighter monetary and fiscal policies being adopted. GDP growth will drop to 0.7% in FY2018/19 before rising to 1.7% in FY2019/20 and 2.1% in FY2020/21.

Confronted by low domestic growth and an uncertain global environment, government is taking steps to bolster economic activity, investment and job creation in the short to medium-term:

i. Firstly, the economic stimulus and recovery plan announced by the President in September 2018, seeks to focus public spending in areas that can grow the economy, create jobs, accelerate necessary growth-enhancing reforms, promote infrastructure development, and tackle problems in education and healthcare. The stimulus plan places agriculture, manufacturing and tourism as critical sectors which need support to drive growth over the medium-term, and

ii. Secondly, the President in October 2018 led an investment summit that resulted in nearly R290 billion worth of investment pledges from local and international companies. It is estimated that this investment would add an estimated R338 billion to South Africa's GDP over the 2019–2024 period, create or sustain an estimated 165 000 direct and indirect jobs (on average per year) and generate an estimated R59 billion in additional government revenue.

Technology Innovation Funding Landscape

In understanding the funding landscape in South Africa, figure 4 shows the major funders of R&D and innovation in South Africa.

The instruments and mechanisms to support technological innovation, aside from TIA's risk funding instruments, are as follows:

i. Technology and Human Resources for Industry Programme (THRIP) – the Dti.

ii. Support Programme for Industrial Innovation (SPII) – the Dti.

iii. Technology Programme – Small Enterprise Development Agency (SEDA).

iv. Industry Innovation Partnership (IIP) Programme – DST.

v. Technology Venture Capital Fund and sector / industry-specific competitiveness funds – Industrial Development Corporation (IDC).

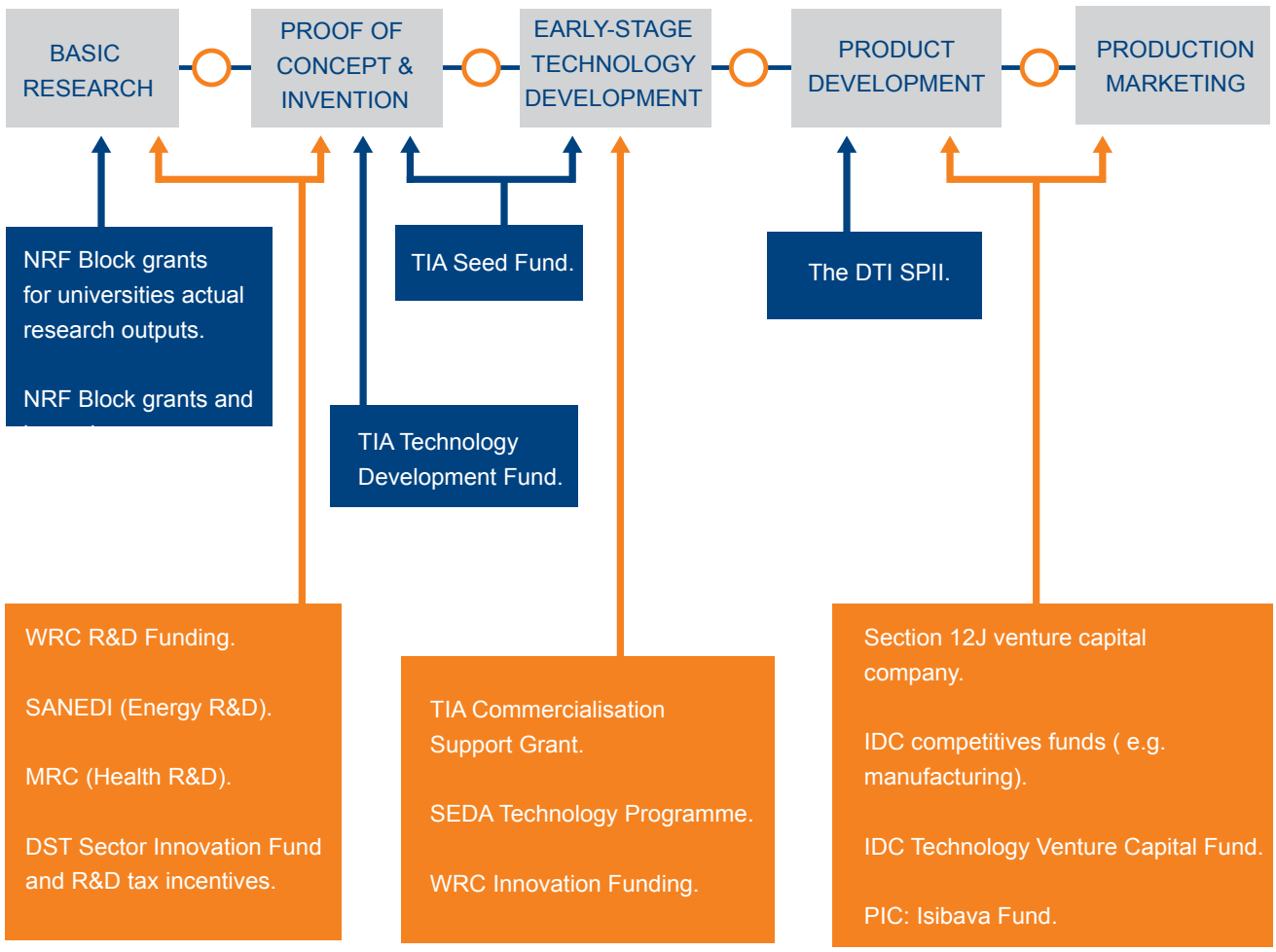

Figure 4: TIA depiction of the main funders of R&D and innovation along the innovation 'value chain' in South Africa. (Source: NACI).

In considering the level of activity across the technology funding landscape as articulated above, **(Ventureburn)** undertook a survey of over 153 techonoly start founders in South Africa and found that only 85 secured funding from angel investors, 3% secured funding from venture capitalists and 1% from government funding. The major funding source for tech start-up was through self-funding of which almost 38% of the respondents confirmed. This reveals that the requirements to access funding to commercialise innovation remain stringent due to the high levels of risk and that there are limited resources available resulting in fewer opportunities being funded. From the start-ups that accessed funding, 37% required less than R50 000; 30% needed R1 million to R5 million and 11% required R100 000 to R250 000. This further emphasises the need for rapid instruments for greater coordination amongst funding institutions in the country to ensure that early stage tech based start-ups receive financial support.

The **South Africa Venture Capital Association (SAVCA)** 2018 Venture Capital Industry Survey revealed that the reported value of investments made during 2017 was R1,2 billion which was an increase of 33% when compared to 2016 when R872 million was disbursed. Interestingly the report highlights that 42% of the

investments made were for start-up capital, 33% for funding growth and only 2% for Seed Capital. The level of activity indicates that there is a need for TIA to engage with funding institutions within the Venture Capital community to integrate internal processes to allow for seamless progression of innovators along the innovation value chain.

The **Industrial Development Corporation** (IDC) New Industries Unit reported that during the period ending FY2017/18, R140 million was approved for new investments in clean energy solutions, FIR, natural products and gas separation. This is a decrease of 38% in comparison to the previous financial year largely owing to the fact that during the year under review, the strategy was updated to define the priority areas over the medium term period.

The **2018 Tech Entrepreneurship Ecosystem in South Africa Report commissioned by Google**, reveals that there are various forms of funding options that exist throughout the country to support technology based start-ups. The report found that private equity is a vibrant and more dominant funding option for techno-prenuers in comparison to venture capital and angel investment. Activity related to the latter was less attractive as most start-ups reportedly elected to self-fund their growth and evolution.

Entrepreneurs

Entrepreneurial activity in South Africa remains moderately low as the country ranked 27th out of 54 (in terms of Total Early Stage Entrepreneurial Activity) participating countries in 2017 according to the **Global Entrepreneurship Monitor's Report.** This represented a marked improvement from the previous year in which the country was ranked 52nd out of 65 participating countries.

The progression in ranking is attributed to increased growth in the number of emerging entrepreneurs involved in starting a new business to introduce new products and or services to the market.

This is against a backdrop of South Africa's academic excellence and strong urban networks of entrepreneurs, where opportunities related to innovation are being stifled by an unconducive business environment, expensive trading costs, and a low skills base as per the **World Bank's 2017 South Africa Economic Update Report.**

The increase in rank reflects the demand for more entrepreneur-centric programmes within the country that are founded on an economic inclusion agenda focusing on creating jobs through innovation. There is a need however, to ease the regulatory requirements by enacting policies that enable the creation of a favourable business start-up transacting environment. TIA will continue to lobby respective governing bodies.

6.1.7. ANALYSIS OF INTERNAL ENVIRONMENT

Socio-Economic Impact Assessment

TIA commissioned Pretoria-based Urban-Econ Development Economists to conduct an Economic Impact Assessment (EIA) for FY2017/18. The overall purpose of the study was to determine the extent to which TIA is realising its mandate and to assess the economic impact of the strategic programmes and operations. The methodology 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.

i. **Programme 1:** Administration;

ii. **Programme 2:** Innovation Funding and Pre-Commercialisation and Support (IFPCS), and

iii. **Programme 3:** Innovation Enabling and Support (IES).

The overall TIA multiplier, i.e. the multiplying effect of the IFPCS, IES and Administration programmes, is provided in the table below. TIA's total impact below shows that it disbursed R573,18 million, which impacted on total new business activity by R2,04 billion, employment by 2 267 jobs, and income by R291,67 million.

Table 7: Economic Impact FY2017/18

Description	Direct	Indirect	Induced	Total
New Business Activity (Rm)	573,18	1 107,14	356,35	**2 036,67**
GDP (Rm)	93,79	465,49	150,34	**709,62**
Employment (Number)	31	1 705	531	**2 267**
Income (Rm)	8,23	218,23	65,21	**291,67**
Tax (Rm)	85,55	20,55	7,56	**113,68**

Source: Urban-Econ Calculations, 2018.

Table 8: TIA's Multipliers

Description	Direct	Indirect	Induced	Total
New Business Activity	1,00	1,93	0,62	**3,55**
GDP	0,16	0,81	0,26	**1,23**
Employment	0,06	2,98	0,93	**3,97**
Income	0,01	0,38	0,11	**0,50**
Tax	0,15	0,04	0,01	**0,20**

Source: Urban-Econ Calculations, 2018.

