technology innovation
AGENCY
Innovating Tomorrow Together

ANNUAL REPORT 2018|19
REVISED

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

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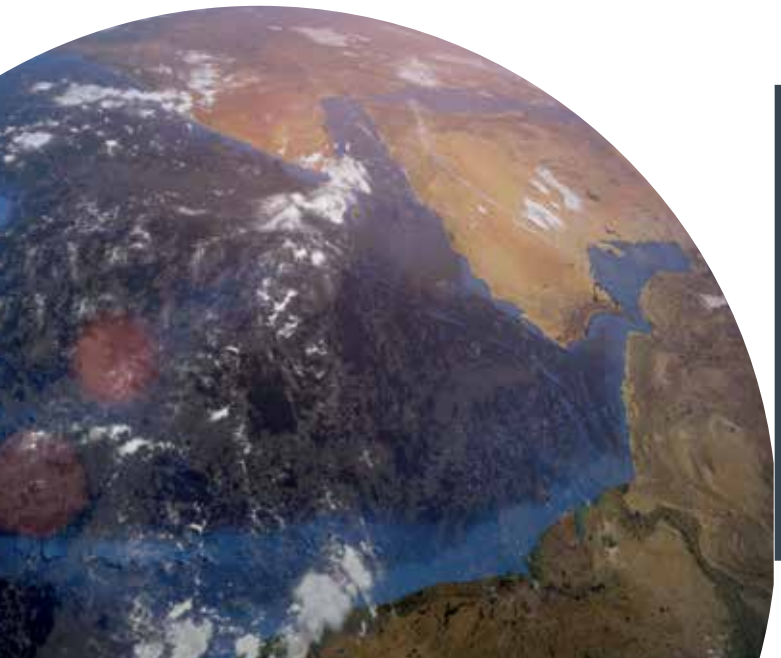
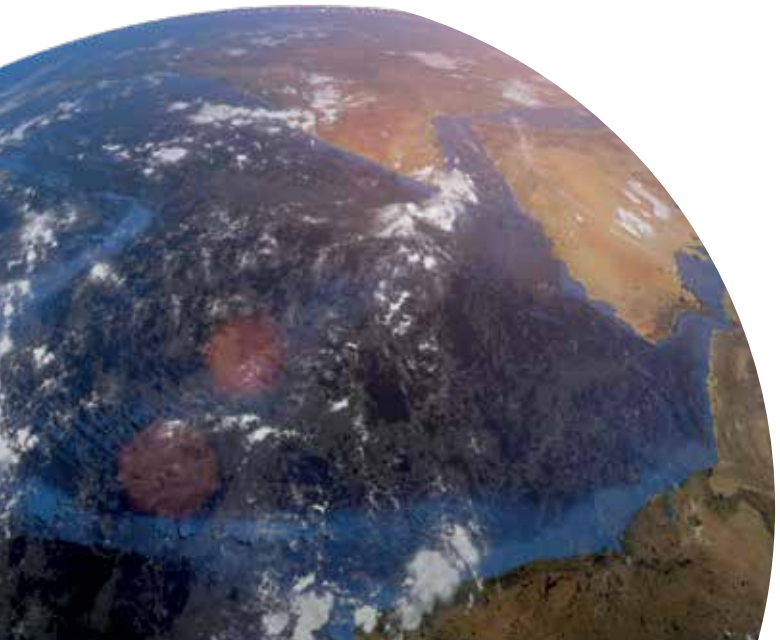
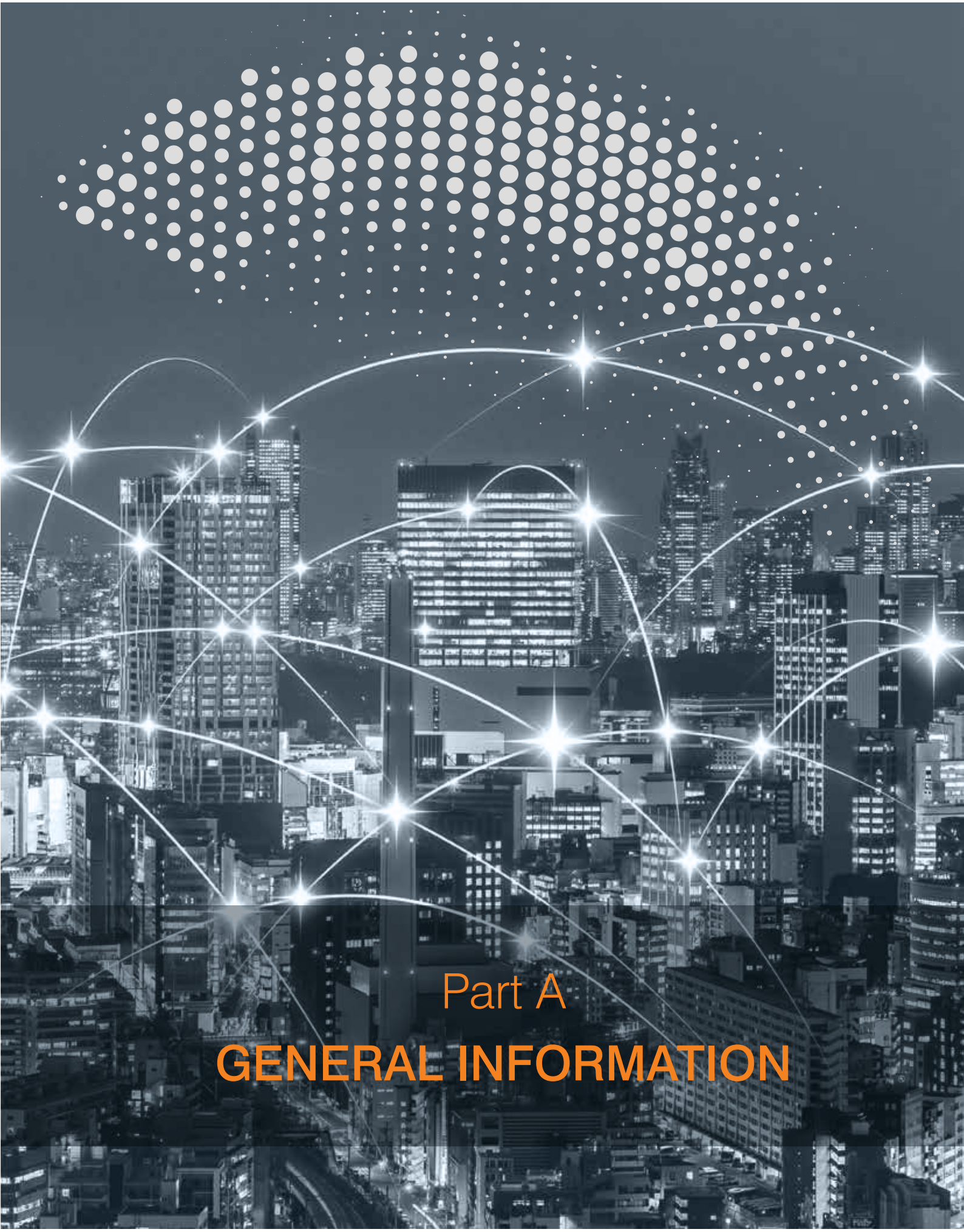


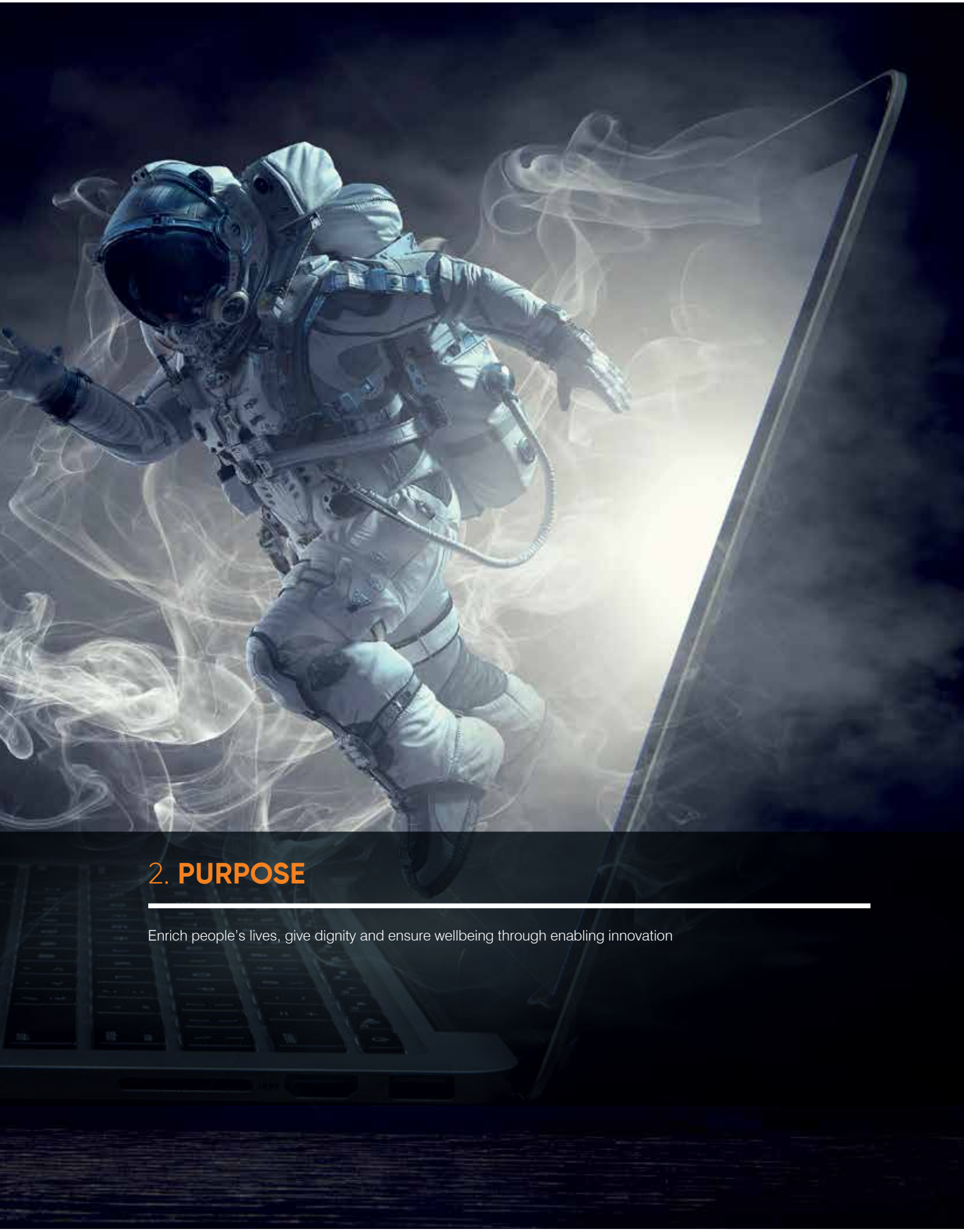




Part A
GENERAL INFORMATION

1. GENERAL **INFORMATION**

This Annual Report is structured to provide a broad overview of and detailed information about the performance of the Technology Innovation Agency (TIA) for 2018/19. As such, the document begins by broadly articulating TIA's performance and operations from the perspectives of the Chairman of the Board and members of the executive, respectively. Thereafter, detailed information, and analysis thereof, is provided for the agency's performance per strategic programme and sub-programme. The latter part of the report provides the requisite governance and financial reports from the Board, the Audit and Risk Committee (ARC), and external auditors. Additional information is provided as appendices at the end of the document.



2. **PURPOSE**

Enrich people's lives, give dignity and ensure wellbeing through enabling innovation

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5. FOREWORD BY THE **CHAIRMAN**

"Reflecting on the prevailing thought on policy regarding science, technology and innovation 10 years ago, TIA was positioned to bridge the so-called innovation chasm between invention and commercialisation by funding the development of promising technologies."

On behalf of the Board, I am pleased to present TIA's 2018/19 Annual Report. Given that the agency is about to celebrate its 10th anniversary, it would be appropriate to reflect on the reasoning behind TIA's establishment and the role it should fulfil within the National System of Innovation.

TIA was established with the ambitious objective "to support the state 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". The TIA Act (2008) paved the way for the Innovation Fund, Tshumisano Trust, Cape Biotech Trust, PlantBio Trust, Lifelab, BioPAD Trust and the Advanced Manufacturing Technology Strategy Implementation Unit to be merged into the newly constituted TIA.

According to the business case for TIA's establishment, which was presented in December 2008, the agency was envisaged to play an active role in enhancing South Africa's capacity to translate a greater proportion of promising local research into commercial technology products and services. The goal was to leverage South Africa's science and technology base to support the country's transformation to a knowledge-based economy through the development of new industries and the creation of sustainable jobs. In essence, it was felt that the unique knowledge generated in South Africa was not being fully utilised for socioeconomic development.

Reflecting on the prevailing thought on policy regarding science, technology and innovation 10 years ago, TIA was positioned to bridge the so-called innovation chasm (characterised by a dearth of available funding and funding instruments) between invention and commercialisation by funding the development of promising technologies. As a counterweight to this linear "science and technology push" mode of innovation, TIA also sought to strengthen the National System of Innovation and provide support to entrepreneurs.
TIA's initial years of operation were challenging owing to the high expectations placed on the fledgling agency, the relatively modest levels of funding it received and the difficult process of integrating seven previous entities into a single agency. Several high-profile governance failures also compounded the agency's challenges.

Operating context

TIA remains uniquely positioned within the National System of Innovation as a vital bridge between the science and technology base and the economy, and broader society. Its powerful mandate contains areas of untapped potential given that "technological innovation" is broadly conceived in the TIA Act as "the application in practice of creative new ideas, which

include inventions, discoveries, the processes by which new products and services enter the market, and the creation of new businesses".

The 2019 White Paper on Science, Technology and Innovation, which was recently approved by Cabinet, adopts a refreshingly expansive and holistic interpretation of innovation to support socioeconomic development against the backdrop of South Africa's triple challenge of poverty, inequality and unemployment. The White Paper also acknowledges the important role played by technology and innovation in broad-based development, alongside the need for excellent, world-class science.

Historically, TIA has mainly focused on supporting the process of translating locally developed inventions into innovations that have commercial potential. I am pleased to note that in 2018/19, TIA's business development efforts yielded significant results in supporting South Africa's inclusive development and transformation agendas. This was achieved through initiatives that focused on grassroots innovation, innovation for service delivery and innovation for local economic development, among others.

Performance achieved

I am proud to report that TIA's governance and performance have improved tremendously since the 2013 TIA ministerial review, the successful implementation of governance and management changes, and a refocused mandate. These improvements have invariably led to greater financial management, with TIA having:

- been awarded unqualified audits for the eighth year in a row;
- obtained recertification for the ISO 9001:2015 standard, which, although in itself is no mean feat, indicates that the agency's quality management system is sound and adheres to all relevant statutory and regulatory requirements; and
- achieved an average of 85% of its performance targets between 2013/14 and 2017/18, matching the average performance of the Department of Science and Technology, TIA's shareholder, and exceeding the average of other public entities reporting to the department in the same period.

TIA achieved 91% of the targets set out in its 2018/19 Annual Performance Plan, which is commendable. Unfortunately, during this period, the agency also experienced a turnover and exodus of senior leadership, which, unless addressed, places the organisation at risk and retards the important strategic work of building sustainable institutional integrity.

TIA remains relevant within a changing policy context

The commercialisation of technological innovation is often narrowly conceived as the pursuit of profit. While this is often true, the technology development projects that TIA supports also have the potential to create social and environmental value.

The development of a smart sensor advisory dashboard for the mining and minerals processing sector is an example of a project that aims to have primarily an economic impact by enhancing efficiencies and productivity in terms of crushing, grinding and flotation operations. Also in this crucial productive sector, the Trailblazer Technologies project aims to treat polluted wastewater from mining operations to reduce environmental impact.

The NovelQuip project straddles the manufacturing and agricultural subsectors. It aims to mechanise the entire tree-planting operation, resulting not only in a reduction in costs, but also improved yields for farmers. A commercial trial of the prototype equipment has commenced in Brazil, which, if successful, will result in the export of other equipment.

In terms of improving animal health within the national Bio-economy Strategy, TIA is supporting the development of a portable point-of-care device to detect foot-and-mouth disease in cattle and avian influenza diseases on farms within an hour, thereby improving disease surveillance and management in support of meat exports. TIA is also funding the development and demonstration of active pharmaceutical ingredients through innovative synthesis technologies by Chemical Process Technologies Pharma, with the objective of stimulating the local manufacturing of such ingredients as inputs for the formulation of drugs to treat diseases such as tuberculosis.

Looking ahead

TIA will continue to build on its historical achievements, especially in the areas of biotechnology, youth and small business development. The agency will also venture further into diverse innovation fields such as innovation for inclusive development, service innovation and public-sector innovation for it to meaningfully participate in implementing the 2019 White Paper on Science, Technology and Innovation. Harnessing existing sources of technological knowledge ("discoveries")

and localising and diffusing associated existing technologies need to exist alongside the commercialisation of locally developed technologies. TIA cannot do this alone. As an important element of the National System of Innovation, the agency will strive to build partnerships with key players, with a view to enhancing South Africa's innovation capacity while promoting investment in our technological future.

For the next phase of TIA's journey some specific areas should be addressed. These include:

- greater strategic alignment between shareholder priorities and the broader programme of work of government;
- improving responsiveness to key stakeholders in line with TIA's enabling mandate;
- securing additional sources of funding to leverage the Department of Science and Technology[1] parliamentary allocation and expand TIA's sphere of impact;
- building long-term institutional integrity based on strong TIA leadership; and
- nurturing a healthy, high-performance organisational culture.

South Africa is not an island, hence TIA must be cognisant of and respond to international developments such as the rapidly maturing field of artificial intelligence and the confluence of technologies in the digital, biological and physical spheres (the so-called Fourth Industrial Revolution). In addition, the effects of the climate crisis, accelerating species extinction and human impact on the ecosystem, demands TIA's consideration of the environment as a priority alongside its aim to achieve social and economic development. As such, TIA will need to focus on sustainable development as it supports researchers and entrepreneurs who are intent on pushing the technological frontier.

The Department of Science and Technology has clearly articulated that TIA's primary priorities should be supporting the realisation of a vibrant and competitive bio-economy, assisting small and medium enterprises (particularly through the Technology Stations Programme), and facilitating the commercialisation of locally developed technologies. These priorities will most certainly persist as TIA develops its strategic plan for the next five-year cycle, 2020-2025.

While the agency occupies a critical position in South Africa's National System of Innovation, it remains underfunded, an issue that is of great concern to the Board. At the national level, it is worrying that the proportion of total research and development expenditure devoted to technological or experimental development (in contrast to the sum of basic and applied research) sharply decreased from 46,3% in 2006/07 to 25,5% in 2016/17.

Much attention is given to lifting gross expenditure on research and development as a proportion of gross domestic product. However, more attention should arguably be paid to significantly increasing the funding allocated to entities such as TIA that focus on innovation for South Africa to reap the benefits of local and international knowledge creation. Doing so would enable TIA to support national efforts to grow the economy, create jobs and preserve the environment. Accordingly, a step change regarding TIA's baseline budget allocation is crucial for the agency to support socioeconomic development in a sustainable, inclusive and transformative manner.

Vote of thanks

I would like to thank the former Minister of Science and Technology, Ms Mmamoloko Kubayi-Ngubane, for her sustained engagement and support during the period under review. Her insights and inputs contributed tremendously to TIA's improved performance. I would also like to thank all members of the Board, our colleagues from the Department of Science and Technology led by the Director-General, Dr Phil Mjwara, TIA's Executives, management and staff, as well as our stakeholders who have worked behind the scenes to support us during the period under review.

Lastly, I would like to mention that, at the time of the finalisation of this Annual Report, both the Chief Executive Officer and Acting Chief Financial Officer during the reporting period, Mr Barlow Manilal and Ms Jolanda Hechter respectively, were no longer in the employ of TIA. Accordingly, the respective reports for their portfolios have been provided by their replacements, Ms Fuzlin Levy-Hassen and Mr Werner van der Merwe.

Professor Edward Christian Kieswetter
Chairman of the Board

1 The Department of Science and Technology was renamed as the Department of Science and Innovation after the period under review.

TIA **BOARD MEMBERS**

Prof Edward Christian Kieswetter

Chairman of the Board

QUALIFICATIONS

MCom (Cum Laude) – North-West University
MBA – Henley, United Kingdom
MSc Ed (Cognitive Development) – University of the Western Cape
Academic Associate (Cognitive Development) – Harvard University
BEd (Hons) (Mathematics and Science) – University of the Western Cape
PG Dip Ed (Engineering and Mathematics Ed)
Engineering Dip (Electrical) – Cape Peninsula University of Technology
Industrial Instrumentation Apprenticeship – Athlone Technikon

FIELD OF EXPERTISE

Engineering

Dr Stephen John Lennon

Board member and Chairman of the Audit and Risk Committee

QUALIFICATIONS

BSc (Chemistry, Applied Chemistry) – University of Natal
MSc (Engineering) Physical Metallurgy – University of the Witwatersrand
PhD – University of the Witwatersrand
Senior Management Programme – University of Stellenbosch
Prince of Wales Business and Environment Programme – Cambridge University

FIELD OF EXPERTISE

Energy sector, sustainability and the National System of Innovation

Ms Joy Sebenzile Matsebula

Board member and Chairperson of the Human Resources and Remuneration Committee

QUALIFICATIONS

PhD (Biometrics) (Incomplete) - University of Saskatchewan
MSc (Biometrics) – Pennsylvania State University
BSc (Natural Sciences, Environmental Sciences and Biometrics) – University of Botswana and Swaziland

FIELD OF EXPERTISE

Environmental Sciences and Biometrics

Dr Jan van de Loosdrecht

Board member

QUALIFICATIONS

PhD (Chemistry) – Utrecht University, The Netherlands

FIELD OF EXPERTISE

Research and Development, Technology, Innovation, Intellectual Property

Dr Judy Coates

(resigned 27th February 2019)

Board member

QUALIFICATIONS

PhD (Organic Chemistry) – University of Johannesburg (formerly Rand Afrikaans University)

FIELD OF EXPERTISE

Biomedical and Organic Chemistry

Mr Thabiso Gerald Ramasike

Board member

QUALIFICATIONS

BCom – University of Johannesburg (formerly Vista University)
International Executive Development Programme (BANKSETA) – York Business School, University of York
Senior Executive Leadership Development Programme – Gordon Institute of Business Science, University of Pretoria
Certified Associate (CAIB (SA)) – Institute of Bankers in Southern Africa

FIELD OF EXPERTISE

Banking and Finance

Dr Mziwandile Madikizela

Board member

QUALIFICATIONS

MBA – Wits Business School
PhD (Biochemistry) – University of Iowa
MSc (Biochemistry) – University of Iowa
BSc (Hons) (Biochemistry) –
University of Fort Hare
BSc (Chemistry and Biochemistry) – University of Fort Hare
Certificate in Technology Management –
University of Pretoria
Executive Coaching –
University of Cape Town
Certificate in Programme Leadership Coaching –
Wits Business School

FIELD OF EXPERTISE

Biochemistry / Molecular Biology, Technology and Innovation Management

Dr Patience Lethabo Mlengana

Board member

QUALIFICATIONS

BA (Social Sciences) – University of the North
PG Dip (Information Science) –
University of the North
Information Science (Hons) –
University of Johannesburg (formerly Rand Afrikaans University)
MSc (Information Science) –
University of Johannesburg (formerly Rand Afrikaans University)
PhD (Leadership and Management) – Logos University, Florida

FIELD OF EXPERTISE

Leadership and Management, Telecommunications

Ms Fuzlin Levy-Hassen

Board member and Chairperson of the Investment and Finance Committee

QUALIFICATIONS

BCom – University of Cape Town
PG Dip (Accounting) – University of Cape Town
BCom (Hons Accounting) –
University of Cape Town
MCom (Accounting) (Incomplete) –
University of Cape Town
PAAB (Chartered Accountant)
Certificate in Venture Capital – UC Berkley,
Haas School of Business
PG Dip (Accounting) – University of Cape Town

FIELD OF EXPERTISE

Venture Capital and Private Equity, Technological Innovation, Commercialisation, Post-Investment and Turnarounds

*A brief biography of each Board member can be found in Section 13.

6. REPORT OF THE INTERIM **CHIEF EXECUTIVE OFFICER**

"TIA acts as a funder, connector, enabler and facilitator in South Africa's National System of Innovation. Its economic impact assessment indicates a fair balance of funded activities across the social, economic and environmental spheres."