Based on the impacts of TIA's programmes and its administrative operations, **it's total multiplier effect is R3,55 for every R1,00 spent.**

Multiplying effects of programmes and sub-programmes are shown in the following figure:

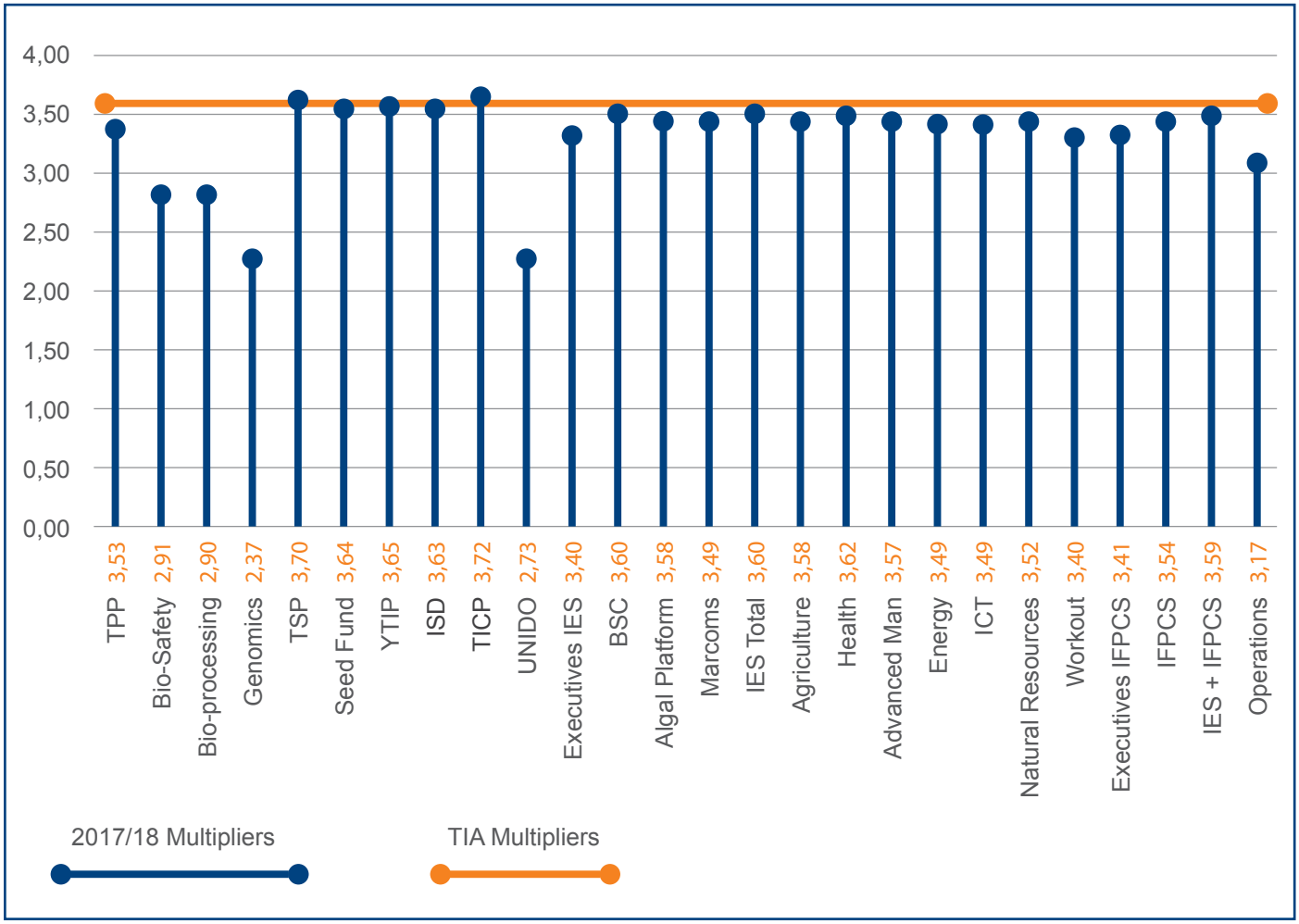

Figure 5: Total TIA Multiplier vs Sub-Programme Multiplier.

According to the Urban-Econ study, the average multiplying effect of all sectors in the national economy is 3,64, which means that TIA is just below the average national norm at 3,55. TIA is seen to have a greater impact when compared to relatable industries such as research (3,32) and financial intermediation (3,07). TIA's multiplier is in line with those of other industries. Regional multiplying effects differ from national multipliers for the same sectors due to the difference in nature, composition, and extent between the regional and national economies.

The relationship between the technology innovation sector and other sectors such as these is based on the backward and forward linkages in the economy. Therefore, TIA's impact is not limited to the NSI only, but it also creates benefits in multiple sectors outside this space. In FY2016/17 TIA significantly stimulated activity in Business Services; Transport and Communication; Trade and Accommodation; and Finance, while in FY2017/18 it stimulated the same sectors in the following order; Transport and Communication, Trade and Accommodation, and Business Services.

A comparison of TIA's total multiplying effect shows that its impact on the economy has been relatively constant from FY2010/11 and has improved since FY2016/17.

Table 9: TIA's Multiplier Comparison, 2010/11-2017/18

Financial Year	Direct	Indirect	Induced	Total
2010/11	1,00	1,10	0,78	**2,87**
2011/12	1,00	1,11	0,83	**2,94**
2012/13	1,00	0,94	0,79	**2,73**
2013/14	1,00	1,01	0,79	**2,80**
2014/15	1,00	1,06	0,77	**2,83**
2015/16	1,00	1,01	0,81	**2,82**
2016/17	1,00	1,66	0,72	**3,38**
2017/18	1,00	1,93	0,62	**3,55**

Source: Urban-Econ Calculations, 2018.

Stakeholder Analysis

FY2018/19 has seen major changes in the Research, Development and Innovation (RDI) landscape, with many roleplayers emerging to join efforts to support the drive towards translation of innovative ideas into products and services. The South African technology start-up landscape has become very dynamic and continues to see intensified efforts by public and private sector organisations to promote the growth and scale of SMMEs for job creation.

The policy landscape is also changing. In executing its mandate, TIA remains alert to these issues. Hence, its stakeholder engagement approach aims to navigate identified opportunities and leverage resources to accelerate activity where strong capabilities are evident and focus on capacity building in those areas where deliberate intervention is required. A few of the actions TIA will be undertaking in FY2019/20:

i. TIA's mandate, its services and role in the NSI,

ii. Improved communications with customers regarding progress made with funding applications,

iii. Positively addressing the shareholder demands with full accountability and results on planned commitments,

iv. TIA in collaboration with its partners will strive to create synergies with the TIA mandate,

v. All TIA's programmes aim to achieve a positive socio-economic impact, and

vi. TIA will implement an awards scheme to motivate employees to ensure job satisfaction, a fair reward system, to instil a sense of purpose and recognition.

6.2. ORGANISATIONAL ENVIRONMENT

It is imperative that an enabling internal environment is created to deliver TIA's mandate successfully. The FY2018/19 business performance was hampered by a lack of necessary skills and competencies due to various vacancies and a structure that needed to be redesigning to deliver effective results.

It was on this basis that three key aspects of business, i.e. People, Processes and Technology were emphasised during the FY2018/19. The following constraints were highlighted and will be focussed on during this planning phase:

i. Structure limitations resulting in a lack of suitable capabilities (skills and competencies),

ii. Silo and not streamlined business processes resulting in incoherent work activities,

iii. Lack of integrated business systems that hamper flexibility and agility required by the business, and

iv. Office facilities that are not conducive to encourage team work, creativity and innovation.

The organisation has adopted a theme *"Effective, Efficient Customer Centricity"* for FY2019/20 to be more responsive to customer needs and meet their demands. The implementation of the Talent Management Strategy will assist TIA to attract, develop and retain the required skills.
This initiative will ensure that TIA has the *"right people on the bus"* that are energised and give purpose and meaning to work by meeting and exceeding customer expectations. TIA regards its employees as knowledge workers who are encouraged to adopt new ways of working and thinking that lead to enhanced performance.

TIA's **ISO 9001:2015** accreditation, sustaining the quality of services rendered by the organisation to its customers to improve efficiency, is paramount for operational excellence. The accelerated pace of innovation has informed the need for speed and quality in responding to TIA's customer and employee demands. Business processes will be continuously improved for agility to streamline business decisions.

A revised IT Enterprise Architecture provides business systems integration for adoption of solutions that are scalable for the future. These systems will improve business performance by providing employees and customers with access on the go with seamless templates for ease of use and responsiveness. Information confidentiality and security management initiatives will be improved with various mechanisms to safeguard the environment from external and internal cyber security risks and illicit activities.

TIA's office space for accommodation will be optimised to foster flexible cooperation between units.

7. PLANNED STRATEGIC INITIATIVES

As TIA enters the last year of its Strategic Plan FY2019/20, it will embark on initiatives that ensure that the organisation transitions seamlessly into the next planning cycle, leaving a lasting legacy of demonstrable impact. The new White Paper on STI sets the agenda that emphasises inclusive development, transformation, increased budget for STI and a coordinated ecosystem.

The initiatives outlined below, represent the key actions that TIA will undertake in FY2019/20.

The Glass Pipeline - Towards a coordinated NSI

The Glass Pipeline model is a partnership mechanism through which TIA will promote efforts towards a coordinated national system of innovation. Through this model, TIA will promote porous boundaries amongst various stakeholders. Promoting a singular view of projects through which all partners at the upstream and downstream end of the innovation value chain can partner this seamless environment for innovation, commercialisation and start-up formation to thrive.

Multidisciplinary teams will be created through staff exchanges and secondments to share complementary expertise in project assessments.

Hub and Spoke Partnership Model

The model aims to promote collaboration with various government departments to develop and execute innovation programmes in support of their mandates. The DST's *"Annual Report on Government Funding for Scientific & Technological Activities FY2015/2016"* shows that, an estimated R23,4 billion was spent on Strategic Technology Activities (STAs) in the FY2015/16. The MTEF appropriations indicate that expenditure on STAs is estimated to increase to R26 billion by FY2018/19.

Many of these departments continue to pursue innovation activities that require strategic guidance, appropriate management and execution. The DST has concluded and approved a Framework for Science & Technology Cooperation with government departments that aims to guide the prioritisation of the science and technology cooperation. Through the Hub and Spoke model, TIA will support this initiative, playing its role as a service provider, using its unique institutional capabilities. These include fund management, project management, technical competencies and technology development infrastructure.

Start-up Nation - South Africa

Many successful economies are putting in place strategies to increase the rate of technology start-ups through effective coordination of existing instruments from government and industry. Start-up Nations / ecosystems have become the way to solve the common problem of lack of coordination and fragmentation of interventions. In FY2019/20, TIA will launch Start-up SA, working with a range of players in the NSI, including government, industry and academia.

Taking our Business to the World

TIA launched its International Partnerships Programme in 2017 in collaboration with the DST. The signature of the agreement to implement the DST's Africa Programme focussing on *"the establishment of technology innovation programmes between South Africa and African partner countries"*, marked the entrenchment of an outward focus that seeks to integrate TIA, its customers and the NSI.

Through the International Partnerships Programme, TIA will intensify efforts to expand its portfolio of relationships, pursuing six key result areas through various platforms around the world; through the Africa Programme; in multilateral forums and organisations; and other formations such as BRICS, SADC (the South African Development Community), AU (African Union), Global Innovation Fund (GIF), etc.

These are briefly described as:

i. Promoting bilateral collaborative research, development and innovation initiatives;

ii. Promoting market access and international networking for promising local technologies;

iii. Facilitate focused capacity-building partnerships for skills transfer into the NSI and Africa;

iv. Attracting investments into the STI for technology innovation and commercialisation;

v. Support regional and continental Science, Technology and Innovation initiatives as contained the AU and SADC Ministerial Declarations and Action Plans, and

vi. Positioning the TIA brand as the thought leader in innovation in Africa and beyond through the hosting of and participation in carefully selected international platforms, events and conferences.

Table 10: Partnerships - Key Result Areas (KRA)

Key Result Area	Key Performance Indicators (KPI)	Targets
(i). Bilateral Research, Development and Innovation (RDI) programmes	Number of innovations co-funded with African or other international partners	20 projects co-funded
(ii). Market access and international networking	Number of SMMEs successfully commercialising technologies in Africa or other international markets	15 technologies receiving follow-on funding or taken up in the market
(iii). Capacity-building	Number of inward-focused capacity building initiatives implemented	Four initiatives implemented
	Number of outward focused capacity building initiatives implemented in Africa	Two initiatives implemented in African countries
(iv). Fund-raising	Amount of funds raised through international partnerships to support TIA's strategic innovation programmes	R30 million
(v). Africa Programme	Number of innovation initiatives implemented to support regional integration in SADC (Industrialisation Strategy)	Two initiatives implemented
	Number of innovation initiatives implemented to support African Union's Science, Technology and Innovation agenda	One initiative implemented
(vi). Positioning TIA Brand	Number of initiatives implemented	Two initiatives implemented

TIA AIMS TO STRENGTHEN ITS POSITION TO INFORM RESEARCH AND INNOVATION AGENDAS WITHIN THE BIO-ECONOMY SECTORS IN COLLABORATION WITH THE DST

8. OVERVIEW OF THE FY2019/20 BUDGET AND MTEF ESTIMATES

TIA has made significant adjustments to the budget to accommodate the reduction in MTEF allocations recently. The current economic environment demands that TIA optimises its current financial resources. The aspirational strategic objectives and the challenges set by the minister and the new board, impose certain pressure on the budget and the capacity within the entity. TIA has identified opportunities to position itself as a national competency in innovation management, funding and commercialisation of technologies. This in turn would mean that funding may need to be leveraged from strategic partners to realise the set objectives.

Administration and Employee Costs

In considering the past five years, it can be noted that administration and employee costs reduced from R211,1 million in FY2013/14 to R189,6 million in FY2018/19. To ensure greater alignment to its mandate, TIA has identified the need to capacitate its operations to achieve greater efficiency for its strategic activities. To this end, administration costs are set to increase during FY2018/19 to FY2019/20.

Operational expenditure is expected to rise in alignment with the inflation rate. The human resources costs will rise due to; a higher salary benchmark applied to ensure the right talent is sourced and retained. To achieve this, a relaxation of the efficiency ratio previously targeted is needed over the MTEF period. This will be closely monitored by the accounting authority of TIA to ensure that it does not exceed the approved limit.

Investment Funding

For FY2019/20, TIA intends to disburse R98m towards Technology Development and Pre-commercialisation projects. This is to be funded through the baseline allocation amounting to R24,6 million and the bio-economy allocation amounting to R73,4 million. The budget allocation has been split at 85% towards technology development and 15% towards pre- commercialisation. Technology development projects tend to generally require significant financial support, in light of budgetary constraints,

TIA will support such projects through leveraging resources from strategic partners.

An amount of R133 million has been allocated for the Innovation Enabling Funding wherein TIA will continue to support the ISDP, the YTIP, the TPP, the TSP, the TIP and the Seed Fund for HEIs and SMMEs. The Innovation Enabling programmes are funded through the bio-economy allocation from the DST (R78,6 million) and TSP allocation amounting to R40,5 million. The balance of the amount will be funded from the baseline allocation and sourced through contract specific income and other income. TIA is currently reviewing its technology infrastructure programmes and will over the medium term assess whether the current operating models are effective in stimulating the NSI.

Other Income

TIA will continue to focus on securing other sources of income to support the programmes and project funding initiatives. This will be done through:

i. Contract specific funds from the DST;

ii. Other government institutions; and

iii. Through partnerships with the public and private sectors (Hub and Spoke model).

These contracted funds will form part of the investment budget of the entity in the form of new initiatives/specific funding as set out in the tables below. Technology development projects (maturing) are expected to yield financial returns to the entity in the form of royalties, loan repayments and other financial outputs will be used to fund new projects. TIA does not anticipate any roll-over of funds emanating from the inability to spend the MTEF allocation received from government during FY2019/20.

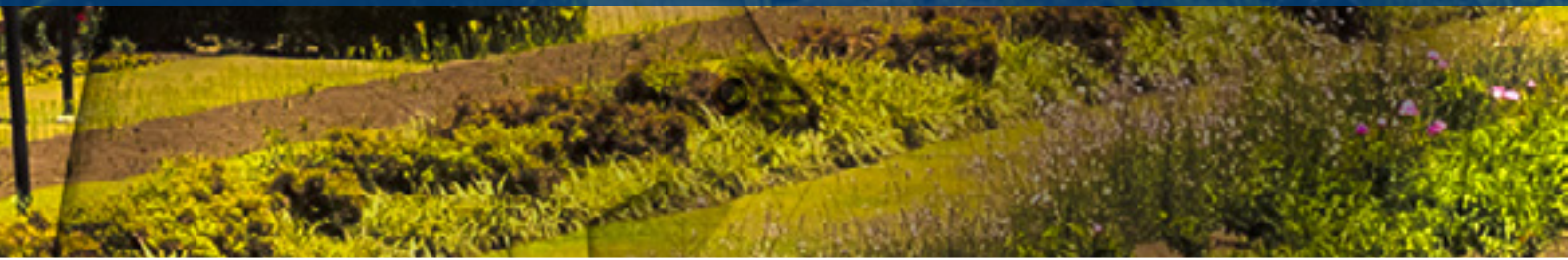

Table 11: TIA MTEF Budget FY2019/20 to FY2021/22 as per Allocation Letter

	2019/20		
	Baseline R'000	**Bio-economy R'000**	**TSP R'000**
Funding:			
Allocation Letter	214 927	185 516	40 486
Other Income	112 569	40 431	-
	327 496	**225 947**	**40 486**
Utilisation	327 496	225 947	40 486
Administration	202 017	15 879	-
Support and infrastructure cost	70 706	1 331	-
Human Resources	131 311	14 547	-
IFPCS	24 574	73 428	
IES	13 905	78 640	40 486
Technology Platforms	-	52 045	-
TSP	-	-	40 486
ISD	-	5 000	-
YTIP	-	3 000	-
TICP	8 105	5 895	-
Seed fund	4 500	9 000	-
GCIP	300	3 700	-
Thought Leadership	1 000	-	-
Consortium based Specific funding	87 000	58 000	-
Surplus (Deficit)	-	-	-

Table 11: TIA MTEF Budget FY2019/20 to FY2021/22 as per Allocation Letter (continued)

2020/21			2021/22		
Baseline R'000	Bio-economy R'000	TSP R'000	Baseline R'000	Bio-economy R'000	TSP R'000
206 729 145 855	195 719 57 145	42 713 -	229 711 153 712	205 960 65 956	45 019 -
372 584	**252 864**	**42 713**	**383 423**	**271 916**	**45 019**
372 584	252 864	42 713	383 423	271 916	45 019
214 102	16 867	-	225 294	14 438	-
74 913 139 189	1 447 15 420	- - -	78 449 146 845	1 525 12 913	- -
29 663 14 819	74 218 85 779	42 713	26 704 14 307	75 795 101 503	45 019
- - - 1 000 7 812 4 000 1 467 540	55 557 - 5 000 3 000 7 688 10 000 2 534 2 000	- 42 713 - - - - - -	- - - 1 000 4 040 6 750 1 827 690	63 410 - 6 500 3 375 14 085 9 350 2 673 2 110	- 45 019 - - - - - -
114 000	76 000	-	117 118	85 882	-
-	-	-	-	-	-

Table 12: Overview of 2019/20 Budget and MTEF Estimates and Expenditure Trends

R'000	Audited Outcome		Estimate	MTEF Estimates		
Programme	2016/17 R'000	2017/18 R'000	2018/19 R'000	**2019/20 R'000**	2020/21 R'000	2021/22 R'000
Administrative	134 275	154 977	189 694	**217 896**	230 969	243 087
IFPCS	113 448	92 435	102 019	**98 002**	103 882	105 500
IES	351 692	216 688	136 609	**133 031**	143 310	148 432
Specific contracted: IFPCS	-	-	21 657	**29 000**	38 000	40 600
Specific contracted: IES	-	-	86 626	**116 000**	152 000	162 400
TOTAL	599 415	464 100	536 605	**593 929**	668 161	700 018
Goods and services	45 601	56 260	71 050	**72 038**	76 360	79 974
Compensation of employees	88 674	98 717	118 644	**145 858**	154 609	163 113
Transfers	465 140	309 123	346 911	**376 033**	437 192	465 932
TOTAL	599 415	464 100	536 605	**593 929**	668 161	700 018

Table 13: Vote expenditure trends by Programme

R'000	Annual Budget	Audited Outcome	Annual Budget	Audited Outcome	Annual Budget	Estimate	Outcome / Annual budget average (%)
Programme	2016/17 R'000		2017/18 R'000		2018/19 R'000		2014/15 - 2018/19
Administrative	159 675	134 275	154 977	154 977	189 694	189 694	93%
IFPCS	148 942	113 448	92 435	92 435	102 019	102 019	93%
IES	207 791	351 692	216 688	216 688	136 609	136 609	159%
Specific contracted: IFPCS	-	-	10 156	-	21 657	21 657	
Specific contracted: IES	-	-	40 626	-	86 626	86 626	
TOTAL	**516 408**	**599 415**	**514 882**	**464 100**	**536 605**	**536 605**	

Table 14: TIA's Entity Budget

		Audited Outcome 2016/17	Audited Outcome 2017/18	Estimate 2018/19
		R'000	R'000	R'000
A	**Administration**	**134 275**	**154 977**	**189 694**
	Support and Infrastructure Cost	45 601	56 260	71 050
	Human Resources	88 674	98 717	118 644
B	**Investments**	**465 140**	**309 123**	**346 911**
B.1	**Innovation Funding and Pre Commercialisation and Support**	**113 448**	**92 435**	**102 019**
	Technology Development	96 431	78 570	86 716
	Commercialisation Support	17 017	13 865	15 303
B.2	**Innovation Enabling and Support**	**351 692**	**216 688**	**136 609**
B.3	**New Initiatives/Specific Contracts**	-	-	**108 283**
	Total Expenditure	**599 415**	**464 100**	**536 605**
	Total Funding	**492 455**	**489 109**	**536 605**
	Allocation from DST	382 364	396 732	420 322
	Additional income target	94 500	82 248	108 283
	Interest income	15 591	10 129	8 000
	Surplus/Deficit	-106 960	25 009	-
	Capex allocation	7 000	7 000	7 000

Table 14: TIA's Entity Budget (continued)