I am pleased to report that TIA's performance continues to grow from strength to strength. During the period under review, TIA achieved yet another unqualified audit, and achieved 21 out of 23 of its performance targets as set out in the 2018/19 Annual Performance Plan. This equates to 91% achievement, which is the second-highest achievement during the current 2015–2020 strategic cycle following a performance of 93% in 2015/16.

In reviewing the performance achieved, TIA excelled in attracting additional funding into its investment portfolio, wherein close to R380 million was received against a planned target of leveraging R147 million from third parties. In addition, a total of 144 technology innovation initiatives were held against a planned number of 37, demonstrating the agency's proactiveness in leading the innovation agenda in the country.

Despite the performance levels achieved, there were challenges encountered in ensuring that the turnaround time for processing applications for funding did not exceed 16 weeks. These challenges mostly related to the quality of applications received and extended processes applied during the assessment phase. A more streamlined process would be adopted in 2019/20 to ensure that the target is met.

TIA fell slightly short of the number of small, medium and micro enterprises supported in our Technology Stations Programme. The planned target was 3360, and TIA fell shy of the target by just 88. Plans are in development to ensure

that the reach of the technology stations is expanded so as to offer more technical assistance to 'technoprenuers' who are located outside of urban precincts.

Performance in support of the Bio-economy Strategy

One of TIA's key tasks in the National System of Innovation is to support the implementation of the national Bio-economy Strategy, a Department of Science and Technology initiative. In the period under review, TIA disbursed R370 million to support approximately 32 projects related to the bio-economy. (Refer to Section 10.3.1 for more details.)

Other support

TIA also provided direct support through various funded interventions to 3 272 small, medium and micro enterprises, 145 of which were supported more than once. This included support to marginalised groups, specifically 1 571 women, 1 515 youth, 2 800 historically disadvantaged individuals and 56 people with disabilities. A total of 63 new innovations were commercialised by TIA beneficiaries, although it is acknowledged that TIA funding might not have been the only factor contributing to successful commercialisation.

Stakeholder engagements

TIA's Strategic Engagements and Corporate Relations unit leads the agency's business development initiatives aimed at building strategic partnerships locally and internationally, thereby diversifying TIA's income streams and ensuring its financial sustainability. During the period under review, the unit continued to make inroads into the National System of Innovation by working intensively with strategic partners across government and in the private sector. National government partners included the Department of Telecommunications and Postal Services; the Department of Tourism; the Department of Agriculture, Forestry and Fisheries; and the Department of Environmental Affairs. Provincial partners included the Gauteng Department of Economic Development; the Northern Cape Economic Development, Trade and Investment Promotion Agency; and the Eastern Cape Development Corporation. Other organisations included the Land Bank, the Industrial Development Corporation and several science councils. In addition, TIA collaborated with established angel fund investors on a co-investment basis. Several international partnerships and collaboration initiatives have been or are being established with countries in Africa and across the world.

Importantly, the Strategic Engagements and Corporate Relations unit engaged intensively with the Department of Science and Technology to successfully negotiate the migration of several of its initiatives to TIA. These include the Agricultural Bio-Economy Innovation Partnership Programme, the Innovation for Inclusive Development Programme and the Grassroots Innovation Programme. TIA also worked closely with the Department of Science and Technology to improve the capacity and capabilities of the 18 technology stations that are hosted by various universities of technology across the country. Accordingly, an additional R95 million was disbursed to these technology stations in 2018/19.

Economic impact assessment results

TIA acts as a funder, connector, enabler and facilitator in South Africa's National System of Innovation. Its economic

impact assessment indicates a fair balance of funded activities across the social, economic and environmental spheres. The economic impact assessment report used the social accounting matrix tool to model TIA's economic impact. For the period under review, the agency's economic multiplier was calculated as 3,26, meaning that for every R1 million spent by TIA, R3,26 million worth of economic activity was generated in the South African economy. It should be noted, though, that while TIA's economic multiplier for 2018/19 is lower than that of 2017/18 (3,55), it does not mean TIA performed poorly in 2018/19. Rather, it reflects a variance in the funding mix across economic subsectors between the two financial years, as each economic subsector has a different set of multipliers.

The social accounting matrix modelling also estimated that TIA's economic activities led to the creation of R1,7 billion worth of new business activity, a contribution of R686 million to gross domestic product, and the creation of 2 247 jobs[2]. Based on interviews conducted with 30 funded beneficiaries, the authors of the economic impact assessment report concluded that TIA, through its respective programmes and interventions, is fulfilling its mandate and has a positive impact on society and the economy.

Organisational environment

Following recommendations that emerged from a work study conducted in 2018, TIA embarked on a realignment exercise during the period under review. The agency's realigned structure aims to enable it to better execute its priority roles within the National System of Innovation in the areas of the bio-economy; small, medium and micro enterprise development; and increased commercialisation. The Board approved the realigned structure towards the end of 2018 for implementation during 2019, with the process expected to be completed by the fourth quarter of 2019/20. (For further information on the context and rationale for the realignment, please refer to Section 13.1.)

TIA realises that its most important asset is its people, and that it is imperative not only to develop its staff, but also identify its future leaders from within. In the period under review, a cohort of 26 TIA personnel participated in an intensive, seven-month cadet leadership development programme to identify future leadership and develop on-the-job skills. (For further information on the cadet programme, please refer to Section 13.3.)

Going forward

Given South Africa's challenging social and economic situation, which is underpinned by high unemployment, poverty, inequality and economic uncertainty, I believe that TIA will continue to live up to government's expectations of growing the economy and improving the lives of South Africans. This means that TIA would need to attend to the following areas which need improvement:

- better stakeholder management and meeting the expectations of the Department of Science and Technology.
- strengthening the internal control environment. Controls remain sound, but the internal control environment has deteriorated slightly in the past year.
- ensuring leadership continuity and filling vacant senior posts that had been filled temporarily by acting staff members.
- identifying and securing additional strategic partners to achieve a more systemic socioeconomic impact via an enlarged technology development and innovation funding pool.

TIA will strive to become a world-leading innovation agency by leveraging technology and innovation. We aim to support the implementation of the National Development Plan by improving livelihoods, stimulating job creation, supporting growth, protecting the environment and enabling enterprise development. All of this is intended to contribute to addressing the dire needs of the many unemployed and marginalised people and communities across South Africa.

Vote of thanks

I am grateful for the support and dedication from the executive team, management and staff, who all diligently serve TIA's ethos of "Teamwork, Impact and Accountability". I also acknowledge the Board and its subcommittees for its continued support during the period under review.

Ms Fuzlin Levy-Hassen
Interim Chief Executive Officer

2 It must be emphasised that these are modelled results, not actual observed/measured results.

TIA'S EXECUTIVE COMMITTEE

Mr Barlow Manilal
Chief Executive Officer

Ms Jolanda Hechter
Acting Chief Financial Officer

Ms Matshidiso Matlolane
Acting Executive: Corporate Services

Mr Werner van der Merwe
Acting Executive:
Innovation Funding and Pre-Commercialisation Support

Mr Vusi Skosana
Co-Acting Executive: Innovation Enabling and Support

Ms Sarusha Pillay
Co-Acting Executive: Innovation Enabling and Support

7. REPORT OF THE **CHIEF FINANCIAL OFFICER**

"TIA's financial results for 2018/19 demonstrate that the agency has managed to maintain sound financial performance despite the tough economic climate. For the agency, the challenge is doing more with less."

TIA's financial results for 2018/19 demonstrate that the agency has managed to maintain sound financial performance despite the tough economic climate. The agency was faced with the challenge of balancing current income with a higher demand for funding to stimulate the technological innovation landscape, combined with the rising cost of goods and services.

The financial results highlight that disbursements towards technology development during the period under review increased. TIA was further able to leverage a significant amount from third parties to invest in technology development. Other income also increased considerably due to TIA's concerted implementation of the hub-and-spoke model. (Refer to Part E: Financial Information for further details.)

Notwithstanding these and other challenges, TIA received an unqualified audit for the eighth consecutive year, as well as zero fruitless and wasteful expenditure and zero irregular expenditure for the third consecutive year. This supports the agency's commitment to maintaining a healthy control environment governed by sound principles and policies.

Revenue: Parliamentary grant and specific contracted amounts from the Department of Science and Technology

The parliamentary grant to TIA increased by 6% in nominal terms, from R397 million in 2017/18 to R420 million in 2018/19, as shown in Figure 1 overleaf. Specific contracted agreements recognised as income increased by almost 60%, from R69 million in 2017/18 to R110 million in 2018/19. This significant increase can mainly be attributed to additional allocations for technology stations hosted at various universities of technology across South Africa, the Agricultural Bio-Economy Innovation Partnership Programme and the Strategic Industrial Bio-Innovation Programme.

Investment and other income

Investment and other income increased by 52%, from R23,1 million in 2017/18 to R35,1 million in 2018/19, as shown in Figure 2 overleaf. This increase was in line with the agency's efforts to raise additional funding to expand its reach within the National System of Innovation. A significant portion of other income generated during the period under review related to loans that were recovered following the improvement in financial performance of small, medium and micro enterprises invested in.

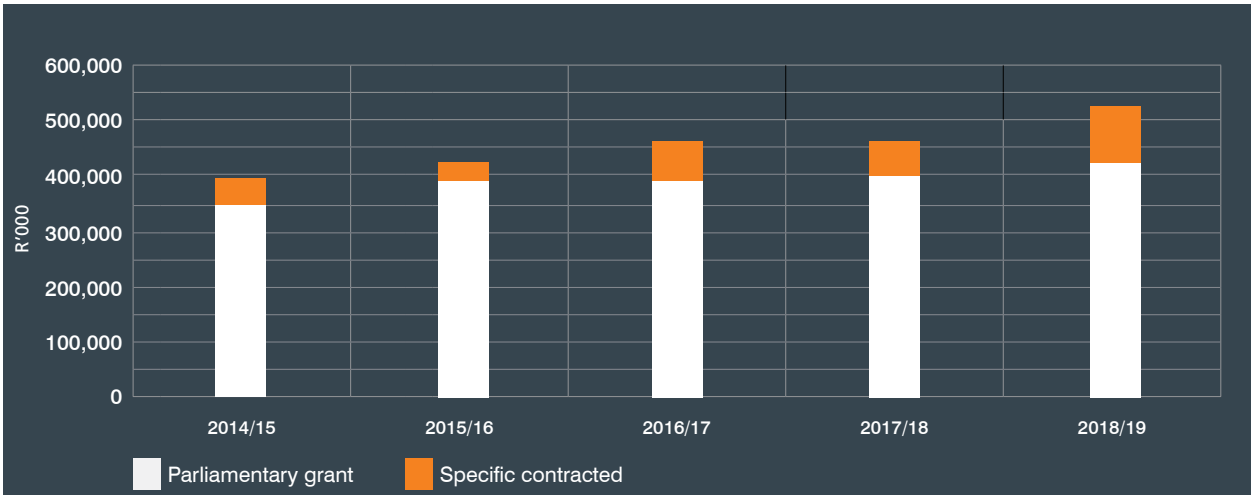


Figure 1: Five-year comparison of revenue

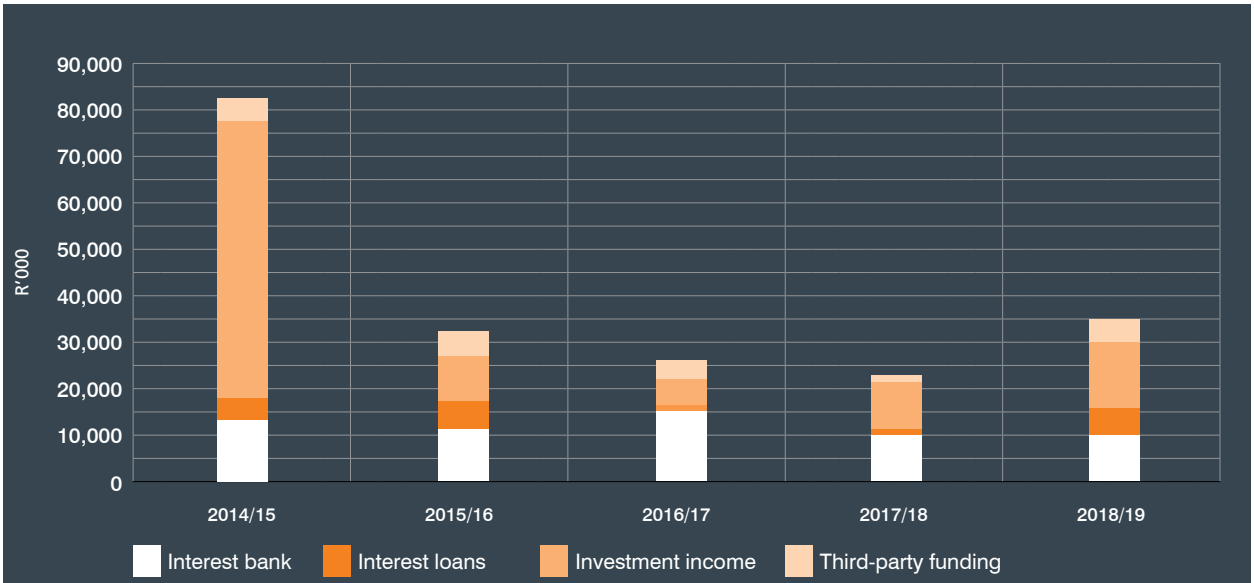


Figure 2: Five-year comparison of composition of investment and other income

Administrative and employee costs

During 2018/19, administrative expenditure increased by 16,9%, as shown in Figure 3 on page 20, due to additional investments made to TIA's employees, such as the organisation's commitment towards the three-year cadet leadership development programme. All personnel also attended a staff alignment framework event to improve overall efficiencies in TIA, which either directly or indirectly resulted in the agency achieving 91% of the targets set out in its 2018/19 Annual Performance Plan. The increased expenditure compared with the preceding financial year was due to organisation-wide initiatives launched to streamline TIA's value chain and optimise transactional processes.

One of TIA's key cost-containment strategies is to optimise the procurement and use of fixed assets. During the period under review, such optimisation resulted in an adjustment of R7 million due to assets being used for much longer than the original estimated lifespan. Personnel costs increased by 6% in line with the agency's efforts to maximise its impact on the National System of Innovation.

TIA used National Treasury's Central Supplier Database to spread its procurement reach to smaller suppliers who might have previously been overlooked. The added benefit of making use of this database is that TIA does not procure goods and/or services from suppliers that are not fully tax compliant, thereby supporting South Africa's fiscus. During

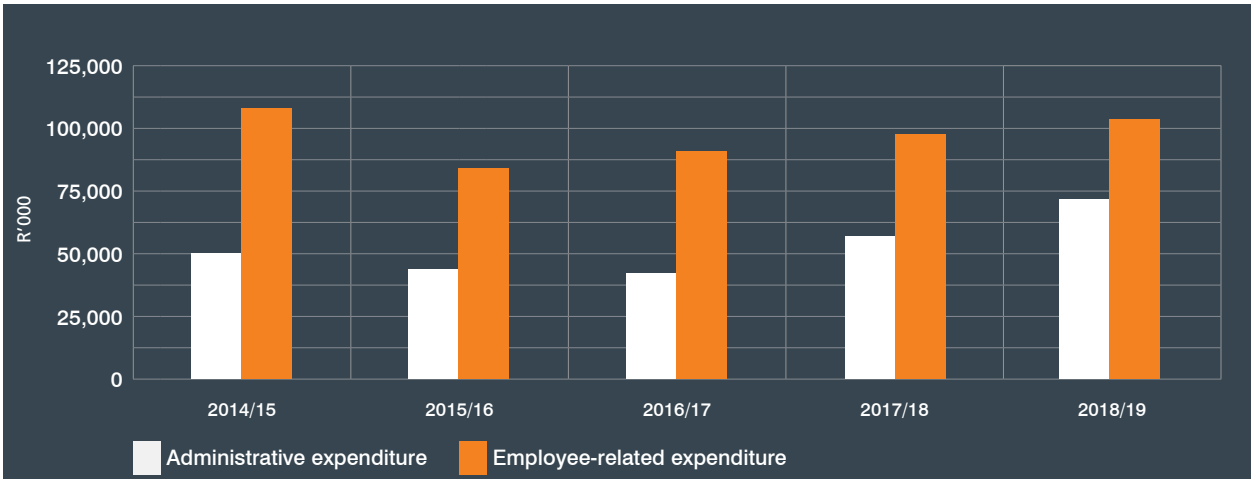


Figure 3: Five-year comparison of administrative expenditure

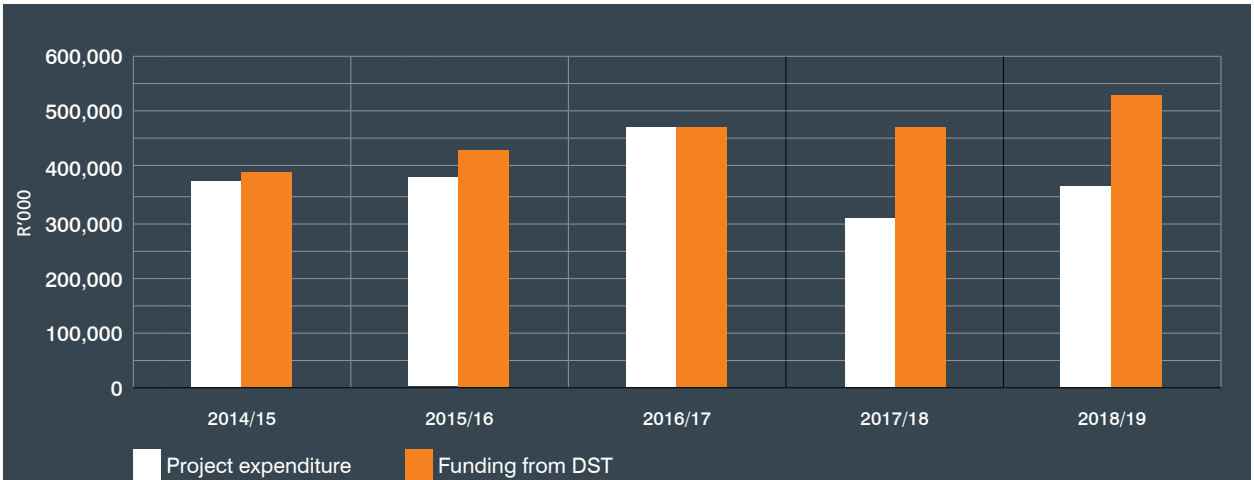


Figure 4: Five-year comparison of funds disbursed to grant allocations received

the period under review, the agency worked towards a consistent three-day payment turnaround time to support small businesses to manage their working capital.

Investment and project funding

In 2018/19, funding for projects and programme increased by 20% from R309,1million in 2017/18 to R369,7million, as shown in Figure 4. These investments directly contributed to the commercialisation of 14 products. Sales generated by the small, medium and micro enterprises that commercialised these products exceeded R63million in the period under review. The agency leveraged additional funding of R379million (compared with R117million in 2017/18) for its investees. R369,7million was invested directly by TIA in line with the agency's 'Hub-and-Spoke' model. TIA also paid R110million towards specific contracted initiatives in 2018/19, compared with R69 million in 2017/18.

Surplus funds

The agency realised an accounting surplus of R22,1million in 2018/19, compared to R22,6million in 2017/18 (Table 1). The nature of technology development falls in the high-risk category owing to it having unpredictable outcomes. In such an environment, there is a concomitant high probability that milestones will not be achieved as planned, making it difficult to forecast and deliver zero surplus/deficit budgets at the end of each financial year. Section 53(3) of the Public Finance Management Act (1999) (PFMA) stipulates that public entities must submit a request to National Treasury to retain any surplus funds. However, TIA's accumulated surplus is zero after considering liabilities and other commitments within the following 12 months.

*Table 1: Five-year financial review**

Statement of Financial Performance	2014/15 R'm	2015/16 R'm	2016/17 R'm	2017/18 R'm	2018/19 R'm
Total revenue	**473**	**463**	**492**	**489**	**566**
Parliamentary grant	338	385	382	397	420
Specific contracted income	51	44	83	69	110
Other Income	83	34	27	23	35
Total expenditure	**535**	**509**	**599**	**467**	**543**
Employee costs	111	84	89	99	105
Project funding disbursements	373	379	465	309	370
Administration costs	51	47	46	59	68
Surplus/(Deficit)	**-62**	**-46**	**-107**	**23**	**22**[4]

Statement of Financial Position	2014/15 R'm	2015/16 R'm	2016/17 R'm	2017/18 R'm	2018/19 R'm
Total assets	**244**	**210**	**122**	**187**	**238**
Property and equipment	14	13	16	24	19
Investment and funding assets	100	49	34	31	42
Cash and cash equivalents	66	132	65	127	167
Receivables	64	16	7	6	10
Total Liabilities	**53**	**65**	**84**	**114**	**143**
Committed conditional grants	16	44	54	88	81
Current liabilities	37	21	29	26	62
Net assets	191	145	38	72	95

*Amounts stipulated are rounded off to the nearest million

Mr Werner van der Merwe
Chief Financial Officer

4 As per note 25 to the Annual Financial Statements, the total commitments amounting to R108,5 million need to be deducted from the cash surplus after liabilities.

8. STRATEGIC **OVERVIEW**

Vision

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

This vision finds expression in the Department of Science and Technology's broader vision to promote "increased wellbeing and prosperity through science, technology and innovation", in that technological innovation should be intensified to uplift the lives of all citizens of South Africa through inclusive development. Accordingly, TIA will strive to ensure that its strategic programmes yield outcomes that are aligned with this vision.

Mission

Facilitate the translation of South Africa's knowledge resources into sustainable socioeconomic opportunities.

Purpose

Enrich people's lives, give dignity and ensure wellbeing through enabling innovation.

Values

Figure 5: TIA values

9. LEGISLATIVE AND **OTHER MANDATES**

TIA is established as a Schedule 3A public entity under the provisions of the PFMA. The mandate of TIA is derived from the provisions of the TIA Act, 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 Department of Science and Technology, in stimulating and intensifying technological innovation to improve economic growth and the quality of life of all South Africans by developing and exploiting technological innovations.

TIA's strategic programmes are aligned with the following national government policies.

National Development Plan (NDP)

The NDP recognises that development in 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 2019/20, 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 socioeconomic 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 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.

Industrial Policy Action Plan (IPAP) 2018/19-2020/21

The Department of Trade and Industry's IPAP highlights the need to leverage STI for industrial growth and development. The plan notes how the Fourth Industrial Revolution is posing challenges to the national systems of skills, the STI landscape (including technology transfer and diffusion), and the infrastructure required for advanced communication and production.

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".

Bio-economy Strategy

The strategy 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 biotechnology-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.

Part B
PERFORMANCE INFORMATION

10. OVERVIEW OF **HIGHLIGHTS**

10.1. Organisational Performance Results in Support of the Strategic Objectives

In relation to the Public Audit Act of South Africa (2004), the performance against the 2018/19 Annual Performance Plan was audited against the reported performance information in accordance with the criteria developed from the performance management and reporting framework for the year ended 31 March 2019. There were no material findings raised on the usefulness and reliability of the reported performance information for the two programmes, namely the Innovation Funding and Pre-Commercialisation Support Programme and the Innovation Enabling and Support Programme. TIA's overall performance against its key performance indicators resulted in an achievement of 91% wherein 21 out of the 23 targets were met. Tables 2-4 below provide detailed performance information against targets for TIA's three strategic objectives.

Table 2: Strategic objective 1: Provide technology development funding and support in high-impact areas

KEY PERFORMANCE INDICATOR		TARGET	ACHIEVED	DEVIATION	COMMENTS
1.1	Number of technologies, processes or services advancing by one or more technology readiness levels	28	30	+2	Projects delivered on milestones
1.2	Number of innovation project outputs taken up in the market	11	14	+3	Uptake in the market went per plan
1.3	Additional funding attracted into TIA's portfolio	R147m	R379,3m	+R232,3m	Third party investment in the AgriProtein project
1.4	Income recognised	R108,3m	R127,4m	+R19,1m	Loans previously impaired became probable

Table 3: Strategic objective 2: Provide thought leadership and an enabling environment for technology innovation in collaboration with role players

KEY PERFORMANCE INDICATOR		TARGET	ACHIEVED	DEVIATION	COMMENTS
2.1	Number of knowledge innovation products produced (prototypes developed, patents registered, technology demonstrators and technology transfer packages) as a result of TIA funding and support programmes	91	110	+19	The bulk of contributions came from the 18 technology stations
2.2	Number of knowledge innovation products produced by TIA-supported programmes receiving third-party funding	30	31	+1	The agency is proud to have achieved this target despite national and international economic challenges and market uncertainty
2.3	Number of SMMEs receiving technology support	3 360	3 272	-88	The Technology Stations Programme rendered a spectrum of technological support services to a wide range of SMMEs, 74% of which are black owned
2.4	Number of SMMEs owned by HDIs assisted as a percentage of total projects supported, receiving funding, support and/or technology services from TIA	67%	74%	+7%	
2.5	Number of technology innovation initiatives (conference papers, presentations and posters, policy recommendations, panel discussions, position papers, publications, think tanks; keynote addresses) undertaken by TIA	37	144	+107	The overachievement indicates TIA's increasing role as a Thought Leader in the innovation ecosystem.