		Budget 2019/20	Budget 2020/21	Budget 2021/22
		R'000	R'000	R'000
A	**Administration**	**217 896**	**230 969**	**243 087**
	Support and Infrastructure Cost	72 038	76 360	79 974
	Human Resources	145 858	154 609	163 113
B	**Investments**	**376 033**	**437 192**	**456 932**
B.1	**Innovation Funding and Pre Commercialisation and Support**	**98 002**	**103 882**	**105 500**
	Technology Development	83 302	88 300	89 675
	Commercialisation Support	14 700	15 582	15 825
B.2	**Innovation Enabling and Support**	**133 031**	**143 310**	**148 432**
B.3	**New Initiatives/Specific Contracts**	**145 000**	**190 000**	**203 000**
	Total Expenditure	**593 929**	**668 161**	**700 018**
	Total Funding	**593 929**	**668 161**	**700 018**
	Allocation from DST	440 929	465 161	481 018
	Additional income target	145 000	195 000	211 000
	Interest income	8 000	8 000	8 000
	Surplus/Deficit	-	-	-
	Capex allocation	7 000	7 000	7 000

Table 15: Budget outlined per Programme 1: Administration

R'000	Audited Outcome		Estimate	MTEF Estimates		
Programme	2016/17 R'000	2017/18 R'000	2018/19 R'000	2019/20 R'000	2020/21 R'000	2021/22 R'000
Administrative	134 275	154 977	189 694	**217 896**	230 969	243 087
Goods and Services	45 601	56 260	71 050	**72 038**	76 360	79 974
Compensation of Employees	88 674	98 717	118 644	**145 858**	154 609	163 113

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

R'000	Audited Outcome		Estimate	MTEF Estimates		
Programme	2016/17 R'000	2017/18 R'000	2018/19 R'000	2019/20 R'000	2020/21 R'000	2021/22 R'000
IFPCS	113 448	92 435	102 019	**98 002**	103 882	105 500
Specific Contracted	-	-	21 657	**29 000**	38 000	40 600
Represented by Transfers	113 448	92 435	123 676	**127 002**	141 882	146 100

Table 17: Budget outlined per Programme 3: Innovation Enabling and Support

R'000	Audited Outcome		Estimate	MTEF Estimates		
Programme	2016/17 R'000	2017/18 R'000	2018/19 R'000	2019/20 R'000	2020/21 R'000	2021/22 R'000
IES	351 692	216 688	136 609	**133 031**	143 310	148 432
Specific Contracted Initiatives	-	-	86 626	**116 000**	152 000	162 400
Total	**351 692**	**216 688**	**223 235**	**249 031**	**295 310**	**310 832**
Represented by Transfers	351 692	216 688	223 235	**249 031**	295 310	310 832

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PART B

PROGRAMME AND SUB-PROGRAMME PLANS

9. PROGRAMME 1: ADMINISTRATION

9.1 Strategic Overview

The Corporate Services Programme is a support function that enables TIA and its stakeholders to deliver on its mandate. The Programme comprises the Human Resources, Information Technology, Facilities and Security and the Business Analysis and Knowledge Management Units. The core function of the programme is to add value to TIA's business by creating an enabling environment that fosters a high-performance culture. Since we are internally focused, we are strategically positioned to partner with business for operational excellence. This will be achieved by nurturing and growing the Human Resource capacity, identifying and implementing IT platforms that enhance integration and effective communication whilst preserving intellectual knowledge and creating a safe and secure environment.

TIA underwent an intensive Section 189 restructuring process during the period FY2013/14 to FY2014/15. The intention of this process was to address the mandate shift, right-sizing the organisation and implementation of greater control and governance measures.

The inadequacies within the adopted structure has compromised TIA from effectively delivering on its mandate.

Following the inputs received during the TIA Board strategy session in FY2018/19; the outcomes of the White Paper on Science, Technology and Innovation; as well as the TIA's Stakeholder Satisfaction Survey for FY2017/18, the existing organisational design was reviewed in terms of its efficiency, effectiveness, capability, capacity and "future fit" for scalability.

To this end, a re-aligned structure (Figure 6) was considered for roll-out in the FY2019/20. The proposed structure seeks to reduce operating costs, increase operational and internal process efficiencies, address the silo effect and bring about greater organisational agility and responsiveness through an integrated approach. The process does not involve any negative impact on staff and a detailed change management programme has been developed to coincide with the implementation process.

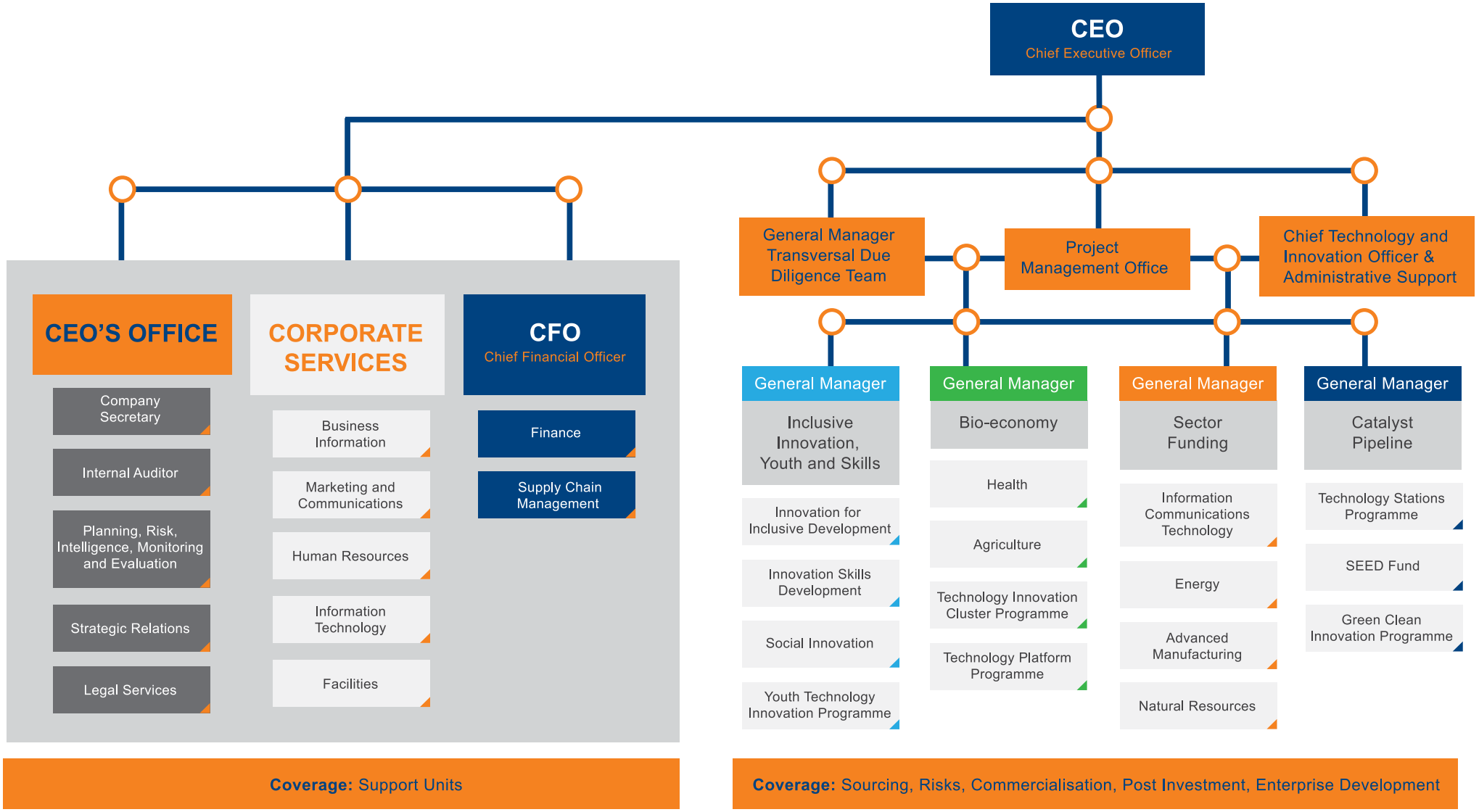


Figure 6: TIA Re-aligned Structure.

9.2 Sub-Programme Overview

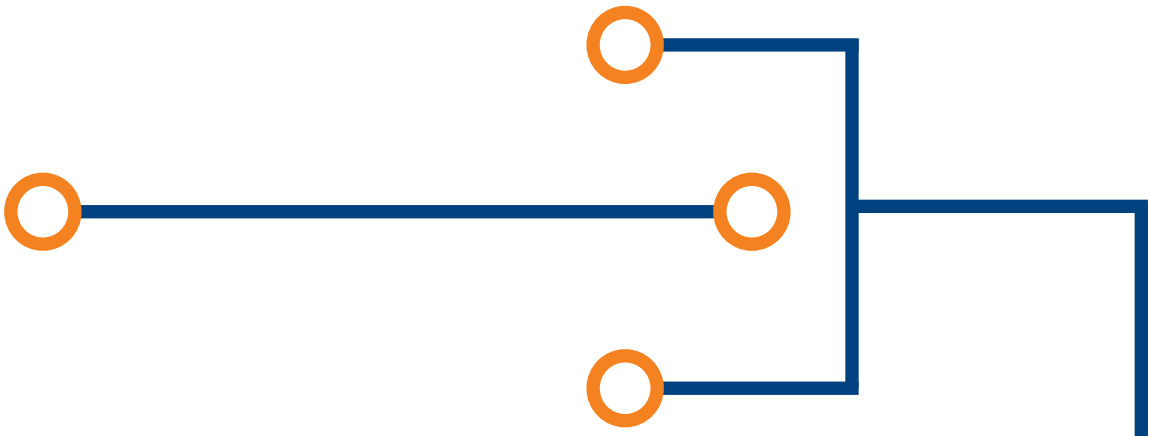
TIA is positioning itself by adopting the *"Hub and Spoke"* model which will see the organisation as a national competence for all innovation initiatives in the country. The programme is cognisant of the business transition and the required internal business transformation initiatives. This implies that the programme must empower the business to transition to the desired end state that is impactful and demonstrates value delivery.

This will be achieved by increasing collaboration and internal integration amongst business units.

The programme has therefore adopted the theme **"Effective, Efficient and Customer Centric"** to enhance operational effeciency.

9.3 Programme 1: Administration MTEF Performance Indicators and Targets for FY2019/20

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**
Strategic Outcome-Oriented Goal 1: Knowledge utilisation for inclusive development	Products, Processes, Services and Start-up Companies	1.4	Amount of income recognised	



2017/18	Estimated performance 2018/19	Medium Term Targets 2019/20	Forecast 2020/21	Forecast 2021/22
	R34 400 000	R65 000 000	R94 000 000	R94 000 000

9.3 Programme 1: Administration MTEF Performance Indicators and Targets for FY2019/20

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
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
		3.2	Number of NSI-related partnerships entered	New Indicator

9.4 Programme 1: Administration Quarterly Performance Indicators and Targets for FY2019/20

STRATEGIC OBJECTIVE 1:

To provide technology development funding and support in strategic high impact areas

No.	Performance Indicator	Reporting Period	Annual Target	Quarterly Targets			
				Quarter 1	Quarter 2	Quarter 3	Quarter 4
1.4	Amount of income recognised	Quarterly	R65 000 000	R20 000 000	R20 000 000	R20 000 000	R5 000 000

2017/18	Estimated performance 2018/19	Medium Term Targets 2019/20	Forecast 2020/21	Forecast 2021/22
27 weeks	15 weeks	15 weeks	14 weeks	14 weeks
		26	26	26

9.4 Programme 1: Administration Quarterly Performance Indicators and Targets for FY2019/20 (continued)

STRATEGIC OBJECTIVE 3:

To develop an effective and efficient internal environment to successfully execute the strategy

No.	Performance Indicator	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	Number of NSI-related partnerships entered	Quarterly	26	6	8	12	0

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

10.1 Strategic Overview

The Innovation Funding and Pre-Commercialisation Support (IFPCS) Programme supports the development and exploitation of technology innovations by enabling and facilitating the conversion of technology ideas into products and services and ultimately, the establishment of viable technology enterprises. This is done by funding the development of technology itself and the support provided for commercialisation. The programme's offerings strive to de-risk technological innovations as they mature through the Technology Readiness Levels (TRL) scale.