Table 4: Strategic objective 3: Develop an effective and efficient internal environment to successfully execute the strategy

KEY PERFORMANCE INDICATOR		TARGET	ACHIEVED	DEVIATION	COMMENTS
3.1	Investment approval turnaround time	4 months	Target not met	>5 months	None of the six calls issued could be contracted in the prescribed time. Management is working on implementing measures to ensure future targets are met
3.2	Funds utilised for projects and programmes as a percentage of total actual expenditure	65%	68%	+3%	The rate of spending exceeded the target by 3%

Summary of TIA's cumulative performance to date since 2014/15

Since 2014/15, TIA has supported around 14 662 small medium and micro enterprises, primarily through its Technology Stations Programme. Thus, together with some other programme outputs around 413 knowledge products were developed with 296 technology innovations recorded. TIA in this process disbursed around R2,2 billion to support technology innovation and related infrastructure developments. Royalties of around R12 million were received. Income from disposed assets amounts to R71 million. Revenue reportedly generated by companies funded by TIA is around R11 billion. (A detailed breakdown of TIA's performance since 2014/15 can be found in Appendix 1 on page 139.)

10.2. Situational analysis

10.2.1. Service delivery environment

TIA received 505 applications for technology development funding during the year, an overall 37% increase in comparison to 2017/18. This was made up of 80% male and 20% female applicants wherein 44% were Africans. The sector segmentation of the applications received were Information and Communication Technology (170), Natural Resources (127) and Agriculture (114). An amount of R370 million was disbursed to support new applications for funding, service current commitments and for the provision of technology infrastructure and technical expertise. Some 3 272 small, medium and micro enterprises were assisted through the Technology Stations Programme, which is hosted at universities of technology across the country.

The performance achieved aligns well with the President's focus on small business incubation, particularly concerning technology-based and youth-owned enterprises. In addition, TIA's various programmes have sought to contribute towards socioeconomic impact in 2018/19, particularly via the development of market-ready technologies that could result in new business or new enterprise formation in priority sectors such as manufacturing, agriculture and health. The agency also began implementing the Department of Science and Technology's Innovation for Inclusive Development Programme. Innovation-focused projects in this programme are also in line with the President's call for rural development, supporting township economies and inclusive growth.

In rendering services to the public, the agency encountered a few challenges, primarily related to the turnaround time for funding applications. This is largely owing to legacy processes not yet fully optimised and streamlined to respond to the growing demand for funding. To this end, an integrated approach was developed internally for process optimisation together with a considered reconfiguration of the operating system to ensure that applications are processed expediently. Externally, rapid technological change continues to pose a threat to the country's core economic sectors and create uncertainty in relation to traditional labour markets.

TIA must ensure its portfolio of projects is aligned to the evolving landscape and that interventions are directed towards addressing national priorities as outlined in the National Development Plan and the 2019 White Paper on Science, Technology and Innovation. To this end, TIA participated in the 2018 National Advisory Council on Innovation's national science, technology and innovation foresight initiative wherein contributions were made into how to identify science, technology and innovation (STI) interventions that can best address future societal challenges and take advantage of future opportunities.

10.2.2. Organisational environment

Internally, there were a few successes realised during the year. The most significant was the retention of TIA's ISO 9001: 2015 accreditation, based on the results of the surveillance audit conducted during January 2019. The timing of the audit was aligned with the completion of the organisational work study process that provided insights into the areas in which TIA could strengthen its internal processes. One of the areas of improvement mentioned in the work study report was the call for applications for funding process, wherein there were challenges in processing applications received for funding in a structured manner.

To this end, TIA implemented a predictive call system that outlines specific thematic focus areas within each sub-programme to ensure that the resultant project portfolio is aligned with external priorities, for example those set out in the Bio-economy Strategy. This has improved operations significantly and the value of this initiative will be realised over the medium term as this would allow TIA to demonstrate its technical capability in providing sector relevant technological innovations aligned with its mandate.

Some challenges were encountered during the year under review, which mainly related to a high number of customer complaints received. Moreover, a review of the operating model highlighted that TIA has a skewed skills and capability base, especially in the scientific, technical and engineering domains. This has resulted in management gaps in terms of coordinating internal operations in pursuit of its strategic objectives. This was exacerbated by a lack of integrated systems and laborious reporting practices that have resulted in reduced productivity.

To mitigate the risks posed by these challenges, the following initiatives will be put in place.

- To resolve the instances of customer complaints, a customer relationship management system was rolled out to optimise the complaint resolution process across the entire organisation.
- Closer monitoring of the predictive call system will take place to ensure that the turnaround times are reduced.
- To address the skewed organisation skills profile, a skills audit will be undertaken in 2019/20 to identify competency gaps and inform a skills development plan. This will be coupled with ongoing coaching and training on processes and procedures to ensure management aligns performance to the same. Implementation of the realigned structure will occur during 2019/20. This crucial intervention will seek to develop adequate capacity and capability to undertake cross-functional activities within the renewed internal operating context.

10.2.3. Key policy developments and legislative changes

During March 2019, Cabinet adopted the White Paper on Science, Technology and Innovation, which proposes important policy shifts for activities related to science, technology and innovation to address aspects such as transformation and inclusivity, as well as strong linkages within the National System of Innovation. These include the following.

- Strengthening the culture of innovation within government and society.
- Improving policy coherence and more effective budget and programme coordination within the National System of Innovation.
- Implementing monitoring and evaluation systems.
- Creating a more enabling environment that advances innovation.
- Developing local innovation ecosystems.

The agency is confident that its future performance in support of the White Paper on Science, Technology and Innovation will lend considerable impetus towards the realisation of its mandate in light of the prevailing macro-economic conditions.

10.3 PERFORMANCE INFORMATION BY PROGRAMME **AND SUB-PROGRAMME**

10.3.1. Contribution to the Bio-economy Strategy

According to the 2013 Bio-economy Strategy of the Department of Science and Technology, the bio-economy *"encompasses biotechnological activities and processes that translate into economic outputs, particularly those with industrial application"*, and includes the *"exploitation of natural resources such as animals, plant biodiversity, micro-organisms and minerals to improve human health, address food security and subsequently contribute to economic growth and improved quality of life."*

During the period under review, TIA supported the implementation of the Bio-economy Strategy across the strategy's three main implementation areas, namely agriculture, health and the industrial bio-economy (industry and sustainable environmental management). Implementation took place directly via TIA's Technology Platforms Programme, Technology Innovation Cluster Programme, Health Sub-programme and Agriculture Sub-programme. Indirect contributions to the Bio-economy Strategy were also made by other operating units within TIA, as detailed below.

10.3.1.1. Agriculture bio-economy activities

TIA's strategic priorities in agriculture are crop and animal improvement, and health, post-harvest technologies, agronomic practices and commodities as guided by industry expert insights and appropriate feasibility or market studies.

One of the key interventions for the year was the implementation of the Agricultural Bio-economy Innovation Programme. This broad-based programme involves government partnerships with the Department of Science and Technology; the Department of Agriculture, Forestry and Fisheries; and the Department of Rural Development and Land Reform. The lead implementation partners currently include GrainSA, Sensako, Agri Technovation, Pannar, the Agricultural Research Council, Stellenbosch University, the University of Pretoria, Vaal University of Technology, the University of the Free State, North-West University and Eden Social Development Foundation. The programme includes Sub-programmes aimed at supporting specific subsectors as follows:

- The **Wheat Breeding Platform** focuses on developing drought-tolerant and pest-resistant varieties of wheat. In 2018/19, 834 new varieties were sourced from various national and international collaborators and 271 line varieties were made available to different breeding companies. Although the Agricultural Research Council selected 161 lines, Sensako selected 27 and Corteva (Pannar) selected 18, none were commercialised during the period under review.
- The **Maize Breeding Programme** is implemented by the Climate Resilience Consortium. It focuses on developing hybrid varieties with increased resilience to drought and heat stress. Smallholder farmers will benefit through access to these improved, high-yielding maize varieties. A total of 100 000 smallholder farmers are being targeted over a five-year period.
- The **Crop Protection Consortium** screens for soil- and seed-borne diseases with a view to developing and managing an early warning system for disease outbreak. Two projects initiated in 2014/15 were completed, namely prominent nematodes pests of soybean and maize in summer grain-producing regions and determinants of soil health; and comparing soil disease complexes, specifically focused on soil-borne diseases and nematodes from conservation agricultural and conventional tillage systems to identify which crop rotation practices contribute to less diseased soils. A third project was initiated during 2018/19 to monitor the spread of the fall armyworm in South Africa.
- The **Soybean Food and Nutrition Programme** is aimed at developing and disseminating appropriate technologies to farmers and communities for promoting the production and processing of soybeans. The project is championed by the Oil and Protein Seeds Development Trust and has the potential to support economic growth for emerging farmers. The three-year agreement with the Oil and Protein Seeds Development Trust includes conducting awareness training on soybean nutrition as an alternative source of staple protein, and training communities and small, medium and micro enterprises on agricultural techniques to achieve good soybean yields so that candidates are empowered to start their own small-holding agro-businesses. Of the total number of people trained to date, 11 are women leaders from the African Co-operative Action Trust and the Ethembeni Trust. The programme has been piloted in rural areas in KwaZulu-Natal, Eastern Cape, Free State and Gauteng. A total of R905 658 has been invested so far, with an additional R1,5 million planned for investment in 2019/20.
- The **Bio-innovation Aquaculture Programme** issued a call for proposals on 25 February 2019. By the close

of the call on 29 March 2019, 74 applications had been received for evaluation and funding in 2019/20. The programme will initially support projects in the areas of freshwater and marine production systems. Particularly those that seek to increase production output or yield; aquatic animal feed; health and disease management technologies; and aquaculture value addition and post-harvest technologies for food security and nutrition. This seeks to support national priorities, including the Oceans Economy and Operation Phakisa.

- Funding was provided towards **agro-processing initiatives for niche commodities** in support of the marula, honeybush and Cape aloe plant species with the view to develop and commercialised these indigenous plants as they offer excellent nutritional content and promising new market opportunities that are expected to result in job creation. During 2018/19, a marula community development programme was initiated in Hoedspruit, Limpopo, aimed at expanding the marula market. It is co-funded by the Industrial Development Corporation and TIA.
- **Agri-Parks initiatives**: The Department of Science and Technology is co-funding Grain SA's farmer development support initiative (which is also supported by the Jobs Fund) to provide additional innovation incentives and alternative sources of nutrition and revenue in communities through crops such as beans and maize. This includes increased access to seeds via distribution throughout the communities to diversify diets, as well as to demonstrate nixtamalisation (a preparation process for grains involving soaking, alkaline cooking and de-husking) technologies and recipes in rural communities to increase the amount of free niacin (vitamin B3). Department of Science and Technology support has also enabled increased storage capabilities to prevent mycotoxin (a toxic substance produced by a fungus) contamination, and improved threshing capabilities to increase the efficiency of maize harvesting. The soybean food and nutrition programme also targets increased reach to communities within Agri-Parks.

TIA's Agriculture sub-programme contribution to the Bio-economy Strategy is presented in Table 5. An overview of the funding for the Agriculture Bio-economy Innovation Partnership Programme is presented in Table 6. For further information regarding TIA's Agriculture sub-programme, please refer to Section 10.3.2.2.

Table 5: Agriculture sub-programme contribution to national Bio-economy Strategy

DST KPI	BIO-ECONOMY OBJECTIVES	SUMMARY OF PROGRESS AGAINST OBJECTIVES
4b	Number of biotechnologies (products, processes and services) reaching demonstration stage	6 varieties of sugar beet reported for progression from Technology Readiness Level 4 to Technology Readiness Level 6 (from the Sweet Stem Sorghum project) Future Fynbos project reported progression from Technology Readiness Level 9 to market expansion phase
5a	Number of biotechnologies (products, processes and services) taken up in the market	Biopher's Pro-forma and Pro-forma S reached demonstration stage
5b	Amount of third-party funding attracted to the bio-innovation portfolio	AgriProtein: R183m Agriculture Bio-economy Innovation Partnership Programme / Oil and Protein Seeds Development Trust co-funding: R1,3m Grain SA: R46,7m
6a	Revenue generated from the sale or licensing of bio-innovations by firms or companies	R15,9m was received from Agriculture Bio-economy Innovation Partnership Programme and disbursed to the Oil and Protein Seeds Development Trust and Grain SA
6b	Additional revenue generated by start-ups commercialising bio-innovations	The sub-programme is still in the process of developing mechanisms to monitor this. As a result, no data is available for the period under review

Table 6: Agriculture Bio-economy Innovation Partnership Programme funding

PROGRAMME FUNDING	2016/17	2017/18	2018/19	2019/20
Grain and Oilseeds Innovation Partnership	-	R7,8m, with an additional R5,7m for the Wheat Breeding Platform (DST contract in place)	R13,5m (Wheat Breeding Platform funding included)	R13,5m
Soybean Food and Nutrition Programme	-	R1,5m	R1,6m	R1,6m
Aquaculture Bio-innovation Programme	Completion of feasibility study	R2m	R2m	R2m
Agro-processing Programme	Completion of feasibility study	R2,5m	R2,5m	R2,5m

10.3.1.2. Health Sub-Programme

The Health Sub-Programme under the Bio-economy Strategy seeks to enhance South Africa's global competitiveness in the health arena and deliver socioeconomic value through technological innovation in healthcare products and services addressing the prevention, diagnosis and treatment of high burden diseases. Resultantly, TIA supports the development, registration, manufacture and commercialisation of products and services within the areas of new and improved therapeutics, drug delivery systems, vaccines and biologics, diagnostics, medical devices, indigenous knowledge systems and natural products, and techniques for provision of services in health. The focus is on facilitating the translation of South Africa's knowledge resources into sustainable health technology-based commercial opportunities by providing risk funding and catalysing partnerships between small, medium and micro enterprises, industries, universities and science councils to support health specific innovations that will contribute to a quality health care system for all. There is also focus on development of new technology platforms, programmes and clusters to support the relevant industries.

In the drug discovery and pharmaceuticals portfolio, TIA continues to fund and support a strategic project in local active pharmaceutical ingredient manufacturing, which is the Chemical Process Technologies Pharma active pharmaceutical ingredient pilot plant. A major project milestone achieved is the successful production at the required scale and within specification of the first active pharmaceutical ingredient, thereby proving initial demonstration of the innovative process. Further pilot runs and current good manufacturing practice certification are in process to validate the production process. Successful demonstration of active pharmaceutical ingredients in the pipeline would enable local manufacturing of such ingredients (including tuberculosis and HIV), which in turn will stimulate job creation, and ultimately reduce imports and costs thus addressing trade balance in the pharmaceutical industry. Other strategic interventions include support of the Drug Discovery and Development Centre that is aimed at building local capacity to develop medicines for the treatment of tuberculosis and malaria. In addition, the active pharmaceutical ingredient cluster seeks to coordinate activities of the various players in the active pharmaceutical ingredient production value chain to identify and alleviate common pain points.

TIA has also supported projects in the diagnostics and devices sectors. Milestones achieved include the completion of the internal audit preparation process towards ISO 13485 certification for Altis Biologics (bone matrix product) and development of some critical components required for the MARTI TB diagnostic. Similarly, TIA seeks to catalyse the development of the medical devices industry by assessing industry-wide intervention gaps through the medical device cluster.

The nuclear medicines cluster programme aims to improve the competitiveness of the nuclear medicine and biosciences sector. Furthermore, the programme seeks to enhance collaboration and networking across the private sector and academia to leverage local excellence and expertise in the industry, and stimulate the technology development environment for research and development activities to develop technology-based products, processes

Figure 6: Professor Maritha Kotze (middle) and contributors to the Open Genome Project

and services. It also aims to facilitate and accelerate the commercialisation of nuclear medicine products for local production, reduce reliance on imported nuclear medicine products into the country and contribute positively toward reducing the trade deficit in the pharmaceutical sector. It also seeks to leverage funds from local and international funding sources and contribute towards skills development and expertise in the industry.

TIA has also shown steady progress in implementing the South African Biodesign Initiative, a Department of Science and Technology-contracted programme. The Initiative supports collaborative and integrative research projects that focus on functional genomics, structural biology, synthetic biology and systems biology. One such project under the Initiative exploits advances in genomics technologies to improve diagnosis and treatment of diseases and cancer.

The Open Genome project has developed its technical specifications and is now in the genetic decoding phase. One of the project leads, Professor Maritha Kotze (Figure 6), is a leading international authority on breast cancer research. As a result of her expertise and profile, the project is receiving considerable attention and recognition. Professor Kotze has been involved in numerous thought leadership initiatives, including a televised appearance at the high-profile 2018 Africa Tech Week Summit. Two journal papers have been published and two students involved with the project were awarded masters and doctoral degrees in April 2019. This joint University of Stellenbosch and Medical Research Council/PATH Global Health Innovation Accelerator project furthers South Africa's precision medicine agenda and can be used to model other diseases for a better approach to treatment.

There are currently two indigenous knowledge-based innovation projects supported during the year under review. One project entails the industrialisation of new skin tone actives for cosmetics, and the other seeks to develop a treatment for benign prostate hyperplasia. A natural products project, namely Enzyme Technologies bromelain (for use in animal and human health markets), secured distribution agreements and undertook market testing in various segments during the year.

10.3.1.3. Industry and Environment Bio-economy Activities

The aim of the programme is to establish world-class competency through the technology development value chains, in biological processes for the production of goods and services, including water and waste management, in support of the industrial bio-economy sector

TIA continues to support the natural beta carotene production and BioDx green biocide projects. BioDx Biological Chemical Technologies (Pty) Ltd, secured a supply order for the company's green biocide following testing in industrial water applications. Successful uptake will contribute to a reduction of the carbon footprint and better environmental management outcomes.

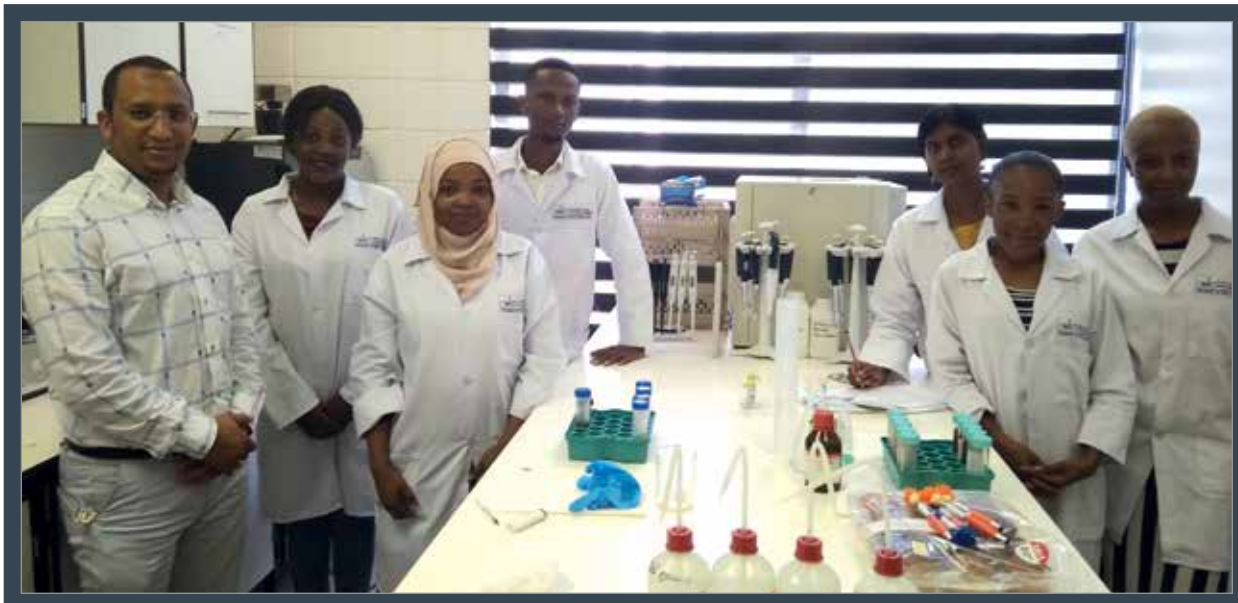


Figure 7: Vaal University of Technology biodiesel research group with principal investigator Dr Naser Feto (left)

During the period under review, the Department of Science and Technology transferred the management of the Strategic Industrial Bio-Innovation Programme to TIA. This was done to create a mechanism to facilitate and leverage resource investments in support of the two strategic pillars of the industrial bio-economy elements of the Bio-economy Strategy (i.e. bio-based industrial applications and environmental management). The programme has thus far contracted R18,8 million over two years for three projects. An additional R2,2 million was disbursed towards a bio-remediation project aimed at providing cost-effective, bio-based technology and bio-innovation solutions to address South Africa's waste and water problems.

In 2018/19 TIA, supported researchers from Vaal University of Technology (Figure 7) and University of South Africa to clone lipases, modify them and immobilise them on to inert surfaces to treat waste oils for conversion into useable biodiesel. This project is also funded under the South African Biodesign Initiative.

TIA's Health sub-programme contribution to the Bio-economy Strategy is presented in Table 7. For further information regarding the Health sub-programme, please refer to Section 10.3.2.3.

Table 7: Health sub-programme contribution to national Bio-economy Strategy

DST KPI	BIO-ECONOMY OBJECTIVES	SUMMARY OF PROGRESS AGAINST OBJECTIVES
4b	Number of biotechnologies (products, processes and services) reaching demonstration stage	Two projects recorded technology readiness level progression, towards demonstration. The Chemical Process Technologies Pharma Active Pharmaceutical Ingredient plant progressed to technology readiness level 5 (active pharmaceutical ingredient 1 production process validated in relevant environment) and Biodx rapid diagnostic monitor progressed to technology readiness level 6 (integrated prototype system verified in operational environment)
5a	Number of biotechnologies (products, processes and services) taken up in the market	Enzyme Technologies bromelain reported uptake in a new market segment
5b	Amount of third-party funding attracted to the bio-innovation portfolio	The unit recorded additional funding of R37,7m into the portfolio across various projects

10.3.1.4. Bio-entrepreneurship

The Gauteng Accelerator Programme Biosciences is a collaboration between TIA, The Innovation Hub and Emory University. It assists scientists and entrepreneurs to pursue commercially viable opportunities for their cutting-edge biotechnologies in agro-processing and health (pharma and cosmeceuticals). In 2018/19, the programme pursued this objective through the basic technology entrepreneurship workshop, the executive education programme and a pitching workshop. The programme culminated in the selection of six technologies for incubation. The top three institutions were the University of Limpopo for the micro propagation of the Strelitzia, the Agricultural Research Council and Letago Pharmaceuticals. Special recognition recipients were Ulusu Genetics and Phytelix.

TIA also partnered with OneBio, a pan-African biotechnology incubator, established in 2018/19, to run a programme aimed at improving the success rates of life science entrepreneurs and innovators from across the continent by helping them to commercialise and scale up their biotechnology start-ups. During the third quarter of 2018/19, OneBio launched a bespoke accelerator programme at the University of the Western Cape. Seven aspiring entrepreneur teams were taken through various aspects of the technology commercialisation process (Figure 8). For information regarding additional initiatives undertaken during the year to support entrepreneurs, please refer to Section 10.3.4.2.

10.3.1.5. Other bio-economy projects

While TIA's health, agriculture and industrial biotechnology efforts are core to implementing the Department of Science and Technology's Bio-economy Strategy, projects connected with or related to the bio-economy are also managed by other business units in TIA, as follows.

Advanced Manufacturing sub-programme (see also Section 10.3.2.4)

The **ArcAqua Sanitising System** converts ordinary cold tap water into a sanitising agent that kills 99.9% of all known bacteria. ArcAqua has developed, patented and commercialised a wall-mounted ozone-based sanitiser system. The company current customers include food retailers, food processing plants and manufacturers, commercial kitchens, restaurants and hotels.

The **Fibrelux** project entails the development of a device for the wool shearing industry that measures wool fleeces while the actual shearing is in process. The device provides information to farmers concerning wool quality/grades, thereby enabling the farmer to obtain the best prices. The Fibrelux device is currently undergoing field trials with small-scale wool farmers in a rural shearing community in collaboration with the National Wool Growers Association and the Department of Rural Development and Agrarian Reform in Eastern Cape.