It is critical that TIA funds projects that have strong potential to be adopted in the market. Currently there are 65 projects being funded under this programme. From this portfolio, 11 projects have the potential to enter the commercialisation space. To increase the number of projects commercialised, the following initiatives will be undertaken in the 2019/20 financial year:

Processes

The IFPCS programme seeks to implement a framework that will promote enterprise development, technology funding, and business acceleration through the alignment of market, business and technology readiness levels. This will enable the programme to critically evaluate the progress of each product development in terms of improving the product, the team, and the business, to enable an easier penetration of the market.

People

Internally, several initiatives will be undertaken to upskill the present commercialisation staff. This will be done through in-house training with partners such as the IDC (that has invited TIA to be part of its training academy) and other experienced business partners. **Externally,** the Programme will establish a panel of business support service providers to assist with the provision of expert business support to TIA funded investee companies and projects.

The panel of experts will provide essential tools and resources that can be used to underpin development, survival and success of projects approved.

Selection

In improving the selection of projects with a high possibility to commercialise, industry specialists will be included in evaluation processes to assist in decision making.

Partnerships

To improve innovation performance and commercialisation, partnerships and relationship building are imperative. Existing partnerships will be strengthened and new partnerships established and will leverage off business incubators, product developers, the Venture Capital community, Angel Funders, Advisors and techpreneurs.

10.2 Programme 2: Innovation Funding and Pre-Commercialisation MTEF Performance Indicators and Targets for FY2019/20

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
Strategic Outcome-Oriented Goal 4: Using knowledge for economic development	Products, Processes, Services and Start-up Companies	1.1	Number of technologies, processes or services advancing by one or more TRL levels	51
		1.2	Number of innovation project outputs taken up in the market	43
Strategic Outcome-Oriented Goal 5: Knowledge utilisation for inclusive development		1.3	Amount of additional funding attracted into TIA's portfolio	R327 000 000
		1.4	Amount of income recognised	n/a

2017/18	Estimated performance 2018/19	Medium Term Targets 2019/20	Forecast 2020/21	Forecast 2021/22
9	14	15	15	20
13	7	8	9	15
R39 700 000	R222 000 000	R100 000 000	R110 000 000	R115 000 000
n/a	R24 000 000	R30 000 000	R36 000 000	R38 000 000

10.2 Programme 2: Innovation Funding and Pre-Commercialisation MTEF Performance Indicators and Targets for FY2019/20 (Continued)

STRATEGIC OBJECTIVE 2:

To provide thought leadership and an enabling environment for Technology Innovation in collaboration with other roleplayers

DST Strategic Outcome	Outputs	Performance Indicator		Strategic Target 2015-2020
Strategic Outcome-Oriented Goal 1: A responsive, coordinated and efficient NSI **Strategic Outcome-Oriented Goal 3:** Human capital development **Strategic Outcome-Oriented Goal 4:** Using knowledge for economic development	Creation of employment and employment opportunities. Innovation skills development. Innovative product, processes and services supporting economic growth	2.1	Number of knowledge innovation products produced as a result of TIA funding and support programmes	8
		2.5	Number of Technology Innovation initiatives undertaken by TIA	

	2017/18	Estimated performance 2018/19	Medium Term Targets 2019/20	Forecast 2020/21	Forecast 2021/22
	2	4	4	4	4
		5	8	15	19

10.3 Programme 2 - Innovation Funding and Pre-Commercialisation Quarterly Performance Indicators and Targets for FY2019/20

STRATEGIC OBJECTIVE 1:

To provide technology development funding and support in strategic high impact areas

No.	Performance Indicator	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	15	3	5	6	1
1.2	Number of innovation project outputs taken up in the market	Quarterly	8	1	2	5	0
1.3	Amount of additional funding attracted into TIA's portfolio	Quarterly	R100 000 000	R21 000 000	R25 500 000	R25 500 000	R28 000 000
1.4	Amount of income recognised	Quarterly	R30 000 000	R2 000 000	R9 500 000	R9 500 000	R9 000 000

10.3 Programme 2 - Innovation Funding and Pre-Commercialisation Quarterly Performance Indicators and Targets for FY2019/20 (Continued)

STRATEGIC OBJECTIVE 2:

To provide thought leadership and an enabling environment for Technology Innovation in collaboration with other roleplayers

No.	Performance Indicator	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	Quarterly	4	2	0	2	0
2.5	Number of Technology Innovation initiatives undertaken by TIA	Quarterly	8	0	2	5	1

11. PROGRAMME 3: INNOVATION ENABLING AND SUPPORT

11.1 Strategic Overview

The Innovation Enabling and Support (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. It will assist TIA in delivering on its mandate using a combination of financial and non-financial programmatic interventions designed with stakeholder engagement and validations through clusters and implementation partners.

The IES initiatives and activities will align to national imperatives by focusing its current and potential programmes on the following areas:

i. Finding alternative technologies;

ii. Processes and services to assist in esolving the energy crisis;

iii. Revitalising the agriculture and agro-processing value chain through supporting bio-technological and other services;

iv. Supporting a more effective implementation of a higher impact IPAP;encouraging private sector participation and investment in TIA supported investments, programmes and initiatives, and

v. Unlocking the potential of SMMEs, cooperatives, township and rural enterprises involved in innovative technologically enabled and focused products and services.

The following elements articulate specific offering and interventions to achieve initiatives in the three sub-programmes of the IES programmes:

Table 18: IES Divisional Programmes and Sub-Programme Objectives and Measures

Sub-Programme and Objectives	Activities and Measures
Sub-Programme 1: Innovation Funding Support To provide Seed Fund and Rapid Response interventions in Technology Innovation Cluster Programmes with strategic partners to lower the barriers for others to participate in technology innovation and new industries.	Direct investment in technology spin-offs to be incubated in new industrial clusters, coordination involving implementation partners and ecosystem building, networking strength through facilitating the localisation and export linkage mentors and potential business partners for take-off agreements.
Sub-Programme 2: Business Enabling Services To enabling tech-based enterprises and skills development for stimulating a culture of innovation in South Africa in response to youth challenges and unemployment.	Integrated learning, internship programme imbedded through IP and Innovation management (i.e. commercialisation Practitioners), business technology entrepreneurship and technical skills transfer, markets evaluations, assisting in the identification and early-stage for nurturing innovative local technologies and business case modelling, accelerator programmes participation.
Sub-Programme 3: Technology Support and Infrastructure To facilitate expert access to Science, Engineering and Technology (SET) expertise and high-end equipment in bio-technology infrastructure nationally.	The Technology Station & Bio-tech Platform provides access to IP development Infrastructure, SET expertise with HEI/SCs for idea to prototypes, and product development, Minimum Viable Products (MVP), piloting to evaluate techno-economics for scale-up and market entry strategies for technology assistance packages, tailor-made training and technology demonstrators.

In this planning period, the are five programme themes and key priorities, namely:

i. To increase investment in high-value products / services manufacturing (e.g. bio-pharmaceuticals and vaccines) for enabling emerging enterprises and supporting the development of new industries that can contribute in reductions of costs in health care;

ii. To demonstrate innovation pipeline for co-investment attractive projects in production of bio fuels towards environmentally sustainable and low carbon economy;

iii. To integrate technology development infrastructure for adaptations and improvement for industrialisation;

iv. To support early stage prototypes in the portfolio with other government programmes and economic development agencies to accelerate country's initiatives in remediation of industrial/ municipal waste and transit projects that are minimising environmental impact, and

v. To scale-up its Science, Engineering and Technology (SET) services for SMMEs to improve their competitiveness, especially youth and PDI-owned enterprises to participate in economic growth activities.

11.2 Programme 3: Innovation Enabling and Support MTEF Performance Indicators and Targets for FY2019/20

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
Strategic Outcome-Oriented Goal 4: Using knowledge for economic development	Products, Processes, Services and Start-up Companies	1.1	Number of technologies, processes or services advancing by one or more TRL levels	51
		1.2	Number of innovation project outputs taken up in the market	8
Strategic Outcome-Oriented Goal 5: Knowledge utilisation for inclusive development		1.3	Amount of additional funding attracted into TIA's portfolio	R224 000 000
		1.4	Amount of income recognised	n/a

	2017/18	Estimated performance 2018/19	Medium Term Targets 2019/20	Forecast 2020/21	Forecast 2021/22
	25	14	15	16	17
	6	4	4	4	4
	R77 500 000	R223 000 000	R57 000 000	R57 000 000	R72 000 000
	n/a	R50 000 000	R50 000 000	R50 000 000	R50 000 000

11.2 Programme 3: Innovation Enabling and Support MTEF Performance Indicators and Targets for FY2019/20 (Continued)

STRATEGIC OBJECTIVE 2:

To provide thought leadership and an enabling environment for Technology Innovation in collaboration with other roleplayers

DST Strategic Outcome	Outputs	Performance Indicator		Strategic Target 2015-2020
Strategic Outcome-Oriented Goal 1: Using knowledge for economic development **Strategic Outcome-Oriented Goal 3:** Human capital development **Strategic Outcome-Oriented Goal 3:** Using knowledge for economic development	Creation of employment and employement opportunities, innovation skills development, innovative product, processes and services supporting economic growth	2.1	Number of knowledge innovation products produced as a result of TIA funding and support programmes	342
		2.2	Number of knowledge innovation products produced by TIA supported programmes receiving additional funding	122
		2.3	Number of Small, Medium, and Micro Enterprises receiving technology support	14 200
		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	69%

	2017/18	Estimated performance 2018/19	Medium Term Targets 2019/20	Forecast 2020/21	Forecast 2021/22
	96	87	96	113	114
	31	30	33	36	37
	2 800	3 360	3 840	4 000	4 100
	54%	67%	69%	75%	75%

11.2 Programme 3: Innovation Enabling and Support MTEF Performance Indicators and Targets for FY2019/20 (Continued)

STRATEGIC OBJECTIVE 2:

To provide thought leadership and an enabling environment for Technology Innovation in collaboration with other roleplayers

DST Strategic Outcome	Outputs	Performance Indicator		Strategic Target 2015-2020
Strategic Outcome-Oriented Goal 1: Using knowledge for economic development **Strategic Outcome-Oriented Goal 3:** Human capital development **Strategic Outcome-Oriented Goal 4:** Using knowledge for economic development	Creation of employment and employement opportunities, innovation skills development, innovative product, processes and services supporting economic growth	2.5	Number of Technology Innovation initiatives undertaken by TIA	97