The **NovelQuip** project seeks to develop a fully mechanised planting solution for commercial forestry that combines seedling extraction, soil preparation, gel/water application, fertiliser application, seedling planting, weedicide application and soil firming. The NovelQuip Forestry company shipped the first Pro-Plant 1 equipment to Brazil, and the company commenced in-field testing at the end of the year under review.

The **Cardio flow Project** focuses on developing a device that will be able to detect possible cardiovascular diseases

Figure 8: The seven teams that participated in the OneBio mini incubation programme: 1) POC-Diagnostics, 2) A-Grow, 3) BioID, 4) BiliGen Bioscience, 5) HaloPhyle, 6) TBNano and 7) AMR Biotech.

by extracting, normalising and interpreting the unique features and characteristics of ultrasound signals.

The **Continuous Supercritical Fluid Extraction of Vegetable Oil** Project seeks to develop a novel plant that extracts vegetable oils from seed oil in a process that eliminates the need to use toxic chemicals.

Energy sub-programme (see also Section 10.3.2.5)

Nelson Mandela University's **Microalgae Project** entails harvesting microalgae biomass and mixing it with coal fines (generated during coal mining and processing) to produce a product called coalgae that has a higher calorific value and lower ash content compared with unmixed coal fines. The technology is ready to be up scaled and demonstrated for longer periods.

Seed Fund Programme (see also Section 10.3.3.4)

In February 2019, TIA entered partnerships with the South African Medical Research Council and the Council for Scientific and Industrial Research whereby these organisations became implementing partners for the Seed Fund programme. Calls for funding were issued within the two organisations in March 2019, and approved projects will receive funding support during 2019/20.

Technology Innovation Cluster Programme (see also Section 10.3.3.2)

The **Forestry Molecular Genomics Cluster Programme** focuses on the genetic control of growth, wood formation and pest and disease resistance in South Africa's forestry plantations. Its aim is to enhance tree growth and health while simultaneously improving properties for timber, pulp, paper, and bio-materials production. Since inception, the programme has uniquely combined rapidly evolving genomic science and bio-technology with direct commercial application. The cluster further aims to expand the national footprint, further exploit commercial applications of the research and technology to date, as well as to identify enabling interventions for vertical value additions in support of bio-refineries. It is envisaged that by 2020/21 the cluster and its associated investment in knowledge, skills, and technology development will form the foundation of a leading, world-class plant biomass incubator focused on innovation and translational research for the bio-economy in South Africa.

"While TIA's health, agriculture and industrial biotechnology efforts are core to implementing the Department of Science and Technology's Bio-economy Strategy, projects connected with or related to the bio-economy are also managed by other business units in TIA"

Natural Resources sub-programme (see also Section 11.3.2.7)

The **Bio-remediation Project** aims to provide cost-effective bio-based technology and bio-innovation solutions to contribute to the reduction of the vast waste and water challenges faced by South Africa. The collaborative initiative draws on the expertise of four South African universities, namely the University of South Africa, University of Johannesburg, University of Venda and the Cape Peninsula University of Technology.

10.3.2. INNOVATION FUNDING AND **PRE-COMMERCIALISATION SUPPORT PROGRAMME**

The focus of the programme is to provide financial and non-financial support to de-risk impactful technological innovations as they progress through different stages of development, with the aim of commercialisation. Through this programme, TIA sources ideas and invests in promising innovative technologies from the research community in universities, science councils and other research institutes and the general community of entrepreneurs throughout the country, across all sectors of the economy. This is achieved by using two instruments, namely the Technology Development Fund and the Commercialisation Support Fund. The programme receives applications through various means including unsolicited applications and making a call focusing on a specific theme.

10.3.2.1. Commercialisation

In 2018/19, the following nine technologies were taken up by the market, with an estimated revenue of R66 million generated in sales.

- The Natural Resources sub-programme funded the **Centre for Machine Technology** and Innovation, which develops, manufactures and performs mining system trial tests consisting of multi-track platforms equipped with various attachments (dozers and sweepers), drills and rock-breaking equipment (conventional and non-explosive).
- In the energy sector, **HyPlat** developed a membrane electrode assembly, which is a critical component in fuel cells.
- In the Advanced Manufacturing portfolio, one of the technologies taken up in the market is **NovelQuip**, a project that has developed a fully mechanised planting solution for commercial forestry. It combines soil preparation; water, fertiliser and weedicide application; and seedling planting. NovelQuip shipped the first Pro-Plant 1 for field testing in Brazil.
- The **Rubber Nano** project focuses on the development of a production-ready nano additive (ZR6-Actiwax) to replace harmful zinc oxide in the rubber curing process.
- The **Fibrelux** project has developed a device for the wool-shearing industry to measure fleeces during shearing.
- The Agriculture portfolio reported that the **Biopher** project developed two products for the pesticides market.

A total amount of R1,1million was received from royalties from the following projects.

- **Blue Cube Systems** – A technology company focused on real-time, in-line instrumentation for the mineral processing industry.
- **Advanced Imaging Technology** – The project specialises in providing innovative and cost-effective solutions to scientific and technical problems experienced by large and small-scale industries. One of its main projects involved developing an advanced magnetic imaging technology that provides online monitoring of steel cord conveyor belts.
- **BioDx** – The purpose of the project is to formulate a green biocide, demonstrate activity against a range of bacteria, conduct initial field trials and secure sales and uptake agreements.

Interest income contribution towards the Innovation Funding and Pre-Commercialisation Support Programme income was R5,3 million, consisting of the following investments.

- **Synexa Life Sciences** is a specialist biomarker services provider, with deep expertise in the design and delivery of biomarker strategies for global biopharma clients.
- **GeoAxon "Kuduwave"** has developed an audiometer that operates in conjunction with a software that runs on a personal computer.
- **AgriProtein** is involved in the development of a process in which waste is turned into animal feed by using waste nutrients (food waste) and growing maggots (turning waste into feedstock).

10.3.2.2. AGRICULTURE SUB-PROGRAMME

Aims to contribute (financially and non-financially) to the development of high-growth and high-impact technologies, products and services that will result in a competitive, broad-based, inclusive and sustainably growing agriculture sector in South Africa, Africa and globally. (Refer also to Section 10.3.1, which addresses this sub-programme's relevance in the bio-economy.)

Focus Areas

- Breeding and productive technologies in livestock and field crops
- Animal and plant health and nutrition
- Post-harvest technologies

Objectives

- Building a pipeline of investment opportunities in the agriculture sector
- Assisting applicants in building fundable opportunities and to assess investment opportunities
- Performing client-centric and value-adding project management of agriculture projects and investments
- Facilitating commercialisation of agriculture projects and investments
- Facilitating co-funding and next round funding of agriculture projects and investments

Support activities include providing funding to key projects as well as non-financial support through

- Identifying new agriculture technology innovators
- Facilitating access to networks of agriculture technology innovators
- Interacting with research communities and other partners/investors
- Building fundable opportunities
- Undertaking project management
- Attracting follow-on funding to commercialise technologies

Provides support to technology innovators in the agriculture sector as a connector, funder and facilitator.

Figure 9: Maggots turned into a protein-rich substance (Source: AgriProtein).

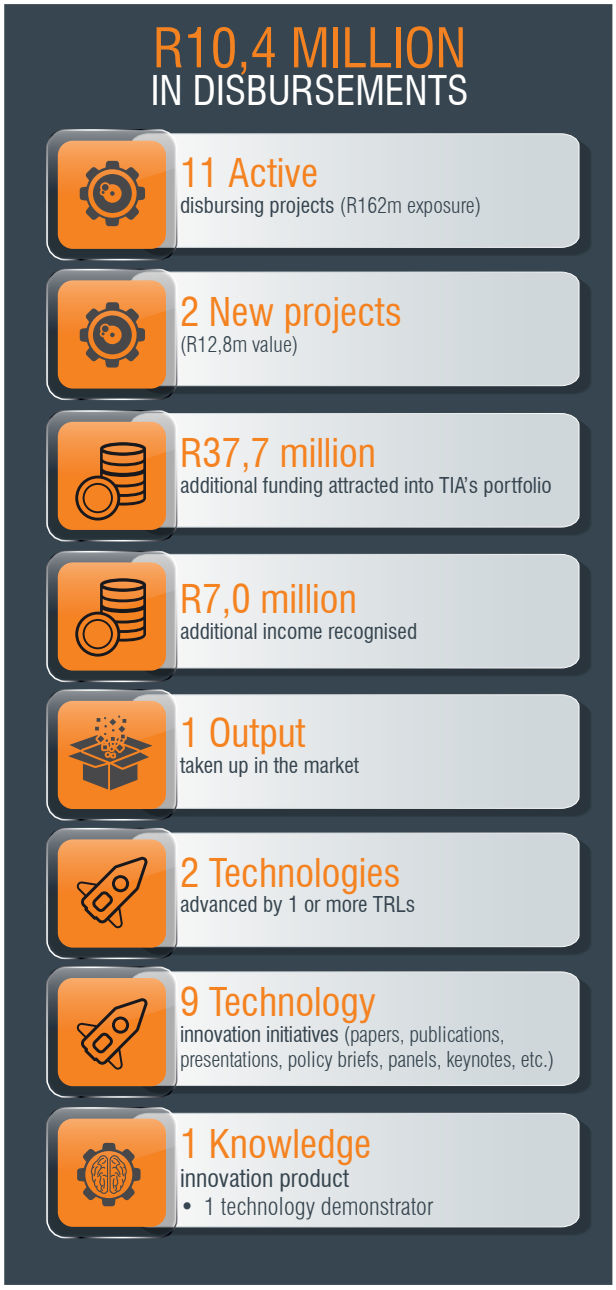
Project example: Agriprotein

- **Description:** Development of a process in which waste is turned into animal feed by turning the nutrients in food waste into a protein-rich feed through the growth of maggots.
- **Innovation output:** Product and process – animal feed
- **Sector:** Recycling and animal feed
- **Intended users:** Animal feed companies and farmers; fertiliser companies and crop farmers
- **Project outcomes:** Increased animal feed; reduced waste
- **TIA role:** Funder and expert support; connector

A word from the investee

Tomas Orr, Project Manager for AgriProtein indicated the company has embarked on an investment drive to fund the planned Gauteng project expansion. Potential debt and equity investors were identified during the African Agri Investment Indaba in November 2018.

10.3.2.3. HEALTH SUB-PROGRAMME



Aims to develop healthcare technological innovations that prevent, diagnose and treat priority diseases in the country, which will assist in improving public health and quality of life. Through improved technology healthcare products and services, the unit intends to contribute to South Africa's social and economic development through translation of knowledge resources and research and development to products that contribute to better health outcomes for South African citizens and advance the country's global competitiveness in health-related areas. (Refer also to Section 10.3.1, which addresses this sub-programme's relevance in the bio-economy.)

Focus areas

- Medical devices and diagnostics
- Pharmaceuticals and bio-pharmaceuticals
- Indigenous knowledge systems and complimentary medicines
- Priority diseases include HIV/AIDS, tuberculosis, malaria and non-communicable diseases such as cardiovascular disease, cancer and diabetes

Objectives

- Invest in affordable healthcare product projects
- Increase development of drugs especially in areas affected by HIV, malaria and tuberculosis
- Improve the current medical devices and diagnostic products and exploit expertise in cardiac and orthopedic devices
- Develop the ability to manufacture vaccines locally
- Support local active pharmaceutical ingredient manufacturing

Support activities include providing funding for the development, registration, manufacturing and commercialisation of key projects as well as non-financial support that connects projects with:

- Service providers that can assist in development of technologies;
- Downstream funders that could provide additional funding or facilitate the commercial uptake of technologies; and/or

Figure 10: Pilot facility at Chemical Process Technologies Pharma

- Potential customers that could commercially uptake technologies.

Provides support to innovators (who could be professors, researchers, or technology developers) with projects between technology readiness levels 4-8 that may already have companies established, where these are typically start-ups or small, medium and micro enterprises; or to innovators within higher education institutions and science councils.

Project example: Chemical process technologies pharma active pharmaceutical ingredient pilot plant

- **Description:** Development and demonstration of innovative synthesis technologies by Chemical Process Technologies Pharma (Figure 10) for the local manufacture of selected active pharmaceutical ingredients that are active components in drug formulations (for example, in tuberculosis drug formulations). These would be used in drug formulations to treat diseases.
- **Innovation output:** Product – Locally-developed and manufactured Active Pharmaceutical Ingredients, using innovative synthesis technologies
- **Sector:** Health
- **Intended users:** Local pharmaceutical industry
- **Project outcomes:** Active pharmaceutical ingredients developed and manufactured locally; import substitution; job creation; local good manufacturing practice facility for small volume manufacturing of active pharmaceutical ingredients
- **TIA role:** Funder and expert support; connector

A word from the investee

"TIA has assisted in the building of a multipurpose pilot plant that is not only a national asset and resource, but a significant building block in the development of an active pharmaceutical ingredient manufacturing industry in South Africa, which will ultimately result in improved quality of life for all of South Africa's citizens." - Anton Steyl CA(SA), Financial Director.

10.3.2.4. ADVANCED MANUFACTURING SUB-PROGRAMME

Aims to utilise technological innovations as a driver to support the development of a knowledge economy in manufacturing, by accelerating both the manufacturing capability and the knowledge intensity of the industry, to increase and sustain the competitiveness and innovation in South Africa's manufacturing industry.

Focus areas

- Chemicals, electronics, materials and automation
- Photonics and aerostructures
- Production technologies and advanced electronics
- Fourth Industrial Revolution technologies

Objectives

- To build TIA's pipeline of advanced manufacturing investment opportunities
- To assist applicants with building a fundable opportunity, and to assess investment opportunities
- To perform client-centric and value-adding project management of TIA projects/investments
- To facilitate commercialisation of TIA projects/investments
- To facilitate co-funding and next round funding of TIA projects/investments
- To participate, co-ordinate and contribute to building the advanced manufacturing innovation ecosystem and seek alignment with key stakeholders (such as the Department of Science and Technology Advanced Manufacturing Technologies Directorate and other actors in the manufacturing sector)

Support activities are delivered though financial and non-financial means. Non-financial support is largely in the form of expert advice.

Provides support to advanced manufacturing technology innovators as a funder and facilitator.

Project example: Continuous supercritical fluid extraction oil seeds extraction technology

- **Description:** Current agro-processing technologies employed for seed oil (for example soybean) extraction utilise harmful solvents in the process, that if not properly removed, leave harmful levels of the solvent that impact product quality and human health negatively. This project aims to resolve that issue by developing a technology that ensures the product is nontoxic to humans. In addition, because the technology does not rely on harmful solvents, it is also not harmful to the environment and is considered a 'green' technology. The technology will potentially result in cost savings for the plant operators. It also exhibits potential for easier adoption by cooperatives, allowing small-scale farmers access to the latest technologies due to its compact and modular nature (figures 11 and 12).
- **Innovation output:** Product – Modernised agro-processing equipment
- **Sector:** Manufacturing and agro-processing
- **Intended users:** Seed oil producers and cooperatives
- **Project outcomes:** Production cost savings; improved oil quality and a healthier product
- **TIA role:** Funder and expert support

Figure 11: Schematic layout of the continuous supercritical fluid extraction plant

Figure 12: The constructed continuous supercritical fluid extraction plant

10.3.2.5. ENERGY SUB-PROGRAMME

Aims to support the development of an innovative, competitive and sustainable energy industry that supports South Africa's transition to a low-carbon economy with an emphasis on renewable technologies and energy storage.

Focus areas

- Bioenergy and renewable energy technologies
- Hydrogen and fuel cells
- Energy management and clean coal technologies

Objectives

- Supporting energy technologies that improve supply security
- Supporting energy technologies that assist in the transition to a low-carbon economy

Support activities include providing funding to key projects as well as non-financial support such as enabling innovators to source additional funding.

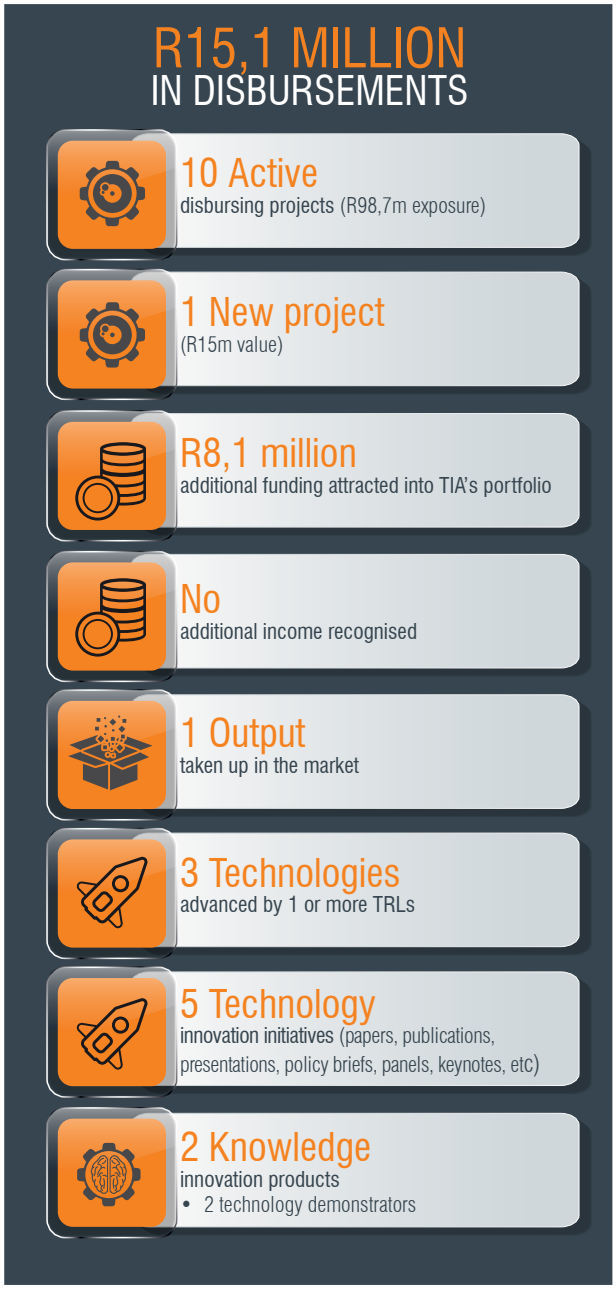
Provides support to technology innovators in the energy sector with projects between technology readiness levels 3-8 that have the potential for commercial impact and improve the quality of life of South Africans.

Figure 13: Pilot waste-to-energy gasifier plant

Project example: Waste to energy gassifier

- **Description:** The gasifier (Figure 13) treats organic waste on-site through a thermal process by converting organic waste into highly combustible syngas that is used to produce heat and generate electricity.
- **Innovation output:** Product – gasification system
- **Sectors:** Waste; energy
- **Intended users:** Industrial and commercial
- **Project outcomes:** Cleaner environment and electricity
- **TIA role:** Funder and expert support; connector

10.3.2.6. INFORMATION AND COMMUNICATIONS TECHNOLOGY SUB-PROGRAMME



Aims to support technology innovators to improve their skill sets and produce new information communication technology products and services, leading to the creation of sustainable social and commercial enterprises.

Focus areas

- Broadband
- Service economy
- Industry applications

Objectives

- Identifying a source of information and communication technology investment opportunities for TIA
- Providing innovators with investment
- Performing portfolio management duties on the various projects
- Enabling the commercialisation of technologies being developed

Support activities include providing funding and non-financial support to information and communication technology innovations from concept to early commercialisation.

Provides support to information and communication technology innovators with projects from technology readiness levels 3-9 that may already have companies established.

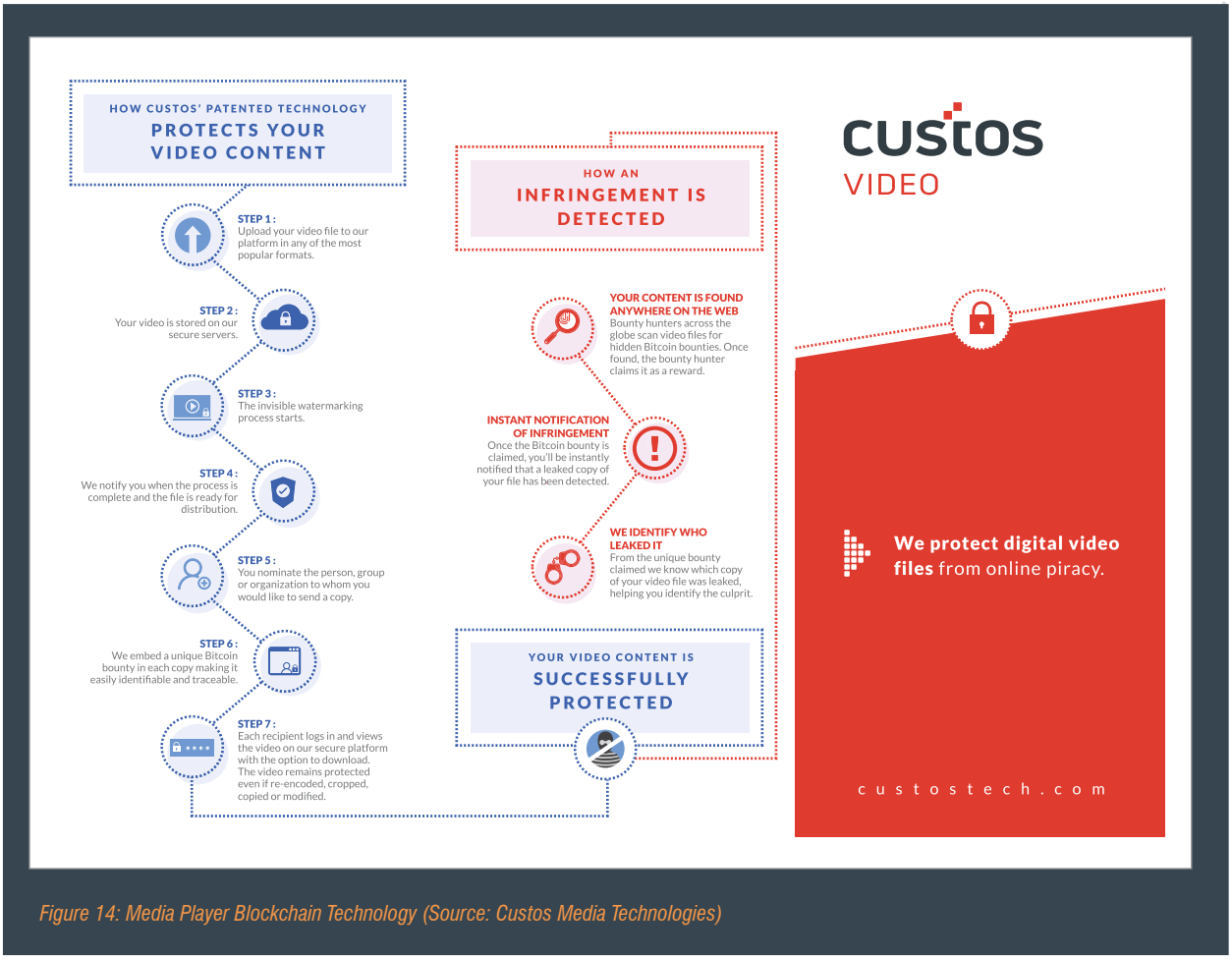
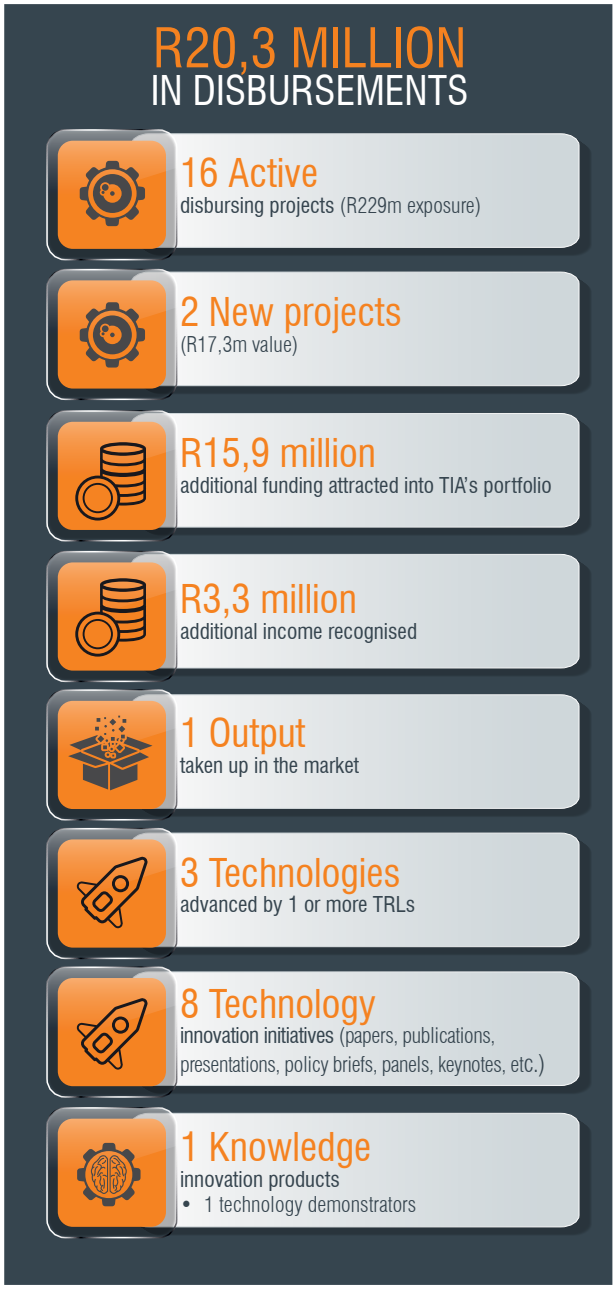


Figure 14: Media Player Blockchain Technology (Source: Custos Media Technologies)

Project example: Custos media

- **Description:** Development of a blockchain technology that protects media producers' (for example films, authors of e-books and music) intellectual property (Figure 14). The technology enables the detection of leaked (pirated) media.
- **Innovation output:** Product – watermarking, extraction tool and internet scanner
- **Sector:** Digital economy
- **Intended users:** Film, media and education sectors; connected enterprises
- **Project outcomes:** Reduction in piracy
- **TIA role:** Funder and expert support; connector

10.3.2.7. NATURAL RESOURCES SUB-PROGRAMME



Aims to ensure water security by using advanced technologies to sustainably improve efficiencies in solving the water crisis. Supports the development of technologies to minimise the impact of and derive value from waste and to sustainably improve process efficiencies during the extraction and exploitation of natural resources, reduce worker exposure to hazards. The Sub-programme also aims to contribute towards enhancing the competitiveness of South Africa's natural resource industries.

Focus areas

- Mining processing
- Mineral value addition
- Water resources, environmental management and waste management

Objectives

- Improving mining production to render it more efficient, safe and competitive
- Ensuring water security and containing water leaks
- Beneficiation of waste
- Upgrading and adding value to minerals
- Developing skills to improve technology development and the commercialisation of resultant technologies

Support activities include providing funding to key projects as well as non-financial support by:

- Pooling various companies' resources to develop technologies
- Developing technology commercialisation plans
- Facilitating access to funders to industrialise the technologies developed

Provides support to technology innovators as a connector, funder, facilitator and enabler. Such innovators are typically small, medium and micro enterprises who have developed mature technologies or are in the process of maturing technologies.

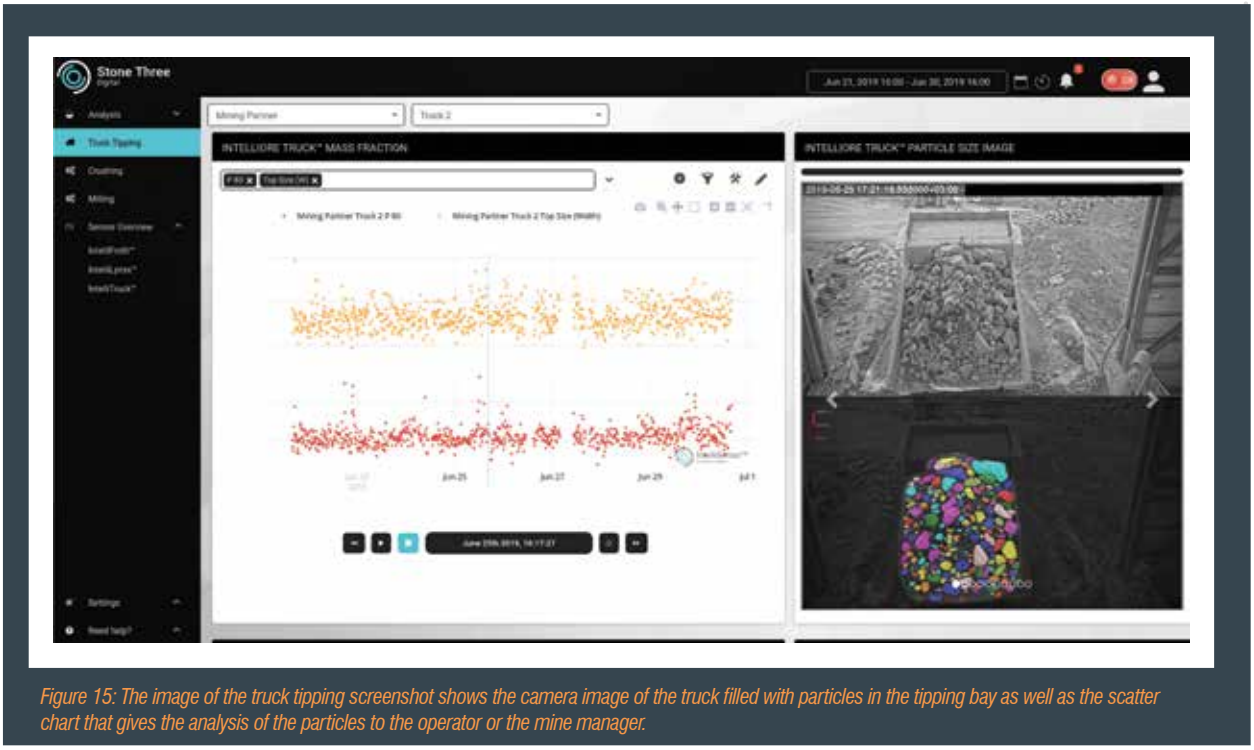


Figure 15: The image of the truck tipping screenshot shows the camera image of the truck filled with particles in the tipping bay as well as the scatter chart that gives the analysis of the particles to the operator or the mine manager.

Project example: Smart sensor process advisory dashboard

- **Description:** Development of smart sensors that enable processing plants to improve efficiencies via the provision of new information based on the analysis of existing data (Figure 15). The advisory dashboard uses digital productivity solutions to improve processes within mines.
- **Innovation output:** Process and service – web advisory dashboard
- **Sectors:** Mining and minerals processing; electronics (process control)
- **Intended users:** Mining and minerals processing industry (for example operations, metallurgists, process engineers and plant managers)
- **Project outcomes:** Increase productivity in terms of crushing, grinding and floatation
- **Contribution to greater African region:** Company's clients are in South Africa, Zambia, Lesotho and Ghana, with opportunities for new clients in Botswana and the Democratic Republic of the Congo
- **TIA role:** Funder and expert support

10.3.3. INNOVATION ENABLING AND **SUPPORT PROGRAMME**

The programme's main aim is to support the creation of a productive and vibrant innovation ecosystem within the National System of Innovation by enabling and stimulating a culture of innovation. This is achieved through facilitating access to infrastructure and technical expertise, and reducing barriers to entry for aspiring/potential innovators to enable technology development in their respective value chains. These include the Seed Fund Programme, the Technology Stations Programme, Technology Platforms Programme, Innovation Skills Development and the Youth Technology Innovation Programme. In addition, TIA also hosts and manages programmes from strategic international partners such as the United Nations Industrial Development Organisation's Global Cleantech Innovation Programme and several ring-fenced programmes on behalf of the Department of Science and Technology.

10.3.3.1. TECHNOLOGY PLATFORMS PROGRAMME

Aims to facilitate access to cutting-edge technological capabilities by investing in and supporting entities to acquire appropriate technologies and expertise that in turn lower the barriers for others to innovate. The programme aims to support the development of technologies with commercialisation potential and contribute to the creation of a vibrant bio-economy. The programme also provides funding and expert support to host institutions to acquire high-end infrastructure and to develop scientific and technical expertise necessary to build long-term strategic capabilities. (Refer also to Section 10.3.1, which addresses this programme's relevance in the bio-economy.)

Supports a wide range of technology innovators including universities, science councils, small and large enterprises, and international organisations.

The programme enables the provision of technology development services from the proof of concept stage up to commercialisation; and specialised training and capacity development opportunities for role-players in multiple value chains. The programme is a critical element of TIA's implementation of the Bio-economy Strategy.

The platforms collectively hosted a total of 98 projects during the period under review. Health-related projects comprise 64% of the portfolio, followed by industrial biotechnology projects (26%).

Strategic partners include higher education institutions, science councils and international funders. The platforms are as follows.

- Bioprospecting platform (University of Venda)
- Metagenomics platform (University of the Free State)
- Metabolomics platform (North West University)
- Drug Discovery and Development platform (University of Cape Town)
- Centre for Proteomics and Genomics Research (Cape Town)
- Biosafety South Africa (Somerset West)
- Bioprocessing Platform (Umbogintwini)

Figure 16: Sugarcane damage due to Eldana.

Project example: Genetically modified sugarcane - commercial pre-release biosafety aspects

- **Description:** Development of a genetically modified sugarcane crop that will reduce the need for insecticide, specifically making plants resistant to Eldana (Figure 16), and providing herbicide resistance. Genetically modified sugarcane is a modern targeted approach aimed at reducing costs related to Eldana pests.
- **Innovation output:** Product – genetically modified sugarcane crop
- **Sector:** Agriculture
- **Intended users:** All sugarcane growers, including commercial and small-scale growers
- **Project outcomes:** New sugarcane variety that cannot be produced currently
- **TIA role:** Funder and expert support

10.3.3.2. TECHNOLOGY INNOVATION CLUSTER PROGRAMME

Aims to stimulate innovative technology development from a national to municipal level to contribute to the creation of a knowledge-based economy in areas of national priority and to promote and catalyse a vibrant and lively marketplace through strengthening the ecosystem to enable, facilitate and mobilise industries in emerging markets, markets requiring revitalisation or markets requiring support for growth and expansion. (Refer also to Section 10.3.1 which addresses this Programme's relevance in the bio-economy.)

Through supporting technology innovations and strategic collaboration with the aim of exploiting opportunities for economic, social gain and knowledge growth. Other offerings of the programme are enhancing intellectual capital, government lobbying and stakeholder awareness creation.

Supports/works with all actors across the technology development value chain including science councils, higher education institutions, corporations, small, medium and micro enterprises, service providers and manufacturers operating in the same industry (Figure 17). The programme is a cross-cutting function in TIA that supports the establishment of cluster initiatives in all sectors of the economy.

Currently the Technology Innovation Cluster Programme leads the following initiatives.

- Forest Molecular Genetics cluster
- uYilo eMobility (electric mobility)
- Nuclear medicines cluster

Technology clusters are collaborative programmes aimed at leveraging the strengths of multiple partners to drive a technology solution and alleviate common industry 'pain points', thereby lowering the barriers to economic growth. Cluster interventions entail the provision of support from the basic research/proof of concept stage, focusing on projects that are likely to be commercialised by the industry (enabled through the provision of funding), providing technical support and business enabling services, and the development of human and intellectual capital.

Strategic partners include higher education institutions, science councils, government departments, technology incubators and the private sector.

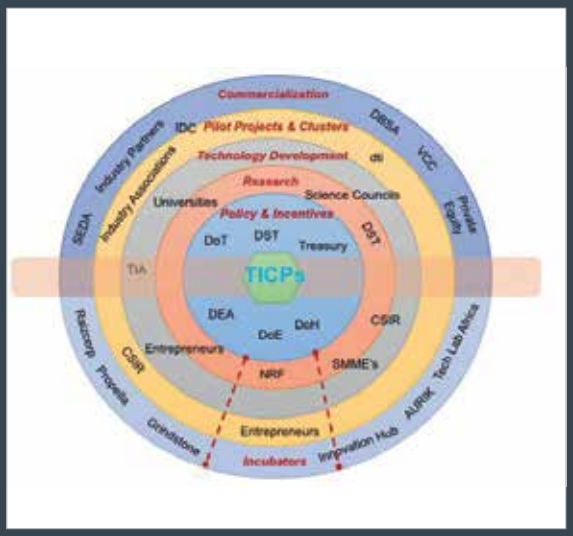


Figure 17: Technology Innovation Cluster Programme stakeholder cluster wheel

Figure 18: Forest Molecular Genetics Programme field researchers collecting wood samples

Project example: Forest Molecular Genetics Programme

- **Description:** The Forest Molecular Genetics Programme is a bio-technology group that improves the genetics of trees to enhance tree growth and health while simultaneously improving properties for timber, pulp, paper and biomaterials production (Figure 18).
- **Innovation output:** Product – forestry products
- **Sector:** Forestry
- **Intended users:** Forestry companies
- **Project outcomes:** Deoxyribonucleic acid markers for tree breeding; synthetic biology toolkit
- **TIA Role:** Funder and expert support; Enabler

10.3.3.3. TECHNOLOGY STATIONS PROGRAMME

Aims to enable academia and industry to take part in technology transfer and development by facilitating their interaction and reducing barriers to market access via subsidised services offered by the 18 technology stations located across the country.

The programme provides technology innovators in targeted industries/communities with sophisticated state-of-the-art equipment, infrastructure and knowledge/expertise in specialised fields, through the technology stations, that would not otherwise be available to commercialise their innovations.

Support services provided by the technology stations spans from the prototyping/piloting stage up until pre-commercialisation, and includes testing and analytical services; rapid prototyping and manufacturing; consultation, technology audit and feasibility study; process or product improvements; applied development, engineering and design; research and development and technology demonstration and training.

Supports mainly small, medium and micro enterprises, but also others considering technology development such as individual innovators and researchers.

Technology stations contribute to greater industry competitiveness through the application of interventions in science, engineering and technology, and facilitating interaction between industry and academia.

During the period under review, the programme recorded the following:

- 51 small enterprises secured business contracts, which could result in the retention and creation of jobs.
- 55 people living with disabilities were supported.
- 1 380 young people received support from technology stations.
- 124 students were afforded the opportunity to work on industry projects at technology stations in the manufacturing and agro-processing sectors because of leveraged direct income.
- A further 1 374 product testing, technology simulations and/or analysis of products were supported in applications of at least 64 research and development initiatives with firms to facilitate advancing the products/services to market for commercialisation.

Strategic partners include 11 higher education institutions, the Small Enterprise Development Agency, the National Intellectual Property Management Office, and the South African Technology Network.

Project example: Production of axle box and traction centre for besaans foundry

- **Description:** The Metal Casting Technology Station at the University of Johannesburg assisted a small, medium and micro enterprises client (Besaans Foundry) to produce an axle box and traction centre (locomotive components) for the Gibela Rail Transport Consortium project (Figure 19). The Technology Station assisted Besaans Foundry to produce ductile iron to the original equipment manufacturer's exacting specification. Reportedly no foundry in South Africa has been able to meet this specification previously.
- **Innovation output:** Product – Axle box and traction centre
- **Sectors:** Manufacturing; rail transport
- **Intended user:** Gibela Rail Transport Consortium
- **Project outcomes:** The small, medium and micro enterprises could secure a nine-year contract with the Gibela Rail Transport Consortium, with the potential of securing 40 new Jobs; potential design registration and South African National Accreditation System certification for the product developed.
- **TIA role:** Funder and expert support

Figure 19: As-cast axle box and traction centre locomotive components

10.3.3.4. SEED FUND PROGRAMME

Aims to assist innovators (university-based researchers and small, medium and micro enterprises) via the provision of bridging finance to translate their research outputs into fundable ideas for further development. The programme provides risk-adjusted conditional grant funding up to R800 000 per application, for technologies between technology readiness levels 3 to 7.

Supports innovators to achieve the following goals:

- Advance their research outputs and ideas to develop prototypes, proof of concept and business cases that could be used to attract follow-on funding opportunities and for further technology development
- De-risk research outputs for follow-on funding from TIA and/or other funders
- Assist innovators with small-scale trials and market testing
- Demonstrate their innovation value proposition to attract commercial partners

Strategic partners

The Seed Fund Programme is implemented in partnership with university and science council technology transfer offices, and together with regional development agencies and incubators. The programme has 35 implementing partners, comprising 23 universities, 3 science councils, 4 regional development agencies and 5 technology incubators.

Seed Fund Programme application breakdown

Applications to the programme during the year under review according to TIA focus areas is presented in Figure 20.

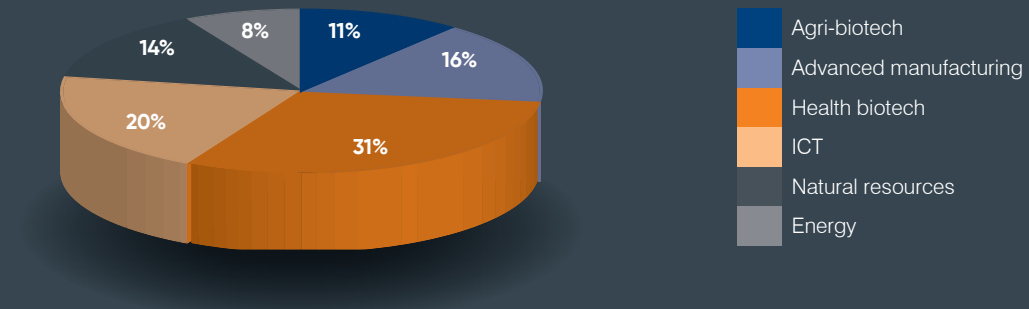


Figure 20: Seed Fund applications categorised into TIA focus areas

Project example: Tangibl Android App for computer programming introduction

- **Description:** Development and introduction of an inexpensive educational tool for introduction to coding to primary school learners without the use of a computer or software (Figure 21).
- **Innovation output:** Product – An app available via the Google Play Store (Figures 22-23) and tokens to play the game
- **Sector:** Education
- **Intended users:** Primary school learners and the public
- **Project outcomes:** Skills development – introducing primary school learners to coding as a skill of the future
- **TIA role:** Funder and expert support

Figure 21: Learners engaging with the app

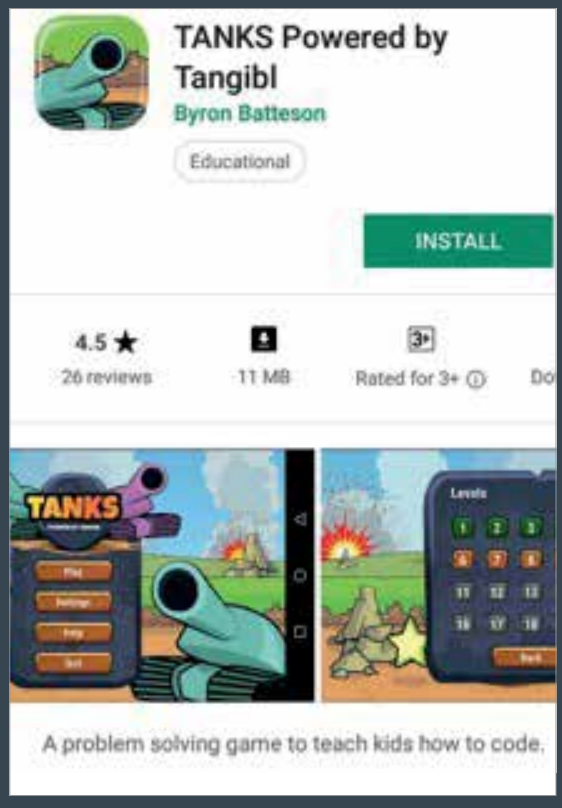


Figure 22: Screen capture from Google Play Store (1)

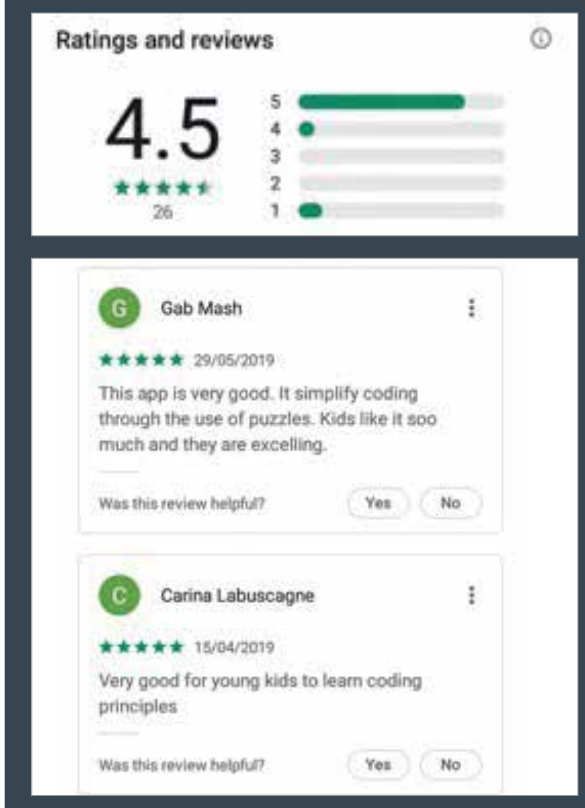


Figure 23: Screen capture from Google Play Store (2)

10.3.3.5. GLOBAL CLEANTECH INNOVATION PROGRAMME

Aims to promote and accelerate clean technology innovations that reduce or optimise the use of natural resources and support small businesses to be viable and investment-ready. Green investments (investment activities that concentrate on companies that try to preserve natural resources) help in minimising South Africa's dependence on fossil fuels, which will in turn reduce air pollution and carbon emissions.

The Global Cleantech Innovation Programme (Figure 24) was incorporated into TIA in January 2018 after four years as a donor-funded project with TIA the host and national implementer. Founding partners were the United Nations Industrial Development Organisation as the project developer and international implementer, and the Global Environment Facility as the principal funder. TIA is the host and national implementer.

The Global Cleantech Innovation Programme-SA also aims to:

- Build a local entrepreneurial ecosystem by identifying the most promising innovative local clean technologies.
- Support, promote and 'de-risk' the technologies of participating companies.
- Promote and develop clean technologies by working with various national programmes, funds and competitions.
- Connect the most promising start-ups with potential investors, customers and partners.

By acting as a competition-based business accelerator programme that trains, mentors, assist with access to capital, showcases innovations of participants and ultimately awards a cash prize to the winners.

Supports innovators, typically small, medium and micro enterprises and start-ups, who are looking to take their projects into the market, where these have significant commercialisation potential. In 2018/19, 44 entrepreneurs participated in the programme, of which 28 are historically disadvantaged individuals. R4,9 million was disbursed to recipients/beneficiaries in this period.

Strategic partners include universities, Africawide, Skeg product development and other Global Cleantech Innovation Programme participating countries such as Morocco and India.

Participants sectors include bioprocessing, clean technology and medical devices.

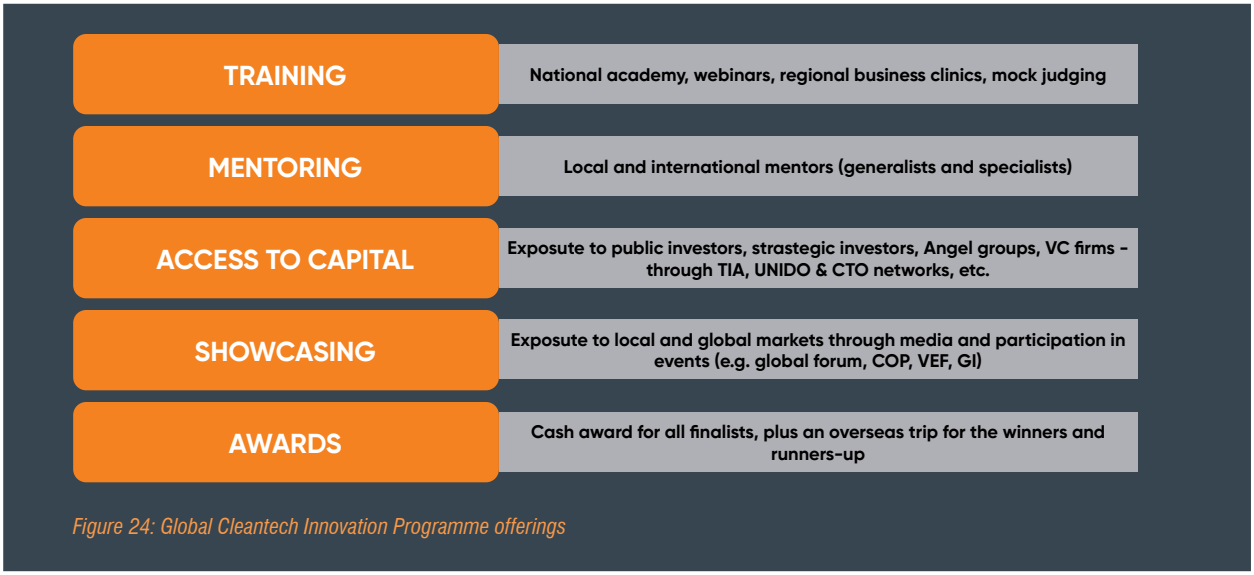


Figure 24: Global Cleantech Innovation Programme offerings

Project example: INSECO

- Description: A system that makes use of the black soldier fly to break down food waste that occur in cities, municipalities or rural towns (Figures 25-26). The product is a protein that can be utilised for human supplements or fats/lipids.
- Innovation output: Product and process – proteins and fats
- Sector: Agri-processing
- Intended users: Agriculture; businesses and communities producing waste; pharmaceuticals; aquaculture sector; human food industry
- Project outcomes: Waste management; sustainable nutrition; 'turnkey' black soldier fly organic waste beneficiation plants/facilities
- TIA role: Funder and expert support

Figure 25: Black soldier fly larvae (Source: Inseco)

Figure 26: Black soldier fly incubators (Source: Inseco)

10.3.4. INCLUSIVE INNOVATION

Aims

- To support a transformation agenda that seeks to increase the participation of previously disadvantaged and marginalised individuals in the National System of Innovation.
- To support an inclusive innovation agenda that positions itself to contribute to the discourse around township and rural economic development, the township economies and improvements in service delivery all of which should help TIA to respond to the needs of the poor.
- To achieve full deployment of the TIA mandate that extends TIA's services to all sectors beyond the traditional biotech and industrial sectors.