	2017/18	Estimated performance 2018/19	Medium Term Targets	Forecast 2020/21	Forecast 2021/22
	54	32	34	41	42

11.3 Programme 3: Innovation Enabling and Support MTEF Performance Indicators and Quarterly Targets for FY2019/20

STRATEGIC OBJECTIVE 1:

To provide technology development funding and support in strategic high impact areas

No.	Performance Indicator	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 TRLs	Quarterly	15	4	4	3	4
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	R57 000 000	R7 500 000	R15 000 000	R26 500 000	R8 000 000
1.4	Amount of income recognised	Quarterly	R50 000 000	R16 000 000	R14 000 000	R14 000 000	R6 000 000

11.3 Programme 3: Innovation Enabling and Support MTEF Performance Indicators and Quarterly Targets for FY2019/20 (Continued)

STRATEGIC OBJECTIVE 2:

To provide thought leadership and an enabling environment for Technology Innovation in collaboration with other roleplayers

No.	Performance Indicator	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	Quarterly	96	27	36	28	5
2.2	Number of knowledge innovation products produced by TIA supported programmes receiving additional funding	Quarterly	33	8	12	8	5
2.3	Number of Small, Medium, and Micro Enterprises receiving technology support	Quarterly	3 840	950	1 110	1 120	660
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	Cumulative	69%	22%	42%	59%	69%
2.5	Number of Technology Innovation initiatives undertaken by TIA	Quarterly	34	8	11	9	6

12. MEDIUM-TERM TARGETS

STRATEGIC OBJECTIVE 1:

To provide thought leadership and an enabling environment for Technology Innovation in collaboration with other roleplayers

DST Strategic Outcome	Outputs	Performance Indicator		Strategic Target 2015-2020
Strategic Outcome-Oriented Goal 4: Using knowledge for economic development **Strategic Outcome-Oriented Goal 5:** Knowledge utilisation for inclusive development	Products, Processes, Services and Start-up Companies	1.1	Number of technologies, processes or services advancing by one or more TRLs	102
		1.2	Number of innovation project outputs taken up in the market	51
		1.3	Amount of additional funding attracted into TIA's portfolio	R551 000 000
		1.4	Amount of income recognised	R665 300 000

Audited/Actual Performance			Estimated performance 2018/19	Medium Term Targets 2019/20	Forecast 2020/21	Forecast 2021/22
2015/16	2016/17	2017/18				
27	31	34	28	30	31	31
9	21	19	11	12	13	19
R97 900 000	R182 200 000	R117 234 769	R223 000 000	R157 000 000	R167 000 000	R167 000 000
R153 800 000	R110 900 000	R67 000 000	R108 300 000	R145 000 000	R180 000 000	R182 000 000

STRATEGIC OBJECTIVE 2:

To provide thought leadership and an enabling environment for Technology Innovation in collaboration with other roleplayers

DST Strategic Outcome	Outputs	Performance Indicator		Strategic Target 2015-2020
Strategic Outcome-Oriented Goal 1: A responsive, coordinated and efficient NSI **Strategic Outcome-Oriented Goal 3:** Human capital development **Strategic Outcome-Oriented Goal 4:** Using knowledge for economic development	Creation of employment and employment opportunities, Innovation skills development, Innovative product, processes and services supporting economic growth	2.1	Number of knowledge innovation products produced as a result of TIA funding and support programmes	350
		2.2	Number of knowledge innovation products produced by TIA supported programmes receiving additional funding	122
		2.3	Number of Small, Medium, and Micro Enterprises receiving technology support	14 200
		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	69%
		2.5	Number of Technology Innovation initiatives undertaken by TIA	124

Audited/Actual Performance			Estimated performance	Medium Term Targets	Forecast	Forecast
2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
76	64	98	91	100	117	117
8	25	31	30	33	38	38
2 197	2 261	2 800	3 360	3 840	4 000	4 100
Measure defined and targets set	64.4%	54%	67%	69%	75%	75%
27	56	73	46	42	56	56

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
Strategic Outcome-Oriented Goal 1: A responsive, coordinated and efficient NSI **Strategic Outcome-Oriented Goal 3:** Human capital development	Stakeholder management, Strategic partnerships. Creation of employment and employment opportunities with Innovation skills development and training	3.1	Investment approval turnaround time	14 weeks
		3.2	Number of NSI-related partnerships entered	New Indicator

	Audited/Actual Performance			Estimated performance 2018/19	Medium Term Targets 2019/20	Forecast 2020/21	Forecast 2021/22
	2015/16	2016/17	2017/18				
	11 weeks	12 weeks	27 weeks	15 weeks	15 weeks	15 weeks	14 weeks
					26	26	26

13. QUARTERLY TARGETS

STRATEGIC OBJECTIVE 1:							
To provide technology development funding and support in strategic high impact areas							
No.	Performance Indicator	Reporting Period	Annual Target	Quarterly Targets			
				Quarter 1	Quarter 2	Quarter 3	Quarter 4
1.1	Number of technologies, processes of services advancing by one or more TRLs	Quarterly	30	7	9	9	5
1.2	Number of innovation project outputs taken up in the market	Quarterly	12	2	3	6	1
1.3	Amount of additional funding attracted into TIA's portfolio	Quarterly	R157 000 000	R28 500 000	R40 500 000	R52 000 000	R36 000 000
1.4	Amount of income recognised	Quarterly	R145 000 000	R38 000 000	R43 500 000	R43 500 000	R20 000 000

STRATEGIC OBJECTIVE 2:

To provide thought leadership and an enabling environment for Technology Innovation in collaboration with other roleplayers

No.	Performance Indicator	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	Quarterly	100	29	36	30	5
2.2	Number of knowledge innovation products produced by TIA supported programmes receiving additional funding	Quarterly	33	8	12	8	5
2.3	Number of Small, Medium, and Micro Enterprises receiving technology support	Quarterly	3 840	950	1 110	1 120	660
2.4	Number of PDI-owned SMMEs assisted as a percentage of total SMMEs supported, receiving funding, and supportand / or technology services from TIA	Cumulative	69%	22%	42%	59%	69%

STRATEGIC OBJECTIVE 2:							
To provide thought leadership and an enabling environment for Technology Innovation in collaboration with other roleplayers							
No.	**Performance Indicator**	**Reporting Period**	**Annual Target**	**Quarterly Targets**			
				Quarter 1	**Quarter 2**	**Quarter 3**	**Quarter 4**
2.5	Number of Technology Innovation initiatives undertaken by TIA	Quarterly	42	8	13	14	7
STRATEGIC OBJECTIVE 3:							
To develop an effective and efficient internal environment to successfully execute the strategy							
3.1	Investment approval turnaround time	Quarterly	15 weeks	15 weeks	15 weeks	15 weeks	15 weeks
3.2	Number of NSI-related partnerships entered	Quarterly	26	6	8	12	0

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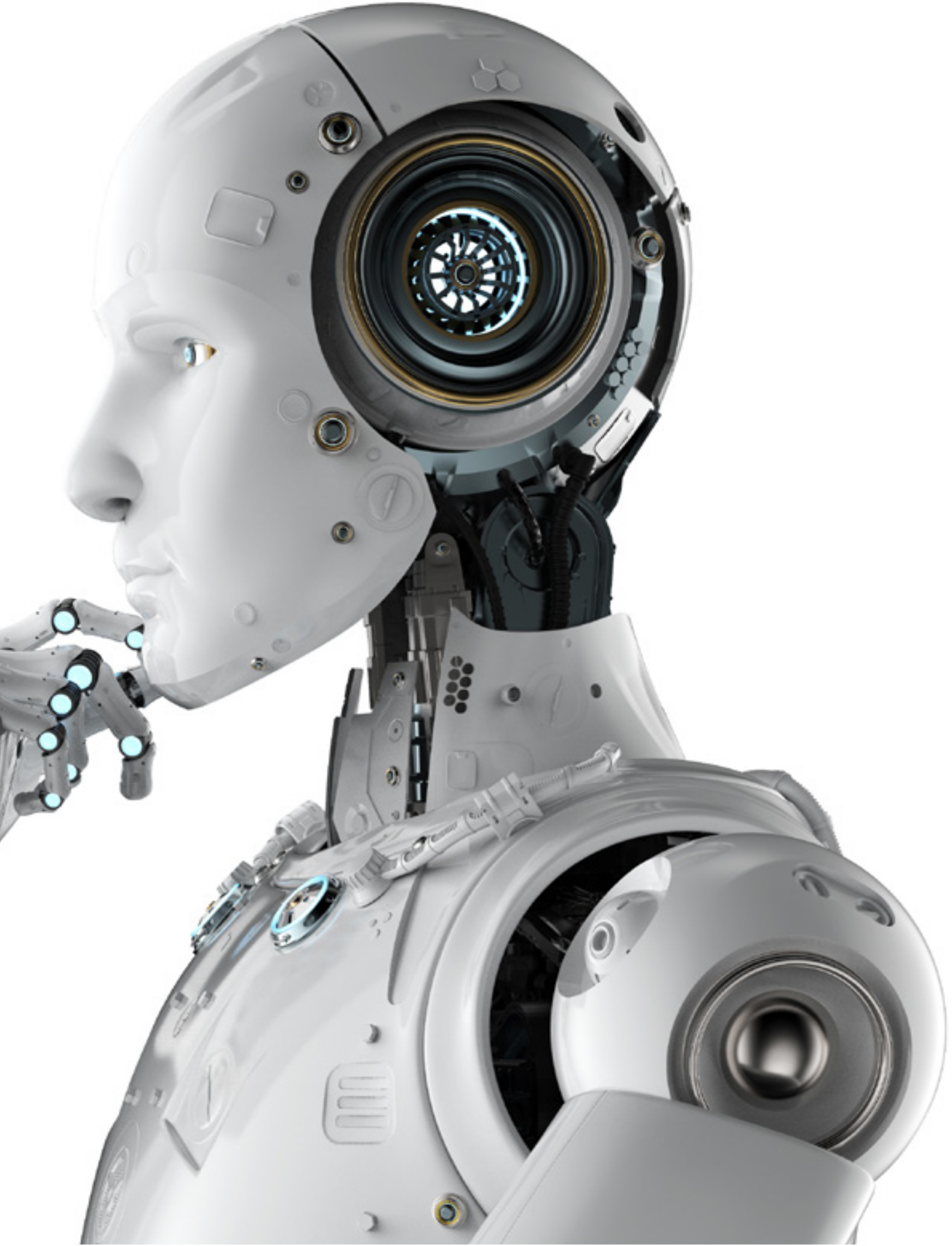
PART C

LINKS TO OTHER PLANS

There are no links to long term infrastructure and other capital plans.



14. VISION

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

16. MISSION

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

15. PURPOSE

We better the lives, wellbeing and dignity of people through enabling innovation.

TIA does not believe that its role is only to transform ideas, but it sees technological innovations as enablers that assist both the private and public sector as well as the broader society to be able to adapt quicker to the speed of change in an ever-changing world.