Focus areas

- Grassroots innovation
- Innovation for service delivery
- Innovation for local economic development.

These areas are embedded in the Department of Science and Technology's Innovation for Inclusive Development Strategy.

Supports communities, a range of publicly-funded implementing agencies (universities and science councils) and publicly-funded entrepreneurs who have technologies at demonstration stage for deployment and diffusion.

Through the Grassroots Innovation Programme, support is provided for innovators with innovative solutions to uplift communities but do not have access to research and innovation networks. Other portfolios are Innovation for Service Delivery and Innovation for Local Economic Development. In total, R10,7 million was disbursed to recipients/beneficiaries.

Strategic partners include local, provincial and national government, agencies that support social and grassroots innovation, impact investors, science councils, higher education institutions, the Department of Trade and Industry, Industrial Development Corporation, Small Enterprise Development Agency, National Intellectual Property Management Office, international partners, embassies and non-profit organisations.

Outputs and impacts

The Inclusive Innovation Programme is a new initiative, but has already produced the following results.

- 2 cooperatives established
- 1 policy brief developed
- 22 papers published
- 2 decision support tools developed
- 8 grassroots innovators recruited
- 1 technology successfully deployed

Project example: Zenzeleni Connectivity Initiative

- Description: Zenzeleni Networks is a social innovation model which has been developed to address technical, economic, legal and social barriers experienced in the harshest of rural settings (Figures 27-29). It does so by creating community-owned, solar-powered, Wi-Fi telecommunications networks that provide affordable communications to remote rural areas in South Africa.
- Innovation output: Service – communications system
- Sector: Information and Communications Technology
- Intended users: Inhabitants of remote rural areas
- Project outcomes: Address techno-economic, legal and social barriers in social settings
- TIA role: Funder and expert support

Figure 27: A technician from the community conducting maintenance of the Zenzeleni "do it ourselves" Connectivity Initiative equipment

Figure 28: The Zenzeleni Mankosi Cooperative members with the Project Team from the University of the Western Cape

Figure 29: The African Community Network Conference hosted at Mankosi in the Eastern Cape. (A stable internet network was providing by the Zenzeleni Connectivity Initiative for the duration of the entire conference.)

10.3.4.1. YOUTH TECHNOLOGY INNOVATION PROGRAMME

Aims to create an environment that inspires and enables the development of youth-led technology enterprises. The Youth Technology Innovation Programme provides funding of up to R1 million per applicant and has the following service offerings:

- Prototype development at TIA technology stations and technology platforms
- IP protection
- Testing and product certification
- Stipend per person per annum for up to four people for use towards establishing an enterprise
- Business coaching
- Incubation services for two years at an incubator recognised by TIA

Supports young individuals aged between 18 and 30 who have innovative ideas with potential for commercialisation. The Programme provides support from the basic concept stage up to pre-commercialisation and supports mostly previously disadvantaged youth from rural areas and townships.

In the year under review, 26 small, medium and micro enterprises received support in various forms, including funds/vouchers for technology development, stipends for early-stage enterprise development, intellectual property support, and monitoring and evaluation support related to prototype development.

Strategic partners include the Small Enterprise Finance Agency, National Youth Development Agency, Industrial Development Corporation, the Department of Trade and Industry and higher education institutions.

Figure 30: Gourmet Grubb EntoMilk-based ice cream

Project example: Gourmet Grubb's entomilk-based ice cream

- Description: The project seeks to optimise the process and formation of an ice cream based on EntoMilk (Figure 30), a milk substitute extracted from black soldier fly (Hermes Illucens) larva.
- Innovation output: Process – Optimal parameters for EntoMilk production; Product – EntoMilk-based ice cream
- Sector: Agro-processing
- Intended users: Individual consumers; fitness market; hospitality sector
- Project outcomes: Reduced water consumption; decreased land for black soldier fly rearing; reduced greenhouse emissions; development of an alternative protein source
- TIA role: Funder and expert support; connector; enabler

10.3.4.2. INNOVATION SKILLS DEVELOPMENT

Aims to stimulate a culture of innovation within the National System of Innovation, thus increasing the rate of translation of innovative ideas into novel technologies, products and services. The programme provides focused and targeted training interventions to strengthen the entrepreneurial capacity of researchers and innovators, thereby enabling them to commercialise their research outputs.

Incubation activities are executed in the following three phases:

- Pre-incubation – involves business counselling to help incubators to understand ideas and their associated potential
- Incubation – an important requirement for the growth of technology-based enterprises
- Post-incubation – will offer opportunities for companies that have 'graduated' to continue benefitting from services and partnerships

Supports beneficiaries of other programmes and potential funding recipients.

ISD offerings

FUTR500 is a youth-focused programme that aims to develop the top 500 South African young minds in innovation leadership, competency and practice. The programme supports and enables innovation and supports the progression of technologies from the proof-of-concept stage through to pre-commercialisation (from technology readiness levels 3-8). The programme provided 140 internships for the year under review.

The Next Generation 100 programme is aimed at developing scientists, engineers and innovators with the appropriate entrepreneurial potential through a series of workshops, together with mentoring support to the top candidates, tailored to fast-track their entrepreneurial venture in a 12-18 month timeframe. The programme supported 100 small, medium and micro enterprises for the year under review. The Swiss Venture Leaders Accelerator Programme and United Kingdom Newton Fund Leaders in Innovation Fellowship Programme has had a transformational impact on the Next Generation 100 programme's demographics. The Swiss Programme consisted of approximately 60% black individuals.

At systemic level, the Innovation Skills Development programme attracts new partners from the industry such as government institutions, universities and communities for social impact. At a systemic level, the Innovation Skills Development Programme will impact the National System of Innovation through the following:

- Foresight Leadership Innovation Programme
- Circular economy (e-Waste)
- 'Skillzbook' (Fourth Industrial Revolution skills for the future)

The programme provided ongoing support for Fourth Industrial Revolution soft skills training to 5 000 community college learners.

Strategic partners include the Council for Scientific and Industrial Research, British Council, United Kingdom Newton Fund Programme, the United Kingdom Royal Academy of Engineering under the Newton Fund Programme, Investec, Stanford University, Swiss University of Basel, Swiss Embassy, Institute for Young Entrepreneurs, the Innovation Hub, sector education and training authorities, Department of Science and Technology, Industrial Development Corporation, Leadership Business Consulting Silicon Valley, Microsoft Africa, Liquid Telecom, Development Bank of Southern Africa and Department of Environmental Affairs.

10.3.5. ECONOMIC IMPACT ASSESSMENT 2018/19

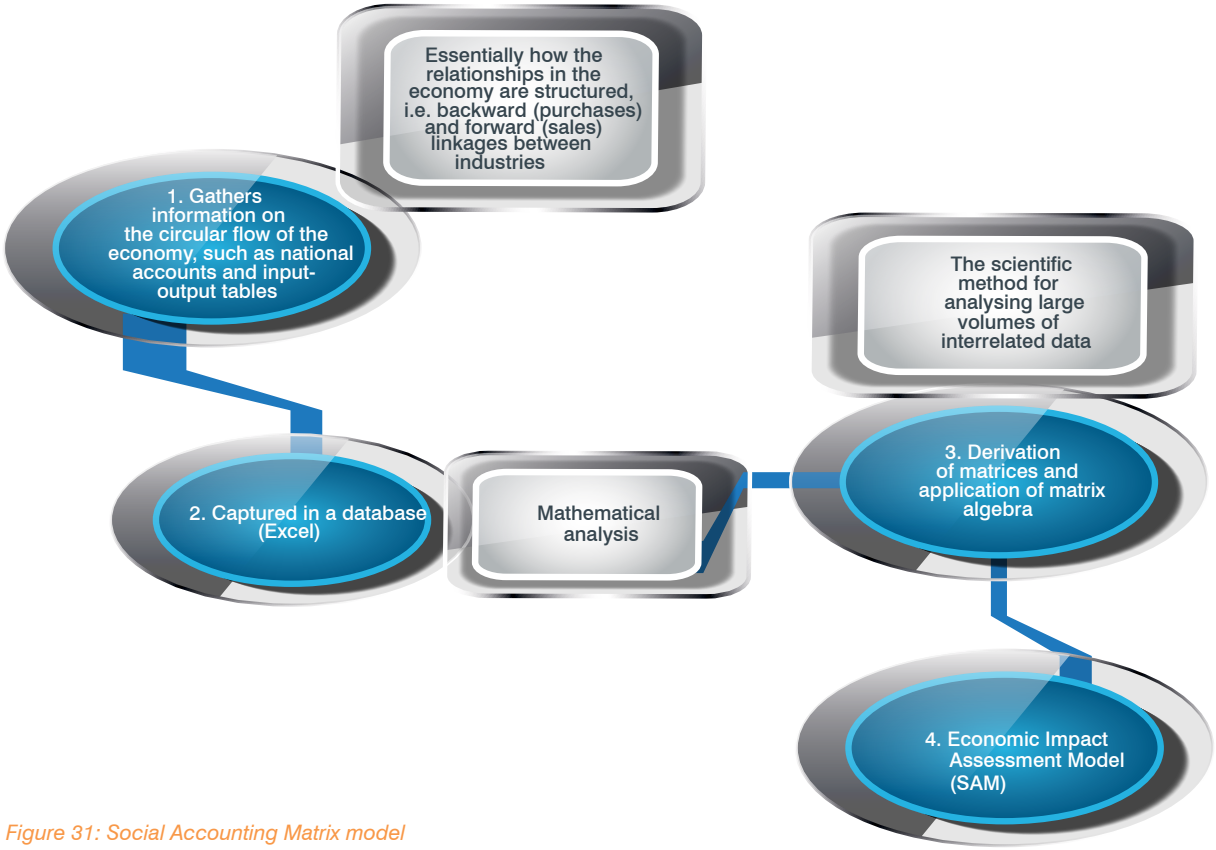


Figure 31: Social Accounting Matrix model

A socioeconomic impact assessment describes and quantifies the impact various interventions can have on production, economic growth and tax within the economy, while considering the welfare effect upon society. The agency's economic impact assessment approach uses the Social Accounting Matrix model, an economic impact model that determines the economic impact of an intervention; in this case, the agency's activities on the economy. The Social Accounting Matrix model represents the flow of all economic transactions that take place within an economy, and is essentially a matrix representation of a country's national accounts. Figure 31 depicts how the Social Accounting Matrix model is applied.

Most beneficiaries interviewed believe TIA is crucial for the process of technological innovation within the National System of Innovation, that TIA addresses its beneficiaries' needs and priorities, and is crucial to its beneficiaries and the country. However, beneficiaries noted that an area in which TIA could improve is the efficiency with which it provides technological innovation support, with only 38,4% of beneficiaries agreeing that TIA provides efficient service. Considering that the population interviewed are beneficiaries who received funding from TIA, their responses may well be positively biased. It is likely that if rejected applicants were to be interviewed, their responses would be negatively biased. This is an area has performed badly in and it is envisaged that with the introduction of the customer relationship management module there would be opportunity to improve in better communicating to applicants who have been declined for funding.

Social Accounting Matrix modelling

The impact of TIA's economic activity is shown in Table 8. TIA disbursed R522,8 million in 2018/19 through a combination of operational expenses and grants to beneficiaries, resulting in new business activity of R1,7 billion, a GDP contribution of R685,6 million, employment creation in the form of 2 247 jobs (direct, indirect and induced), income of R334,7 million and taxes of R101 million.

TIA's economic impact multipliers are depicted in Table 9. TIA's multiplier is R3,26 million in new business activity and 4,3 job opportunities for every R1 million spent, based on the impact of TIA's sub-programmes, programmes and administrative operations.

Table 8: Impact of TIA's economic activity

	DIRECT	INDIRECT	INDUCED	TOTAL
New business activity	R522,8m	R774,7m	R408,9m	R1 706,4m
GDP	R194,1m	R319m	R172,5m	R685,6m
Employment	442	1 177	628	2 247
Income	R114,8m	R145,1m	R74,8m	R334,7m
Tax	R78,4m	R13,9m	R8,7m	R101m

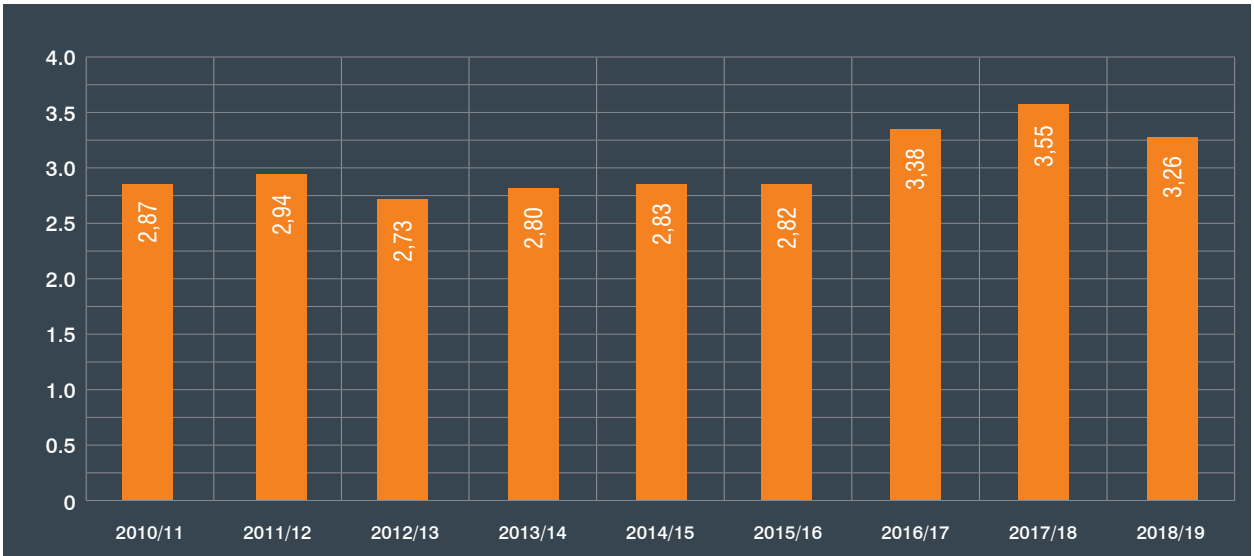
Source: Urban-Econ calculations, 2019

Table 9: TIA's economic impact multipliers

	DIRECT	INDIRECT	INDUCED	TOTAL
New business activity	1	1,48	0,78	3,26
GDP	0,37	0,61	0,33	1,31
Employment	0,84	2,25	1,2	4,29
Income	0,22	0,28	0,14	0,64
Tax	0,15	0,03	0,02	0,2

Source: Urban-Econ calculations, 2019

A comparison of TIA's economic impact multipliers from 2010/11 to 2018/19 is presented in Graph 1. Overall, TIA's economic impact multiplier decreased from 3,55 in 2017/18 to 3,26 in 2018/19, which, despite the decrease, is still above the historical average, and comparable with the figure for 2016/17. According to economic development consulting firm Urban-Econ, this decrease can be attributed to changes in the way TIA has allocated its funding across different economic subsectors, which themselves have various multiplier characteristics. As a result, the decrease is not an indication of TIA's performance.

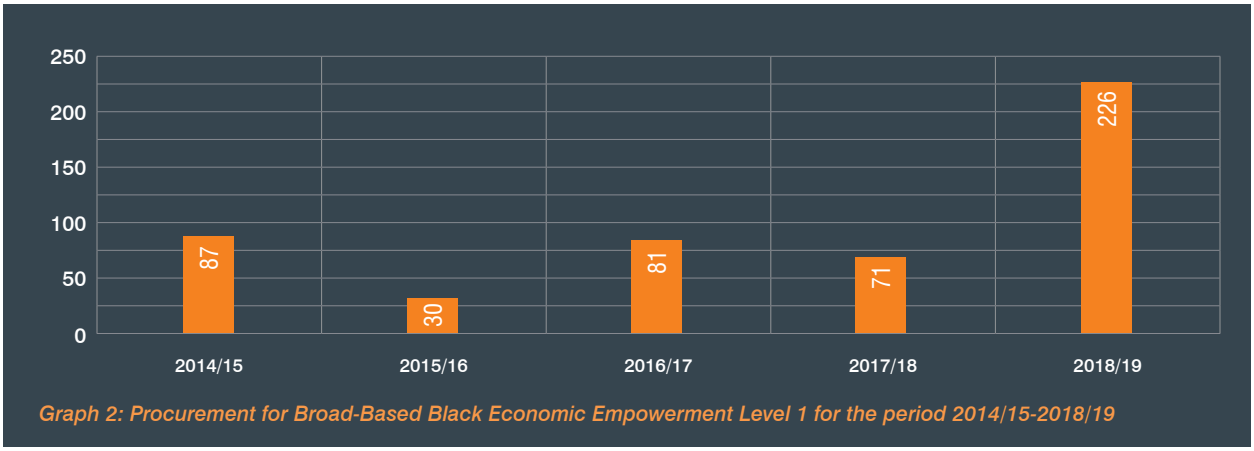


Graph 1: Comparison of TIA's economic impact multipliers for the period 2010/11-2018/19

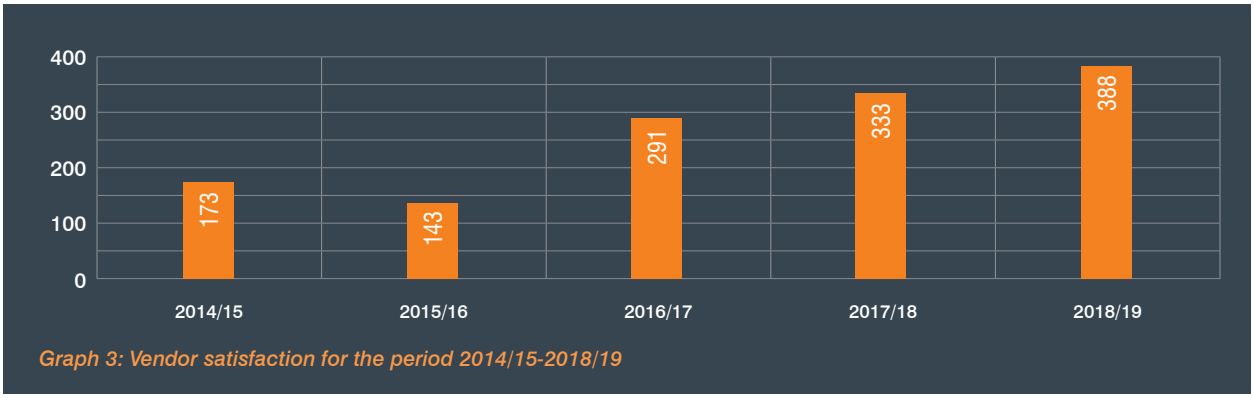
Source: Urban-Econ calculations, 2019

10.3.6. TIA PROCUREMENT SPEND ANALYSIS

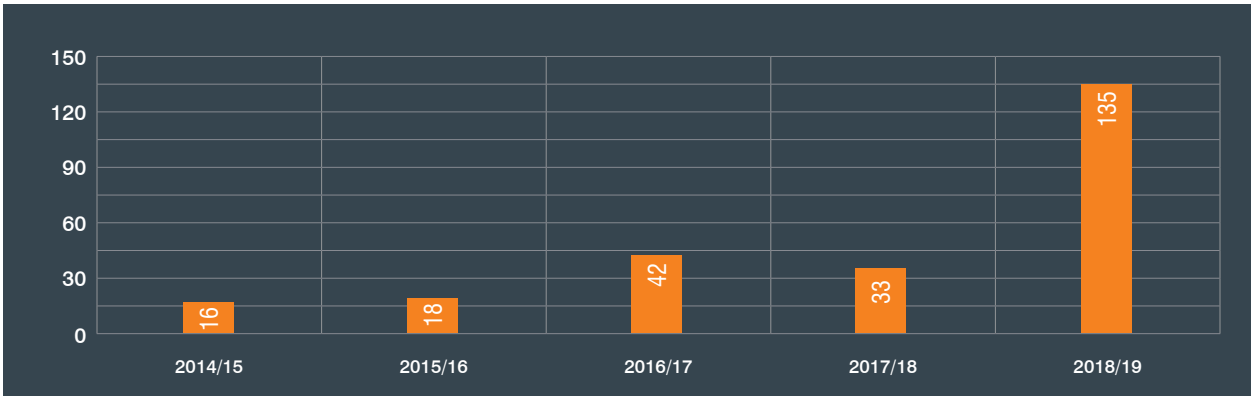
TIA's procurement spend analysis indicates that its number of suppliers had increased from 230 in 2014/15 to around 451 in 2018/19. For the same period, the number of black-owned suppliers also increased from 90 in 2014/15 to around 159 in 2018/19, while procurement from women-owned suppliers increased from 7% to around 30%, with youth-owned suppliers increasing from 3% to 13%. TIA has also succeeded to pay its vendors within 3 days for the last two financial years. TIA's procurement spend for the 2014/15 to 2018/19 period has increased from R23 million to R43,3 million. TIA's procurement spend across various dimensions is presented in Graphs 2-4.



Graph 2: Procurement for Broad-Based Black Economic Empowerment Level 1 for the period 2014/15-2018/19



Graph 3: Vendor satisfaction for the period 2014/15-2018/19



Graph 4: Procurement from women-owned suppliers for the period 2014/15-2018/19

11. STAKEHOLDER **ENGAGEMENT**

During the period under review, TIA engaged in several business development initiatives, locally and abroad, to pursue four strategic objectives as follows:

- Source and secure a sustainable pipeline of investment opportunities from the research and development performing community.
- Increase TIA's funding base to reduce the organisation's dependence on the fiscus.
- Promote closer linkages with commercialisation partners, hence increasing access to co-funding, follow-on funding and industry supply chains.
- Promote integration of South Africa's innovation and entrepreneurial community into global markets and access to partnerships and funding.

This report provides an account of the business development unit's activities and initiatives during the period under review.

11.1. Local partnerships

TIA collaborated with several stakeholders in the National System of Innovation to develop ways of promoting the seamless transfer of early-stage projects to its funding cycle. TIA partnered with the South African Medical Research Council regarding both the Seed Fund and to support the establishment of the Medical Device Cluster. The agency also partnered with the South African National Space Agency to run a joint competition for space science technologies, and with the Water Research Commission to nurture the development of early-stage technologies in the water and sanitation sector. Through these partnerships, TIA has attracted an increased pipeline of investible technologies that are presently going through various stages of assessment.

In the same vein, TIA also partnered with other actors in the National System of Innovation that are responsible for supporting research and innovation activities in the higher education environment. These included the National Intellectual Property Management Office, the South African Technology Network, and the Southern African Research and Innovation Management Association. As these organisations are all closely connected to the Technology Transfer Offices in South Africa, they serve as strategic platforms to inform research and promote thought leadership in innovation. In this regard, TIA partnered with both the Southern African Research and Innovation Management Association and the South African Technology Network in hosting their annual conferences in 2018.

Beyond engagements with the research community, TIA has also partnered with other players in the National System of Innovation to establish strategic innovation programmes to be jointly co-funded. These are the Gauteng Department of Economic Development (establishment of a Medical Device Cluster initiative) and the Department of Telecommunications and Postal Services (to promote the development of viable technology enterprises in the information and communication technology sector).

Lastly, to promote closer collaboration with the private sector and leverage increased funding, TIA launched the Industry Matching Fund as a co-funding instrument that aims to incentivise corporate partners, angel investors, venture capital and other key the funding organisations in the private sector to increase their role in funding of technologies from TIA's portfolio. This fund is being piloted with two angel investors, namely Jozi Angels and Dazzle Angels. The latter specifically targeting women who develop promising innovative technologies. Through the fund, investee companies will access much-needed mentorship support from experienced business practitioners and improve their connectivity to industry supply chains.

Further information on TIA's strategic innovation programmes is presented in Table 10.

Table 10: Strategic innovation programmes with various stakeholders

STAKEHOLDER GROUPING	ORGANISATION	STRATEGIC INTENT
Business/Industry	East London Industrial Development Zone and East London Science and Technology Park	Leveraging the East London Industrial Development Zone's strong relationship with automotive, agriculture and energy partners and incubation support for TIA-supported investees
	State-owned entity procurement forum	Collaboration to promote the uptake of locally developed innovations by government and its entities, including the development of an enterprise supplier development framework inclusive of technology-based small, medium and micro enterprises and start-ups.
Government Departments	Gauteng Department of Economic Development	To promote collaboration on the following initiatives. • Waste management, including electrical and electronic equipment and tyre recycling • Implementation of the Grassroots Innovation Programme • Technology development regarding acid mine drainage • Mine safety and mine dumps rehabilitation • Medical Device and Diagnostics Innovation Cluster programme
	Department of Telecommunications and Postal Services	Strategic innovation programme to development of viable information and communications technologies and enterprises supporting the implementation of the Information and Communications Technology Small, Medium and Micro Enterprises Strategy
Incubators	Gen-Africa	Promote and source a pipeline of investments in the financial technology, health, manufacturing and information and communication technology sectors
Science Councils and Research Entities	South African Space Agency	Promote the development and transition of early stage innovations in space science towards successful commercialisation
	Water Research Commission	Promote the development and transition of early-stage innovations in the water and sanitation sector towards successful commercialisation
	South African Medical Research Council	Promote the development and transition of early-stage innovations in the health sector towards successful commercialisation
	South African National Energy Development Institute	Promote the development and transition of early-stage innovations in the renewable energy sector towards successful commercialisation
Intellectual Property Management Institutions	National Intellectual Property Management Office	Promote collaboration on the following initiatives. • Capacity-building initiatives on intellectual property • Intellectual propety mining • Thought leadership • Joint establishment of an intellectual property support fund for start-ups

Table 11: Africa Programme partners and engagements

	NAME OF PROJECT AND DESCRIPTION	PARTNER INSTITUTIONS		TIA CONTRIBUTION TO THE SA PROJECT PARTNER	TOTAL PROJECT VALUE
		SA	TANZANIA		
1	Bacterial Biocontrol Agent to prevent fungal and bacterial diseases in important agricultural and tropical crop plants	University of Pretoria	University of Dar Es Salaam	R320 000	R640 000
2	Water Nano-Filter System for removing heavy metals and microbes from fresh water	Council for Scientific and Industrial Research	National Institute for Medical Research	R320 000	R700 000
3	Syna Products for the treatment of skin conditions through medical plant extracts	University of Pretoria	Soikone University of Agriculture	R325 000	R650 000
4	Fishmob mobile technology for small-scale artisanal fishers to marine resources and markets	University of the Western Cape	University of Dar Es Salaam	R322 500	R545 000

11.2. International Partnerships

The international partnerships programme aims to promote the establishment of high-yielding partnerships with international role-players in Africa, Europe, Asia and the Americas to encourage joint innovation initiatives, leverage market access and international funding opportunities and promote investments into South Africa's National System of Innovation.

TIA continued to expand its strategic engagements with African partners such as Tanzania, Tunisia and Zambia, as well as exploring new partnership opportunities and areas of cooperation with Egypt and Ghana. Through these partnerships, TIA will advance the rich portfolio of joint research outputs that the Department of Science and Technology invested in over the last decade through various bilateral relationships under management by the National Research Foundation. To date, four projects have been co-funded with the Commission for Science and Technology of Tanzania. These are shown in Table 11 above.

By the end of 2018/19, TIA had initiated similar programmes with Zambia by issuing a joint call for proposals in both countries in October 2018. These proposals were jointly assessed by TIA and its counterpart organisation, the Zambia National Technology Business Centre, in February and March 2019. Successful applicants will be contracted within 2019/20.

Following a successful workshop on research, development and innovation in water, energy, biotechnology and health, hosted by the Egyptian Academy of Scientific Research and Technology in Cairo, Egypt, in March 2019, TIA has designed a joint technology innovation programme that will promote collaboration between the two countries in the areas of water, energy and biotechnology, commencing in 2019/20. The workshop was hosted as part of the Department of Science and Technology-led initiative to promote collaboration of technology innovation with Egypt and was also attended by representatives from the Water Research Commission and the South African Medical Research Council.

In addition to joint technology innovation initiatives, TIA also provides technical and advisory support to Ghana's Ministry of Environment, Science, Technology and Innovation for the conceptualisation and establishment of the Ghanaian Innovation and Research Commercialisation Centre, an innovation and research commercialisation organisation. This support was provided following a direct request by the government of Ghana through the South African Minister of Science and Technology. The Ministry requested TIA's support based on the latter having previously supported other African partners, such as Botswana, Namibia, Tanzania, Tunisia and Zambia through institutional capacity-building interventions.

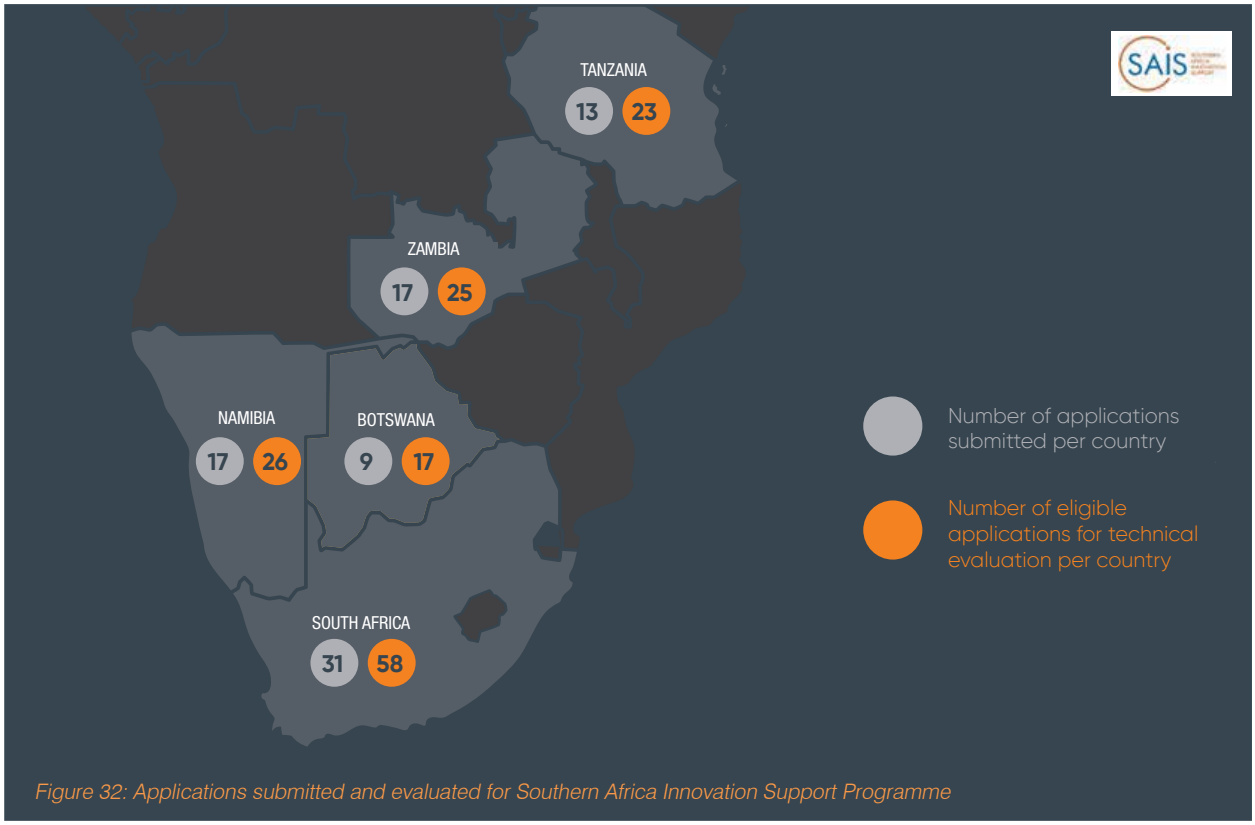


Figure 32: Applications submitted and evaluated for Southern Africa Innovation Support Programme

TIA also continued to support the Southern African Innovation Support Programme as South Africa's National Focal Point during the period under review. The programme, which was initiated in 2017 and will run until 2021, is jointly funded by the Department of Science and Technology, Finland's Ministry for Foreign Affairs and the ministries responsible for science, technology and innovation in the four partner countries, namely Botswana, Namibia, Tanzania and Zambia. The programme's overall objective is to enhance regional cooperation in innovation and strengthen regional systems of innovation, which would contribute to more inclusive entrepreneurship and business development in Southern Africa.

As South Africa's national focal point for the programme and connected hubs coordinator, TIA worked closely with the programme management office in Namibia to promote the programme. The objective for connected hubs is to strengthen the Southern Africa Innovation Summit regional platform by enabling networking among start-up communities and entrepreneurs across the Southern African Development Community, as well as global innovation activities that are organised among various innovation support organisations across the region and together with key innovation actors in Finland.

To this end, several promotional activities were implemented, including, coordinating and supporting online training modules for the Connected Hubs partners; awareness-creation and participation at the annual Southern Africa Innovation Summit Innovation Forum event; and awareness-creation and support in the announcement of the first call for proposal at TIA's stakeholder session in Pretoria.

The first call for proposals attracted 58 applications from South Africa, of which 34 were eligible for technical evaluation and 12 were funded (Figure 32). The programme recently launched a second call for proposals that attracted 176 applications, of which 41 were from South Africa. The second call for proposals will be assessed and concluded in 2019/20.

Part C
GOVERNANCE

12. GOVERNANCE **STATEMENT**

12.1. Framework and accountability

TIA was established in terms of the TIA Act to support government by providing funding and expertise for technological innovation. The agency's strategic role is, therefore, to accelerate economic growth by stimulating and exploiting innovation. Part of its strategic programmes entails assisting in the creation of an ecosystem that enables TIA beneficiaries to advance their innovations from concept to market.

As a Schedule 3A public entity, TIA is accountable to the Department of Science and Technology through the Parliamentary Portfolio Committee on Science and Technology. The agency meets with the committee annually to report on its performance and plan for the execution of its medium-term strategy.

TIA's Board, which is its accounting authority, was appointed on 1 May 2017 by the agency's then executive authority, the former Minister of Science and Technology, Ms Naledi Pandor. The Board has completed two years of its four-year term of office.

In terms of Section 5 of the TIA Act, the accounting authority is responsible for the overall governance of the agency and steering it towards realising its strategic goals. To ensure effective leadership, TIA's Board comprises individuals with a wide range of skills and experience. As such, the Board considers good corporate governance as key to TIA's success. In its commitment to maintaining the highest standards of governance, the Board provides strategic oversight and effective direction to the agency by adhering to the relevant codes of best practice, principles of fairness, integrity, responsibility and a well-entrenched obligation to ensure accountability.

12.2. Code of conduct

To support good governance, TIA adopted a code of ethics and values as part of its policies and procedures. This code is adhered to in TIA's dealings with all stakeholders and organisations, internally and externally, and nationally and globally.

12.3. Accounting authority

The Board comprises the following members, whose appointments met with the Minister's approval.

- **Professor Edward Kieswetter (Chairman of the Board)**

  Professor Kieswetter's academic highlights include serving as Visiting Professor at the Da Vinci Institute as from 2016. In 2015, he was reappointed as Visiting Professor at the University of the Free State.

  Prof. Kieswetter's accolades include being named a finalist in the All Africa Business Leaders Awards in 2015, ACQ Africa Dealmaker of the Year 2014, Boss of the Year South Africa in 1999, Boss of the Year Leadership Thinker in 2006, finalist of the Eskom Chairman's Award in 1999, NOSA Exemplary Award in Safety Leadership in 1997, and National Productivity Institute Gold Award in 1997.

  In executive roles, Prof. Kieswetter has, *inter alia*, served as the Group Chief Executive for the Alexander Forbes Group Holdings, Deputy Commissioner and Chief Operating Officer of the South African Revenue Service, Senior Executive and Director of FirstRand Banking Group, Senior General Manager: Generation and Power Station Manager at Eskom, and Lecturer and Divisional Head: Faculty of Electrical Engineering, Athlone Technikon.

  In addition, he has served in various national and international board and governance roles until his recent appointment as the Commissioner of the South African Revenue Service.

- **Mr Thabiso Ramasike**

  Mr Ramasike is a businessman, strategist, director of companies, public speaker and philanthropist. He is the Executive Chairman of Tuleka Group (Pty) Ltd (formerly known as Gerald Group) and has successfully held several positions in the financial services industry during the course of his career.

  Other executive positions currently held by him include Executive Chairman positions Kwena Fund Managers (Pty) Ltd and Boleng Insurance Ltd. He also holds non-executive positions as the Chairman of the Finance Investments and Estates Committees of the University of South Africa Council, the Chairman of the Social, Ethics, Transformation and Sustainability Committee and of the Audit Committee of African Unity Insurance Ltd., the Chairman of the Transformation Committee of

Curro Holdings Ltd., and is a member of the Audit and Risk Committee of the South African Revenue Service.

- **Ms Fuzlin Levy-Hassen (Chairperson of the Investment and Finance Committee until 13 June 2019).**

  Ms Levy-Hassen's career as a chartered accountant spans more than two decades. During this time, she has been exposed to many different industries, from start-ups to Johannesburg Stock Exchange-listed companies. She has dealt with deal sourcing, audits, company/risk analysis, turnarounds, technology innovation and commercialisation, venture capital, private equity, investment banking, due diligence, post-investment management, directorships and investment committees, as well as lecturing in accounting.

  She joined the Industrial Development Corporation in 2008, where she held the role of Senior Account Manager for Venture Capital until 2015 and thereafter the position of Senior Manager for New Industries until 2018. Prior to her tenure at the Industrial Development Corporation, she held the position of Investment Manager of Growth and Acquisition Finance at Investec for a year, was a Senior Lecturer at the University of Western Cape and has worked for the National Empowerment Fund, Norwich Investments, the University of Cape Town and Ernst & Young. She is currently the Chief Executive Officer of a consulting company.

- **Dr Jan van de Loosdrecht**

  Dr Van de Loosdrecht has been employed at Sasol for more than 20 years, and has worked at the intersection of technology innovation, management, commercialisation and intellectual property, while utilising sound business acumen.

  Dr Van de Loosdrecht was closely involved in technology innovation with respect to the design, scale-up and commercialisation of Sasol's cobalt-based Fischer-Tropsch catalyst for the ORYX GTL plant in Qatar. He is a co-author of more than 35 scientific articles and co-inventor of more than 15 patents.

  In addition to his normal duties at Sasol, he was an Industrial Fellow at the Eindhoven University of Technology, the Netherlands from 2010 to 2015 in collaboration with Prof. Hans Niemantsverdriet. Recently, Dr Van de Loosdrecht has taken up the position of Senior Manager: Technology Analysis and Intellectual Property at Sasol Group Technology.

- **Dr Judy Coates (resigned 27 February 2019)**

  Dr Coates is a former Scientific and Regulatory Affairs Manager at the Innovative Pharmaceutical Association South Africa. She was responsible for monitoring trends, issues, problems, opportunities and activities in the healthcare environment, with a specific focus on scientific and regulatory affairs, in order to identify issues that affect the industry; developing positions on key issues in conjunction with members of the association; and the overall coordination and support of a number of the association's working groups.

  She served as the head of the Biomedical Group at Mintek for eight years. In 2011, she transferred from Head: Biomed to the Human Resources Division in the position of Head: Academic Support. Her tenure in this role entailed the managing of Mintek's learning and development portfolio. In this role, she established a number of frameworks and policies to administer and guide the way Mintek engaged with key stakeholders that fell within the Academic Support portfolio.

  In 2012, Dr Coates joined TIA as General Manager: Health. She was responsible for the oversight and leadership of the TIA Health sector team, the development and implementation of the Health sector strategy, the management and growth of the Health investment portfolio, and the management of various stakeholder relationships.

- **Dr Stephen Lennon (Chairman of the Audit and Risk Committee)**

  Dr Lennon has more than 30 years' experience in the power sector. He is recognised as an international expert in energy and technological innovation, with specialist knowledge in sustainability, climate change, energy planning and strategy, and non-renewable and renewable energy and networks.

  Dr Lennon is widely recognised for his expertise in the energy arena and resultantly has held numerous energy-related international leadership roles. He has

received several lifetime achievement awards and is a fellow of the South African Academy of Engineering and the Royal Society of South Africa.

He is President of the United Nations Association of Australia in Western Australia and Vice President of the National Association. He is also an adviser to Fusion Energy Holdings (a diversified clean energy business) and Shanduvan (Pty) Ltd (a niche energy sector advisory business).

- **Dr Mziwandile Madikizela**

Dr Madikizela is a consultant in science, technology and innovation, and an executive coach. He is also an extraordinary senior lecturer in technology management at the University of Pretoria's Graduate School of Technology Management. His research interests lie in the commercialisation of university research outputs, innovation management and regional innovation systems. Between 2011 and 2013, he was a part-time Biotechnology Adviser to TIA.

Dr Madikizela's career spans more than 25 years, with roles as Senior Research Scientist at AECI, Executive Manager of Transnet Chemical Services and Environmental Technology Manager at Sasol. During this period, he completed an MBA degree at Wits Business School. After completing his doctoral studies in the United States, he undertook a post-doctoral research fellowship in molecular parasitology at Brown University in Providence, Rhode Island. This was followed by a second fellowship in cancer research at the University of Cape Town.

His leadership roles include non-executive director and member of the Remuneration and Research and Development Board Committees of Onderstepoort Biological Products, member of the Council of the Agricultural Research Council from 2005 to 2009, director of Oil Pollution and Control South Africa – Central Energy Fund, and Chairman of the Board of the African Clinical Research Organisation.

- **Ms Sebenzile Matsebula (Chairperson of the Human Resources and Remuneration Committee)**

During her professional career, Ms Matsebula held the positions of Research Officer: Biometrician, and Deputy Director and Director: Office on the Status of Disabled Persons in the Presidency. She currently holds the title Executive Director of Motswako Office Solutions (Pty) Ltd., a business in the information and communications technology sector. Her expertise includes board governance, human rights, social justice, disability mainstreaming, scientific research, statistical design and analysis, and monitoring and evaluation, among other things.

A notable career accolade includes being nominated to serve on the Committee of the United Nations Convention for Persons with Disabilities in 2012. She was also one of 12 women with disabilities who were selected for the 2012 National Tributes, an award recognising the achievements of outstanding women with disabilities in South Africa, in which Ms Matsebula was awarded the prize in the research and development category. In 2014, she was recognised as an entrepreneur with a disability who has displayed outstanding personal achievements in business.

She is currently chairperson of the Disability Empowerment Concerns Trust and Taquanta Investment Holdings Company. She also serves on a number of boards, including the Centre for Alternative and Augmentative Communication at the University of Pretoria, First Rand Foundation, the National Library for the Blind, the Presidential Working Group on Disability, and the South African Development Trust for Disabled People.

- **Dr Patience Mlengana**

Dr Mlengana is the Managing Director of Romador Technologies, a company in the telecommunications sector. She is the founder and Director of PMM Property Holdings and has held the position of Chief Executive Officer at Nyathela Consulting since 2002. Prior to this, she served as a General Manager at City Power, Senior Customer Services Manager at Dimension Data, Mergers and Acquisitions Manager at Telkom, Assistant Product manager at MTN, and a

Market Researcher at the South African Broadcasting Corporation.

She holds several degrees, which include a BA in Social Sciences and a post-graduate diploma in Information Science from the University of the North (now University of Limpopo) in 1991 and 1992, respectively. Dr Mlengana obtained her honours in Information Science and masters in Information Science from the University of Johannesburg in 1993 and 1996, respectively. She obtained her PhD in Leadership and Management from Logos University in Florida, the United States, in 2017.

12.4. Changes to the Board

- Dr Coates resigned from the Board on 27 February 2019.
- Ms Levy-Hassen, who was appointed by the Board as a co-opted member to the Investment Finance Committee, was recommended for appointment to the Board as a full member with effect from 4 April 2018.

12.5. Board charter

The Board conducts its activities in terms of its charter, which is central to determining how it interacts with management, the shareholder and other stakeholders. The charter is largely informed by principles of sound governance, particularly those contained in the provisions of the PFMA and the King IV Report for Corporate Governance, to the following ends:

- Formulating strategic plans.
- Providing strategic direction.
- Monitoring operational performance and management against annual performance targets.
- Providing oversight on the preparation and integrity of the Annual Financial Statements and all related information.
- Defining levels of materiality and significance, reserving specific power to itself, and delegating other matters with the necessary written authority to the established subcommittees and, subsequently, to the Chief Executive Officer.
- Maintaining adequate accounting records.
- Ensuring adequate safeguarding, verification and maintainance of the accountability of assets.
- Preventing and detecting material misstatement and loss.
- Determining policy and processes to ensure the integrity of TIA's risk management and internal control procedures.
- Implementing systems of internal control that are designed to provide reasonable, but not absolute, assurance as to the reliability of the financial statements.
- Overseeing the implementation of an information technology governance framework.
- Receiving and considering recommendations and investment funding decisions from its subcommittee.
- Receiving and considering reports from the Executive Committee and thereby providing guidance and assistance to the Executive Committee about funding/investment decisions and related matters.
- Monitoring the management of the funds by reviewing reports from management at committee meetings that focus on the primary determinants of returns, including asset allocation and investment strategy.
- Providing guidance on TIA's
    - organisational capability, organisational design and human resources strategy;
    - performance management systems, bonus and incentive programmes;
    - long-term strategic plans and performance; and
    - determination of criteria to measure executive performance, including setting performance drivers, and monitoring and evaluation mechanisms.
- Ensuring TIA complies with all relevant laws, regulations and codes of business practice, and that it communicates with its shareholders and relevant stakeholders (internal and external) openly and promptly and with substance prevailing over form.
- Developing a code of conduct that addresses conflicts of interest, particularly relating to Board members and management.
- Ensuring there is an appropriate balance of power and authority on the Board, such that no individual or select individuals can dominate the Board's decision-making.

12.6. Board structures

The Board operates and conducts itself through three standing subcommittees (the ARC, the Investment and Finance Committee, and the Human Resources and Remuneration Committee) that report to it and are ultimately accountable it. The Board's devolution of responsibilities, therefore, falls on these three subcommittees, which meet independently and report regularly to the full Board through their respective chairpersons. The Board and its subcommittees are discussed in greater detail below.

12.7. Board meeting and attendances

The Board has recognised the relevance and significance of TIA's role in the National System of Innovation, and has prioritised the Bio-economy Strategy, the Technology Stations Programme, and commercialisation for the successful implementation of TIA's mandate. The Board met at a strategy session workshop from 29-30 May 2018 to define areas for improvement and determine prospective initiatives to strengthen TIA's position in the National System of Innovation.

During the period under review, the Board convened for six meetings. Members' meeting attendances are set out in Table 12.

Table 12: Board attendance register.

	BOARD MEETINGS	30 MAY 2018	30 JULY 2018	30 OCTOBER 2018	24 JANUARY 2019 (SPECIAL)	15 FEBRUARY 2019 (SPECIAL)	27 FEBRUARY 2019
Prof. Edward Kieswetter	6	✓	✓	✓	✓	✓	✓
Dr Stephen Lennon	6	✓	✓	✓	✓	✓	✓
Mr Thabiso Ramasike	5	✓	✓	✓	✗	✓	✓
Ms Fuzlin Levy-Hassen	5	✓	✓	✗	✓	✓	✓
Dr Jan van de Loosdrecht	5	✓	✓	✓	✓	✓	✗
Dr Judy Coates (resigned)	5	✓	✓	✓	✓	✗	✓
Dr Mziwandile Madikizela	6	✓	✓	✓	✓	✓	✓
Ms Sebenzile Matsebula	4	✓	✗	✗	✓	✓	✓
Dr Patience Mlengana	4	✗	✓	✓	✗	✓	✓
Mr Barlow Manilal	6	✓	✓	✓	✓	✓	✓

✓ In attendance ✗ Apology received A Absent without an apology

12.8. Audit and Risk Committee

Chairman:	Dr Stephen Lennon
Members:	Dr Jan van de Loosdrecht
	Mr. Thabiso Ramasike

The ARC is constituted in terms of section 77 of the PFMA, as amended, read with Chapter 27 of the Treasury Regulations.