TIA's deep-seated desire is to connect innovative ideas to people, so that their lives can be enriched to achieve a higher standard of living. Therefore, all TIA's decisions are based on contributing towards the future of this country and how, together, it can create a tomorrow filled with promise and opportunity for all to thrive.

17. TIA VALUES

INTEGRITY

TRANSPARENCY

INNOVATION

TEAMWORK

PROFESSIONALISM

EXCELLENCE

Figure 7: TIA Values.

18. LEGISLATIVE AND OTHER MANDATES

12.1 Legislative Mandate

The mandate of TIA is derived from the provisions of the Technology Innovation Agency Act (Act 26 of 2008), which establishes TIA as an Agency to promote the development and exploitation, in the public interest of discoveries, inventions, innovations and improvements.

The objective of TIA is to support the State, through the DST, in stimulating and intensifying technological innovation in order to improve economic growth and the quality of life of all South Africans by developing and exploiting technological innovations.

12.2 Recent Court Rulings

None.

12.3 Policy Context

UN 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. Sustainable Development Goals (SDGs) and 169 associated targets. Each goal has specific targets to be achieved by 2030. Paragraph 51 outlines the 17 sustainable development goals and 169 associated targets. Each goal has specific targets to be achieved by 2030.

The national policies to which TIA aligns are as follows:

Table 19: Analysis of the Policy Landscape

Policy	Policy link to TIA Annual Performance Plan
National Development Plan (NDP) 2030	The NDP notes that the development in the Science, Technology and Innovation (STI) fundamentally alters the way people live, communicate and transact. The NDP highlights that STI is key to equitable growth and underpins economic advances, improvement in health systems, education and infrastructure. In FY2019/20, the NDP enters the second phase (2018-2023) in which ***"the country should lay the foundations for more intensive improvements in productivity."***
Medium Term Strategic Framework (MTSF) 2014-2019	The MTSF is the overarching government framework for the socio-economic transformation of South Africa. It identifies technology innovation as one of the critical policy areas required to speed up growth and transform the economy to create decent work and sustainable livelihoods. 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.
New Growth Path (NGP) 2020	The NGP advocates that, to drive economic growth, new jobs would need to be created through ***"seizing the potential of new economies by growing the knowledge economy."*** In FY2019/20, the plan enters into the second phase, in which there should be intensive improvements in productivity.
Industrial Policy Action Plan (IPAP) 2018/19 - 2020/21	The Department of Trade and Industry's (the DTI) IPAP, highlights the need to leverage STI for industrial growth and development. The plan notes how the new digital industrial revolution is posing challenges to the national systems of skills, STI landscape (including technology transfer and diffusion) and the infrastructure required for advanced communication and production.

Table 20: Department of Science and Technology (DST) Priorities

Policy	Policy link to TIA Annual Performance Plan
National Research and Development Strategy (NRDS)	The NRDS aims to identify specific priority areas that need to be capacitated to enable economic growth to be underpinned by STIs.
STI White Paper	The policy aims to help drive STI to accelerate inclusive economic growth to make the economy more competitive. In support of the priorities as set out by the DST, TIA focuses on three specific areas i.e, the Bio-economy Strategy, the Technology Stations Programme and Commercialisation. In advancing these three priority areas, TIA seeks to align to the broader national government socio-economic imperatives of poverty, inequality and unemployment
Bio-economy Strategy	The strategy 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 bio-technology-based industries. In turn, these new industries would generate and develop bio-based services, products and innovations in which new and existing companies would provide and/or utilise such solutions.

DIRECT CONTRIBUTION

Bio-economy Strategy

TIA's implementation of the Bio-economy Strategy aims to strengthen TIA's ability to inform research and innovation agendas, facilitate a more coherent policy environment as well as a more engaged public dialogue. Successful implementation requires a high degree of alignment and multi-stakeholder engagement with roleplayers across the ecosystem.

Over the past four years, R717,3 million was spent on implementing the Bio-economy Strategy across the various focus areas within TIA's Bio-technology Platforms, the Seed Fund and various technology development projects.

During FY2019/20, a total amount of R226,4 million is allocated towards the programme made up of R186 million for ring-fenced projects and R40,4 million from DST contracted projects.

The funding split across the various bio-economy focus areas as follows:

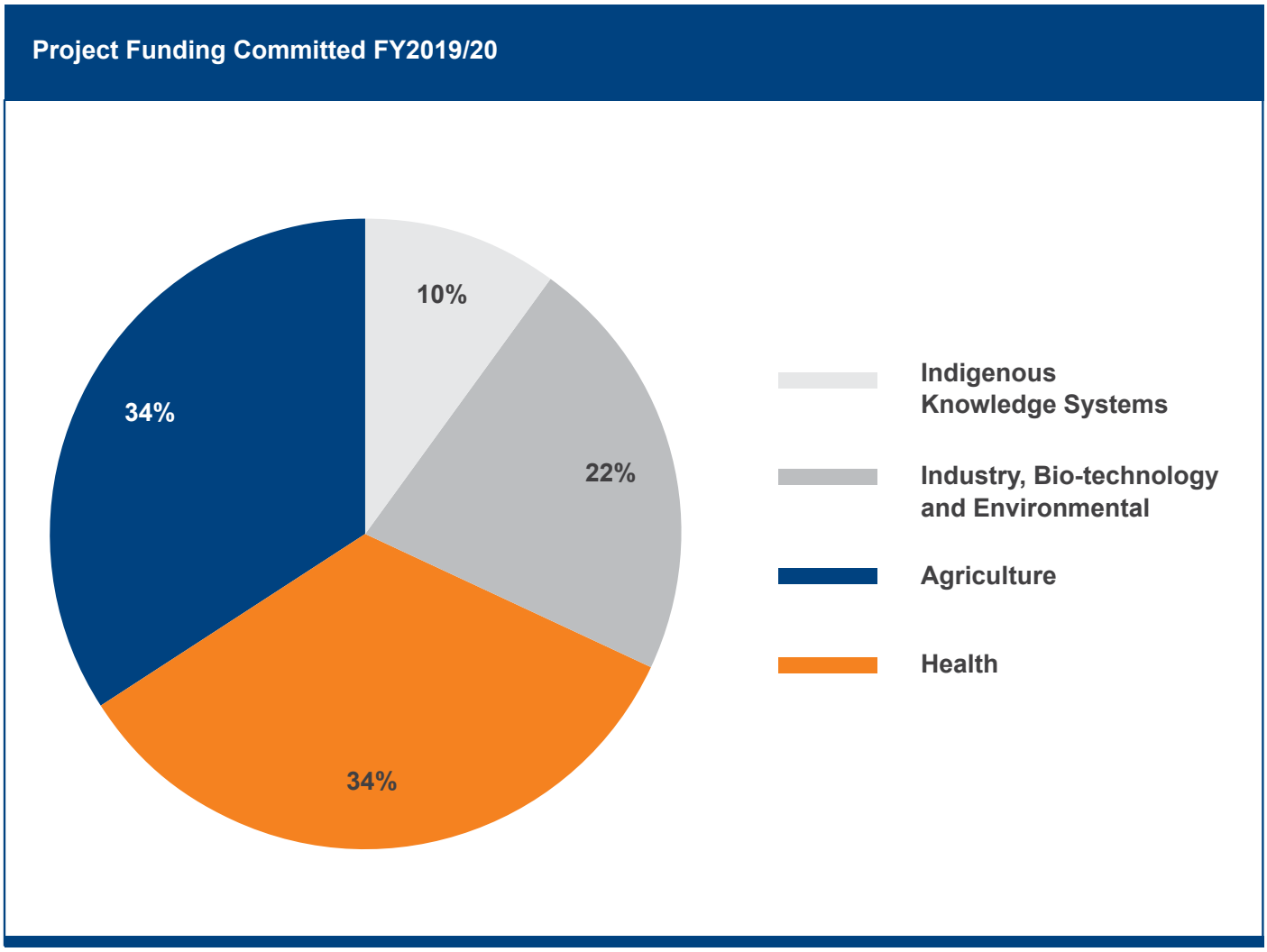


Figure 8: Project Funding Committed - FY2019/20.

The ring-fenced allocation is anticipated to be spent as follows: R15,8 million towards administration costs, R73,4 million on technology development projects (TIA's existing project portfolio accounts for R62 million of the forecasted R73,4 million), R78,6 million would be for the Technology Platforms and other programmes enabling bio-activities.

The contract programme funding would be spent on the ABIPP, SIIP and SABDI as articulated in Section 6.1.5.A.

Technology Station Programme

A total of R384,1 million was allocated and expended through the Technology Stations over the past four years. Of this amount, 27% was utilised towards NSI coordination and technology infrastructure, 55% towards technical services and application of R&D for enterprises, 17% towards tailor made training and demonstrations, and 1% for marketing related activities.

For FY2017/18, the TSP has achieved an impact of an economic multiplier of 3.7. Audited data from FY2015/16 to FY2018/19 reveals that an average of 2 413 SMMEs were assisted each year. In FY2017/18 alone, 34 knowledge based products and 1 571 competitive improvements were developed with a further 41 enterprises securing commercial contracts because of interventions from the programme.

For the FY2019/20, the TSP plans to spend an amount of R78,3 million in realising the activities as articulated in section 6.1.5.A.

Commercialisation

In the last four years, TIA has invested approximately R155,5 million towards the commercialisation of its project portfolio. The impact of the interventions amounted to revenue generated of R8,3 billion and creation of more than 14 000 jobs.

Whilst in the past, commercialisation was approached from a narrow view of market uptake through for e.g. licensing, assignment of IP and direct sales, TIA has recently adjusted its previous exclusive focus on the Technology Readiness Levels (TRL) with new enhanced processes. These include enterprise development (through the Business Readiness Level (BRL) approach) as well as market and demand side validation and feedback loops (the Market Readiness Level (MRL) approach) that flows back into the product design phase.

To support this process, TIA provides a range of enabling and support programmes such as entrepreneurial skills development (Innovation Skills Development (ISD)), Youth Technology Innovation, Global Cleantech Accelerator, business incubation through the Seed Fund and the Technology Stations and Platforms Programmes. These programmes aim to strengthen the readiness of the techpreneurs supported to be able to transition into the market to secure additional funding to scale their operations.

The pace and scale of TRL, MRL and BRL progression becomes a critical indicator and success driver for commercialisation. The integrated approach to commercialisation will involve much closer alignment with TIA's accelerator and incubation partners.

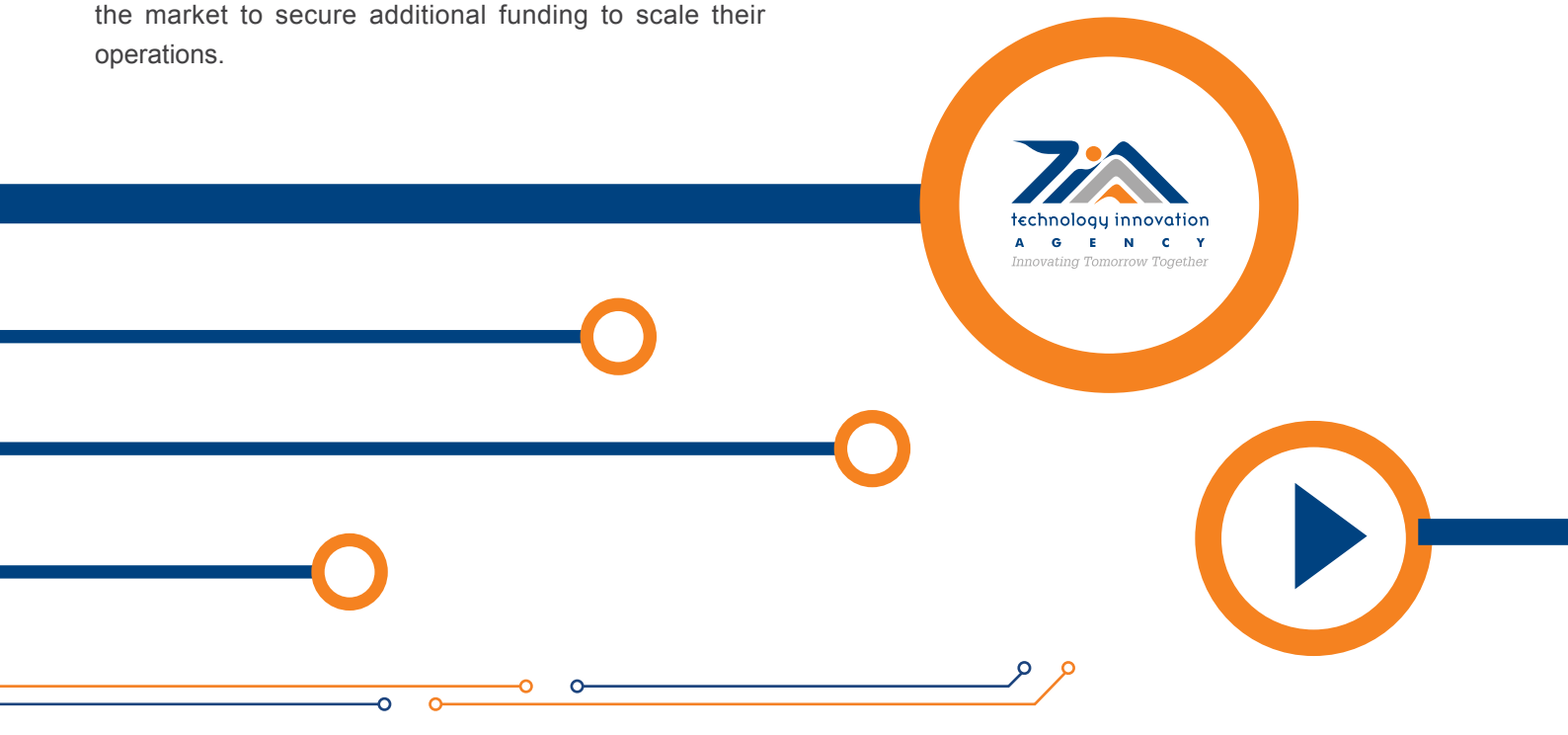
Furthermore, TIA has adopted the *"glass pipeline"* approach incorporating *"backward integration"* and *"forward integration"*. Backward integration informs the applied research segment of the value chain whilst forward integration informs the follow-on funders and commercialisation partners. The goal is to synchronise the supply and demand sides of the value chain for greater probability of commercialisation opportunities and successes.

For the FY2019/20, TIA has allocated an amount of R45,5 million to fund its commercialisation drive. The strategic emphasis of TIA's commercialisation work for the year will aim to:

i. Accelerate the progression of promising innovations within the existing portfolio;

ii. Increase efforts to promote the uptake of near-market technologies; and

iii. Intensify efforts towards the establishment of viable technology start-up companies.



Risk Funding

TIA provides risk funding to advance innovative ideas through three risk funds. These funds are aimed at creating and supporting an enabling innovation environment. This is meant to support progression of innovation towards market readiness. These risk funds are disbursed in the form of grants, loans or equity investments.

All funding transactions are conditional, meaning there must be a milestone plan, a phased disbursement, repayment period, an agreed levy and an acceptable internal Rate on Return.

The funds are differentiated based on the various stages of technology development as defined by the framework presented below:

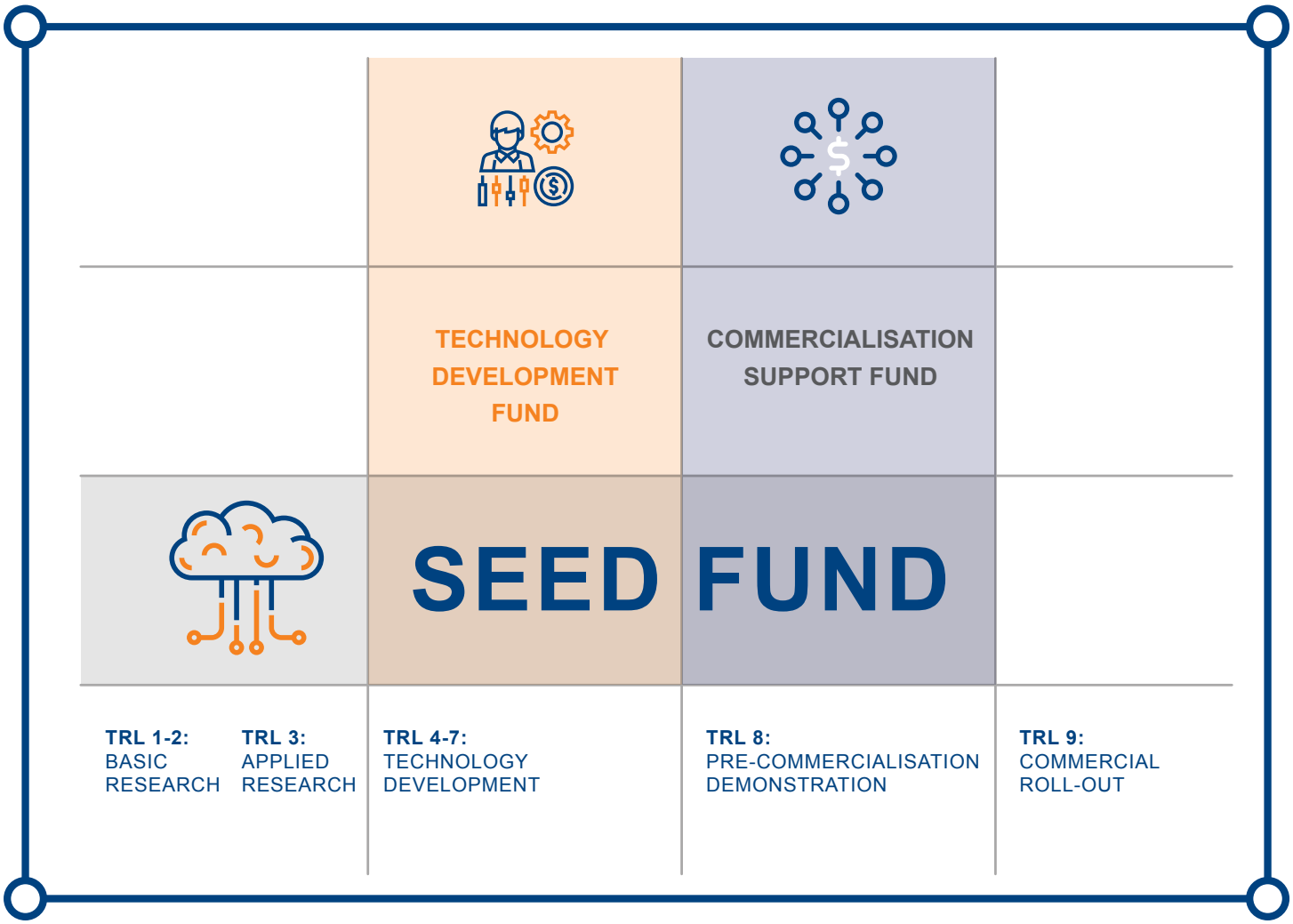


Figure 9: TIA Risk Funding Scheme.

19. LIST OF ACRONYMS

AU	African Union
ABIPP	Agriculture Bio-economy Innovation Partnership Programme
bn	Billion
BRICS	Brazil, Russia, India, China, South Africa
BAKM	Business Analysis & Knowledge Management
CPGR	Centre for Proteomic and Genomic Research
CPSI	Centre for Public Service Innovation
CPT Pharma	Chemical Process Technologies - Pharma
CRM	Customer Relationship Management
CSIR	Council for Scientific and Industrial Research
DST	Department of Science and Technology
EIA	Economic Impact Assessment
FY	Financial Year
GAP	Gauteng Accelerator Programme
CPGR	Centre for Proteomic & Genomic Research
GCIP	Global Cleantech Innovation Programme
H3D	Drug Discovery and Development Centre
HEI	Higher Education Institution
HIV	Human Immuno-deficiency Virus
HR	Human Resources
IDC	Industrial Development Corporation
IES	Innovation Enabling and Support
IFPCS	Innovation Funding and Pre-Commercialisation and Support
IP	Intellectual Property
IPAP	Industrial Policy Action Plan
ISD	Innovation Skills Development
ISO	International Organisation of Standardisation
KPI	Key Performance Indicator
KRISP	Kwazulu-Natal Research and Innovation Sequencing Platform
KZN	KwaZulu-Natal
m	Million

MTEF	Medium-Term Expenditure Framework
MTSF	Medium Term Strategic Framework
NACI	National Advisory Council for Innovation
NDP	National Development Plan
NMP	National Metabolomics Platform
NECSA	South African Nuclear Energy Corporation SOC Limited
NIPMO	National Intellectual Property Management Office
NRF	National Research Foundation
NSI	National System of Innovation
PDI	Previously Disadvantaged Individuals
PFMA	Public Finance Management Office
PRIME	Planning, Risks, Intelligence, Monitoring & Evaluation
R&D	Research and Development
SABDI	South Africa Bio-design Initiative
SANEDI	South African National Energy Development Institute
SC	Science Centre
SET	Science, Engineering and Technology
SIIP	Strategic Industrial Bio-Innovation Programme
SEDA	Small Enterprise Development Agency
SMME	Small Medium & Micro Enterprises
SO	Strategic Objective
STA	Strategic Technology Activities
STI	Science, Technology and Innovation
TB	Tuberculosis
TIA	Technology Innovation Agency
TPP	Technology Platforms Programme
TRL	Technology Readiness Level
TS	Technology Station
TSP	Technology Stations Programme
UKZN	University of Kwa-Zulu Natal
UK	United Kingdom
UN	United Nations

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AGENCY
Innovating Tomorrow Together

Gauteng Head Office

Switchboard
+27 (0) 12 427 2700

Postal Address
P.O. Box 172
Menlyn
Pretoria
0181

Physical Address
TIA House
83 Lois Avenue
Menlyn
Pretoria

Kwa-Zulu Natal Office

Switchboard
+27 (0) 31 220 3101

Postal Address
P.O. Box 30603
Mayville
Durban
4058

Physical Address
4th Floor
102 Stephen Dlamini Road
Musgrave
Durban

Western Cape 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

www.tia.org.za