The ARC assists the Board in discharging its duties relating to the safeguarding of assets, the operation of adequate systems, control processes, and the preparation of accurate financial reporting and statements in compliance with all applicable legal requirements, and accounting and auditing standards.

During the period under review, the ARC monitored the effectiveness of TIA's internal controls, governance, and compliance with its risk management framework. A combined assurance plan was introduced to ensure the agency adopts a coordinated approach to all assurance activities. While several material risks emerged, no internal or external audit findings came to the ARC's attention that indicate any material breakdown of internal controls during the period under review.

The ARC convened five times during the period under review, as detailed in Table 13.

Table 13: Dates of ARC meetings and member attendance

	MEETINGS ATTENDED	21 MAY 2018	16 JULY 2018	10 OCTOBER 2018	30 NOVEMBER 2018 (SPECIAL)	19 FEBRUARY 2019
Dr Stephen Lennon (Chairman)	5	✓	✓	✓	✓	✓
Dr Jan van de Loosdrecht	5	✓	✓	✓	✓	✓
Mr Thabiso Ramasike	5	✓	✓	✓	✓	✓

12.8.1. Risk management

To contend with the current operating environment, it is critical that TIA's executive and Board identify risks and develop appropriate mitigation strategies. TIA employs a robust, systematic process at both operational and strategic level, which is integrated and central to its strategic planning process.

Methodology

The methodology applied is derived from the prescripts of the Committee on Sponsoring Organisation Enterprise Risk Management Framework, ISO31000 on Enterprise Risk Management Framework, the Public Sector Risk Management Framework (National Treasury), Institute of Risk Management South Africa risk principles, and the TIA Risk Management Policy.

Context

Using PESTEL , a risk landscape analysis was undertaken in 2018/19. Inputs into the landscape analysis considered the Institute of Risk Management South Africa 2018 Risk

Report, the 2018 Deloitte Africa Risk Report, the 2018 World Economic Forum Global Risk Report, the Proviti 2018 Risk Report, and the 2018 Allianz Risk Barometer Report.

The results were tabled at the Enterprise Risk Management Committee, the Executive Committee, the ARC and the Board for consideration in the formulation of the resultant strategic risk register.

Process

On approval of the risk landscape analysis, the strategic risk register, with the recommended mitigation actions, were populated and managed by the TIA executive for the remainder of the financial year. In line with international best practice, risks are detailed; comprehensively assessed on their probability, severity and the quality of the existing control environment; and managed through acceptance, transfer, avoidance or reduction measures. These measures result in residual risk scores that indicate the relative importance of the risk and facilitate the assessment of progress made in addressing risks. The strategic risk register devolves into programme, sub-programme and ultimately project risk reporting levels.

Oversight of the strategic risk register is predominantly within the ambit of the ARC. Through the committee, the Board determines the agency's tolerance for risk. Risk registers are maintained and managed using the BarnOwl Risk Management System. In 2018/19, internal audit reviewed the effectiveness of the planned controls within the risk management process.

Strategic Risk Report as at 31 March 2019

The global risk landscape during 2018/19 was such that risks relating to the environment (i.e. extreme whether events, natural disasters and the failure to mitigate climate change) dominated the narrative, together with growing concerns of cyber-attacks and data theft. Within South Africa, the Institute of Risk Management South Africa in its 2018 Risk Report observed that risks pertaining to structurally high unemployment, unmanageable fraud and corruption had significant influence at a country level, whilst risks relating to macro-economic developments and government regulations would likely affect industry. Against this background, the Board, during the strategy session in June 2018, identified eight risks that could impede the realisation of the strategic objectives and associated measures for 2018/19.

The major risks identified mainly relate to the inability to manage the poor reputation of TIA, the possible negative impact of economic conditions affecting the realisation of the TIA mandate, the possible poor performance of TIA's investment portfolio, and the non-alignment within the organisational structure coupled with inadequate operational capability. For further information on the risks contributing factors and risk ratings, please refer to Appendix 2 on page 142.

In response to the risks posed, the TIA Executive Committee, under direction from the Board, formulated mitigation actions that were monitored throughout the year to ensure that risk exposure is monitored. Progress in the implementation of the action plan was presented to the ARC and Board for consideration on a quarterly basis. As at the end of March 2019, three mitigants were in progress, four were halfway and two were almost completed. These will be managed in the following financial year, during which a reassessment will be undertaken to ascertain if any of the risk had been mitigated.

12.9. Investment and Finance Committee

Chairperson:	Ms Fuzlin Levy-Hassen (resigned 13 June 2019)
Members:	Dr Jan van de Loosdrecht
	Dr Judy Coates (resigned 27 February 2019)
	Dr Mziwandile Madikizela

The Investment and Finance Committee derives its authority from the Board, and was established to oversee and provide advice to the Board on issues central to the Board's core mandate on TIA's investments.

The Investment and Finance Committee considers investment proposals where TIA's exposure per project is above R15 million but below or equal to R30 million, and oversees the management of financial resources within its delegated authority. The committee also considers ad hoc matters as delegated to it by the Board.

During the period under review, the Investment and Finance Committee approved an additional R6,4 million (for a total project exposure of R19,8 million) for a project that intends to become a preferred, consistent supplier of high-quality, high-activity bromelain to local and international users. In the same period, R15,1 million was approved for another client, that aims to exploit rare mineral resources in South Africa. Both projects were approved based on having a high probability of commercial success.

The Investment and Finance Committee convened five

times during the period under review. Particulars of the committee's meeting attendances are provided in Table 14.

12.10. Human Resources and Remuneration Committee

Chairperson:	Ms Sebenzile Matsebula
Members:	Mr Mziwandile Madikizela
	Dr Patience Mlengana
	Mr Thabiso Ramasike
	Dr Judy Coates (resigned 27 February 2019)

The Human Resources and Remuneration Committee derives its authority from the Board, and was established to oversee and provide advice to the Board on issues central to the agency's HR capability, design and strategy, as well as remuneration and succession planning. The committee is responsible for ensuring TIA develops a framework, policies, guidelines and an environment that allows the agency to employ, reward and retain dedicated, motivated, efficient and loyal employees to achieve its long-term strategic goals.

During the period under review, the committee reviewed policies relating to attracting, developing and retaining staff. TIA's remuneration and rewards philosophy was independently benchmarked with comparable organisations to enable it to attract and retain the skills it requires. Talent management remains an important focus for TIA.

The committee convened five times during the period under review, details of which are provided in Table 15.

12.11. Board remuneration

Board members receive fees for services they render to the Board and the executive authority in accordance with the relevant tariffs as determined by National Treasury, and which are regulated and updated from time, to time and approved by the Minister.

All Board members' travel costs in relation to executing their duties as TIA Board members, such as airfare and car hire, are paid for by TIA. Board members are also reimbursed for incidental expenses such as airport parking, toll fees and transfer fares, and for the use of their personal vehicles, they are reimbursed per kilometre as permitted by TIA's travel policy.

Table 14: Dates of Investment and Finance Committee meetings and member attendance

	MEETINGS ATTENDED	10 MAY 2018	11 JULY 2018	12 DECEMBER 2018 (SPECIAL)	31 JANUARY 2019	22 FEBRUARY 2019
Ms Fuzlin Levy-Hassen	4	✓	✗	✓	✓	✓
Dr Jan van de Loosdrecht	4	✓	✓	✓	✓	✗
Dr Judy Coates	5	✓	✓	✓	✓	✓
Dr Mziwandile Madikizela	5	✓	✓	✓	✓	✓

Table 15: Dates of Human Resources and Remuneration Committee meetings and member attendance

	MEETINGS ATTENDED	17 MAY 2018	18 JULY 2018	03 OCTOBER 2018	24 OCTOBER 2018 (SPECIAL)	13 FEBRUARY 2019
Ms Sebenzile Matsebula	4	✓	✗	✓	✓	✓
Mr Mziwandile Madikizela	4	✓	✓	✓	✓	✗
Dr Patience Mlengana	4	✓	✓	✓	✓	✓
Mr Thabiso Ramasike	5	✓	✓	✓	✓	✓
Dr Judy Coates	5	✓	✓	✓	✓	✓

12.12. Financial interest disclosures and independence

Annually, and on an ad hoc basis, through active solicitation, members are required to disclose any potential conflicts of interest. In the period under review, disclosures received from Board members were closely scrutinised by the Company Secretary and Chairman of the ARC. No conflicts or potential conflicts of interest were noted. Where required, members are recused from matters that may result in conflicts of interest. Members are regularly encouraged to disclose potential conflicts at every meeting.

12.13. Board and subcommittee evaluations

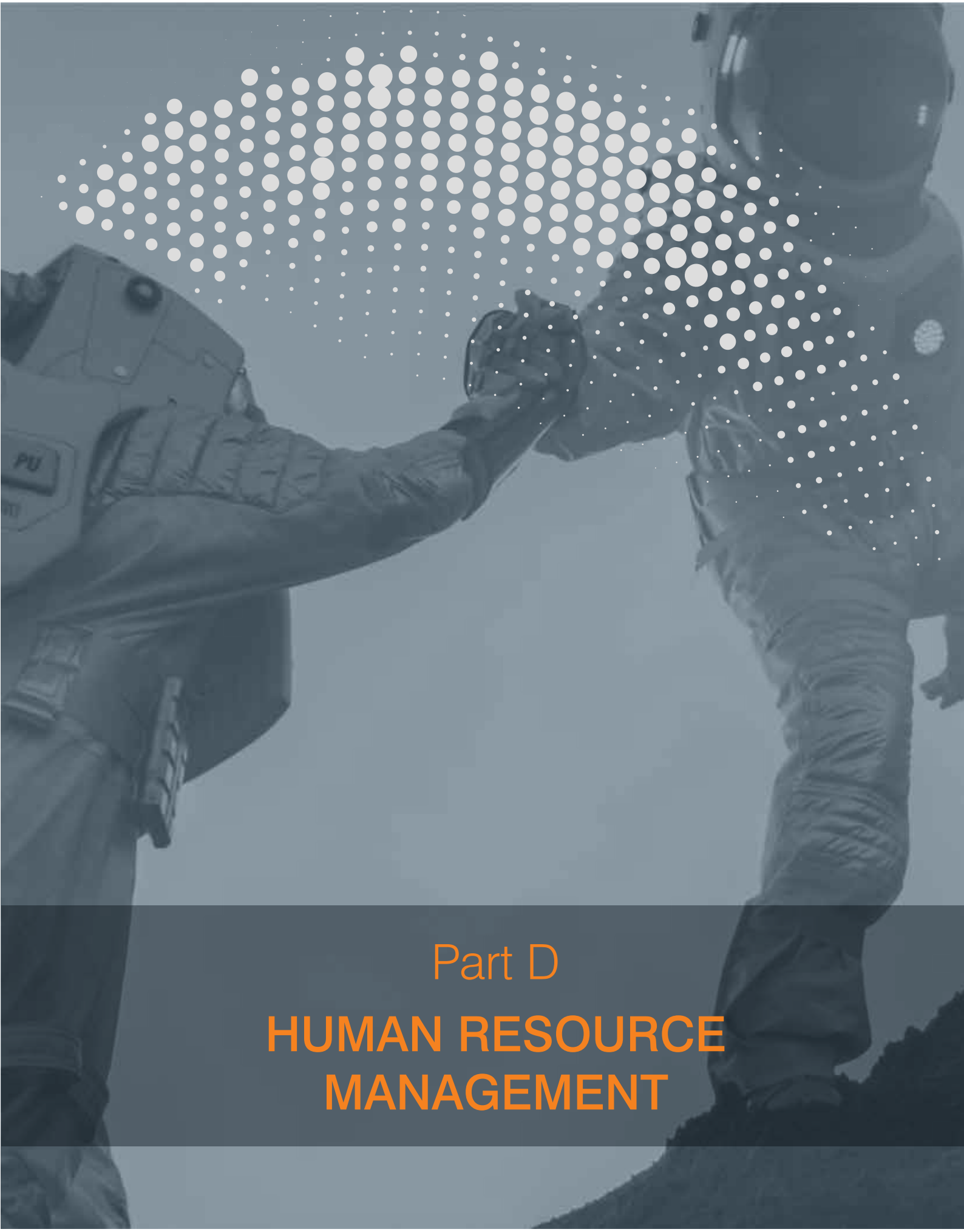
In line with principle 9 of King IV, the Board and its subcommittees undertook to conduct a self-review on its performance. By means of a questionnaire, the Company Secretary conducted the exercise to determine the effectiveness of the Board and its subcommittees. Given the responses and scores obtained, it was concluded that the Board and its subcommittees fully discharged their fiduciary duties in that, among other things:

- the Board is well balanced;
- meetings are effectively run by each subcommittee chair;
- board members are aware of their responsibilities and the requirements of their roles in line with the charters that govern the Board and its subcommittees; and
- members are well equipped in skills and knowledge to contribute to TIA's current strategy and the implementation of its Annual Performance Plan.

The review identified the need for ongoing governance training for the Board. The Board is mindful of this requirement and initiatives to increase awareness and maintain a sound knowledge of the latest developments in the area of corporate governance are undertaken on a regular basis.

12.14. Company Secretary

The Board's self-review included a review of the Company Secretary's performance. Given the response by members, the Board was of the view that the Company Secretary provided adequate support.



Part D

HUMAN RESOURCE MANAGEMENT

13. HUMAN **RESOURCES**

The Human Resources unit adds value to TIA by creating an enabling environment, which fosters seamless collaboration to achieve operational excellence. The unit plays an enabling role in the organisation to attract, develop and retain talent while inculcating a culture of high performance.

13.1. Organisational realignment

TIA embarked on a journey to re-align the organisational structure to enhance organisational performance by ensuring cross-cutting thematic areas are capacitated and synergies are fostered to enable greater efficiencies for portfolio management. The realigned structure will enable TIA to accelerate its contribution to the Bio-economy Strategy, give greater focus to the Technology Stations Programme and capacitate the commercialisation function. Figure 33 depicts the Board-approved realigned structure for implementation during 2019/20.

Prior to the implementation of the realigned structure, in 2018/19, TIA's management and staff were involved in several change-management events. The Board approved the realigned structure towards the end of 2018/19 for implementation during 2019/20, with the process expected to be completed by the fourth quarter of 2019/20.

The realigned structure will be implemented in a phased approach over time to capacitate key focus areas as the volume and complexity of the TIA mandate evolves. The first phase of implementing the realigned structure in 2019/20 will entail recruiting general managers. This will be followed by the recruitment of staff for the new transversal services function and a project management office. This phase will also entail conducting a skills and competency audit of current staff to ensure optimal placement within the new organogram.

Performance against employment equity targets

TIA continues to comply with South Africa's employment equity requirements and targets. As per the agency's objective to be an employer of choice, a reasonable accommodation policy was drafted to ensure an accessible and productive environment for all staff. TIA noted a significant increase in the number of employees with disabilities during the period under review (5.1% against a target of 3%). The employment equity plan at the time did not take economically active population demographics

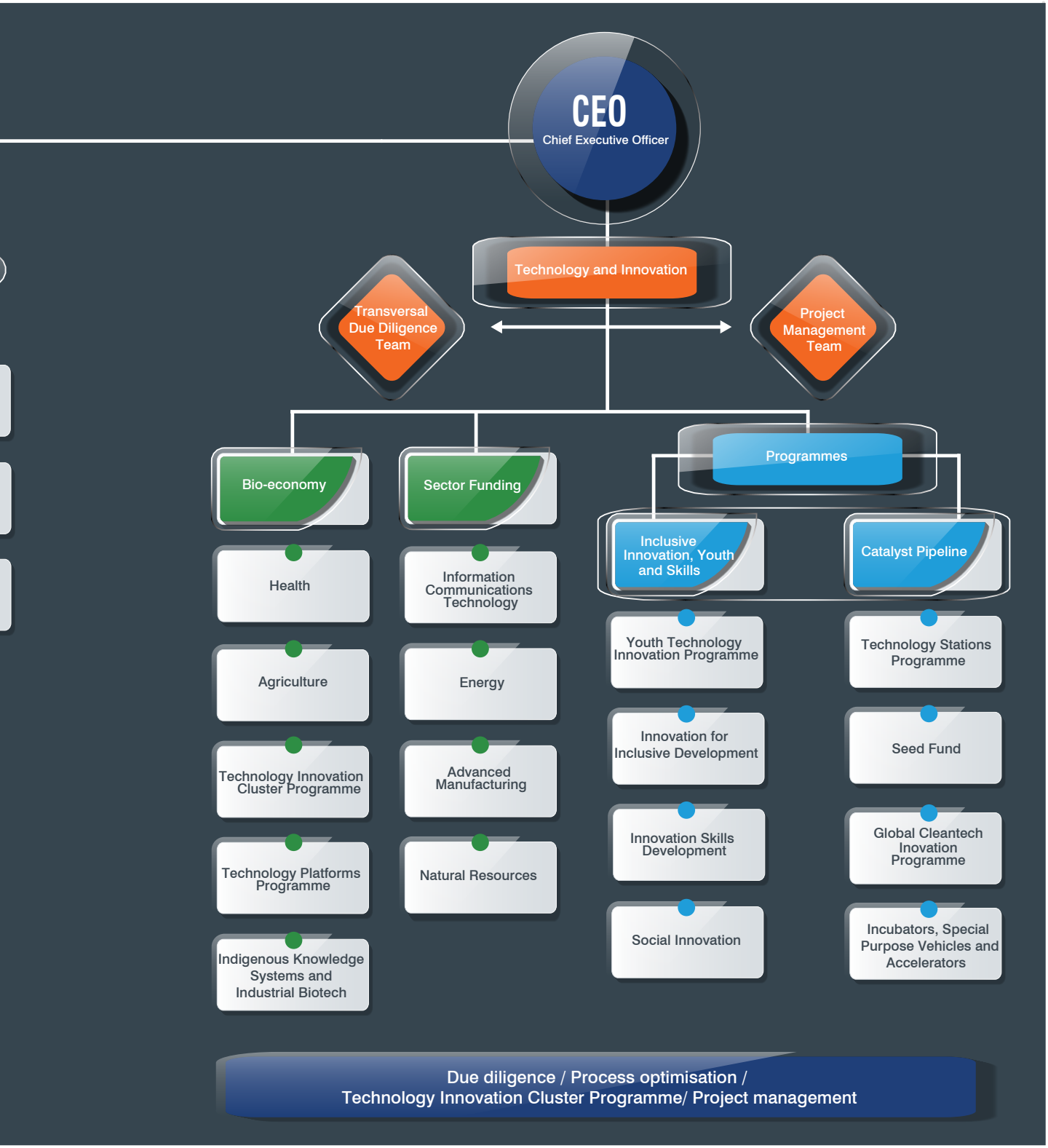
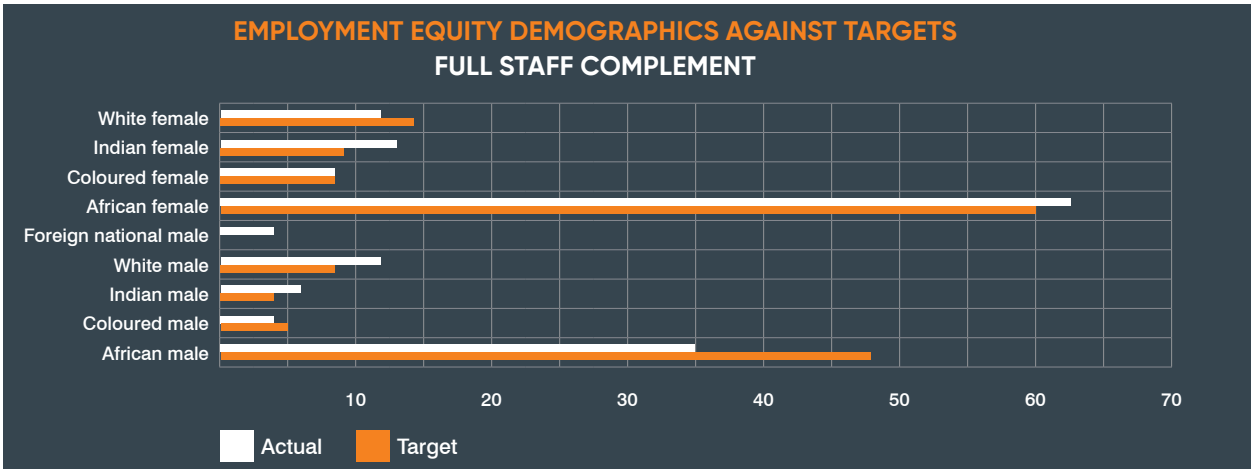


Figure 33: TIA realigned structure

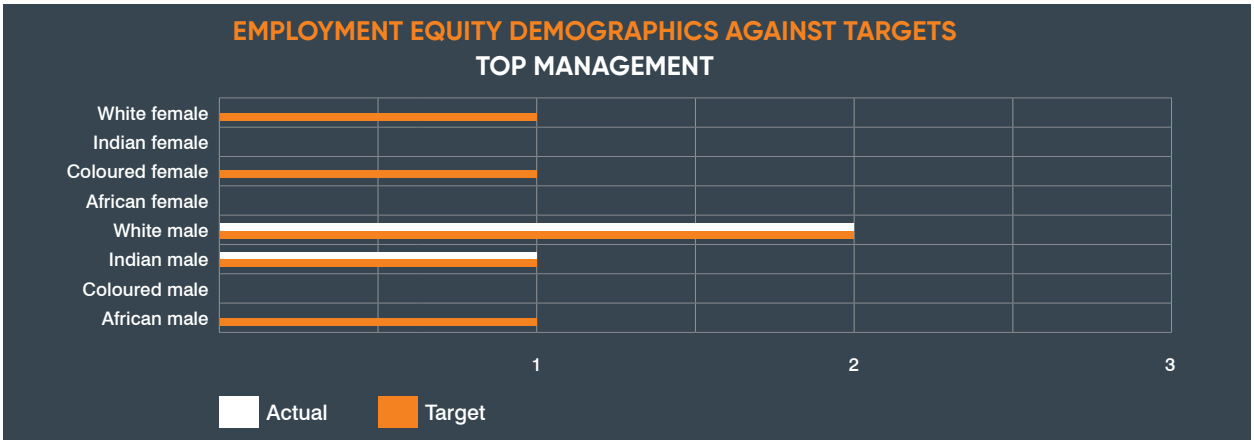
Internal Audit reports administratively to the CEO and functionally to the Audit and Risk Committee of the Board. The Board Secretariat reports administratively to the CEO and functionally to the Board.

into consideration, and this will be reconsidered in line with the new five-year strategic plan. Graphs 5-11 depict the agency's employment equity profile for 2018/19 against its employment equity plan.

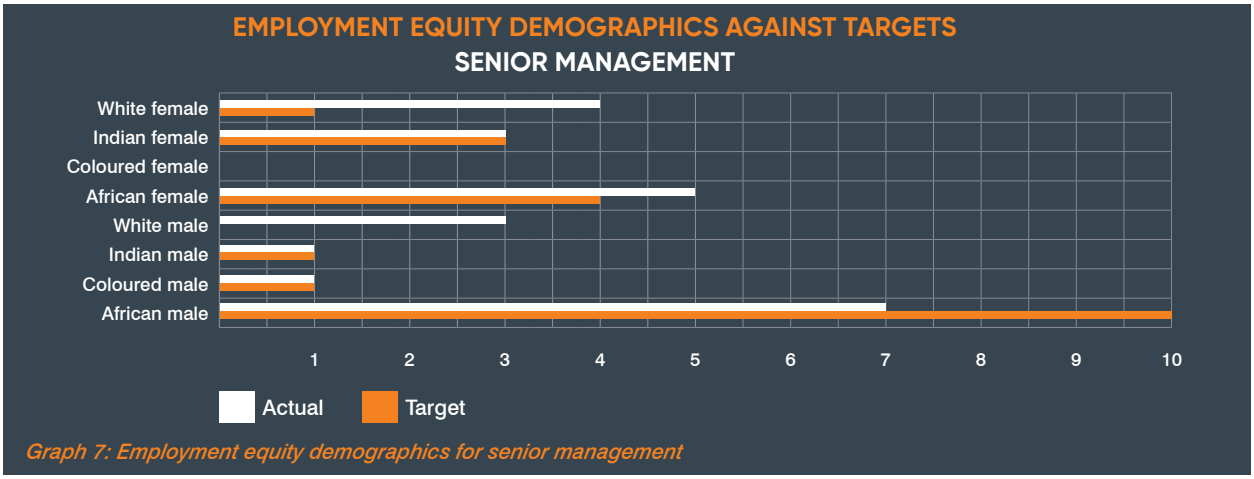
In view of the full staff complement, TIA exceeds the target on employment of Indian females, African females, white males and Indian males. Future recruitment initiatives will focus on the employment of African males.



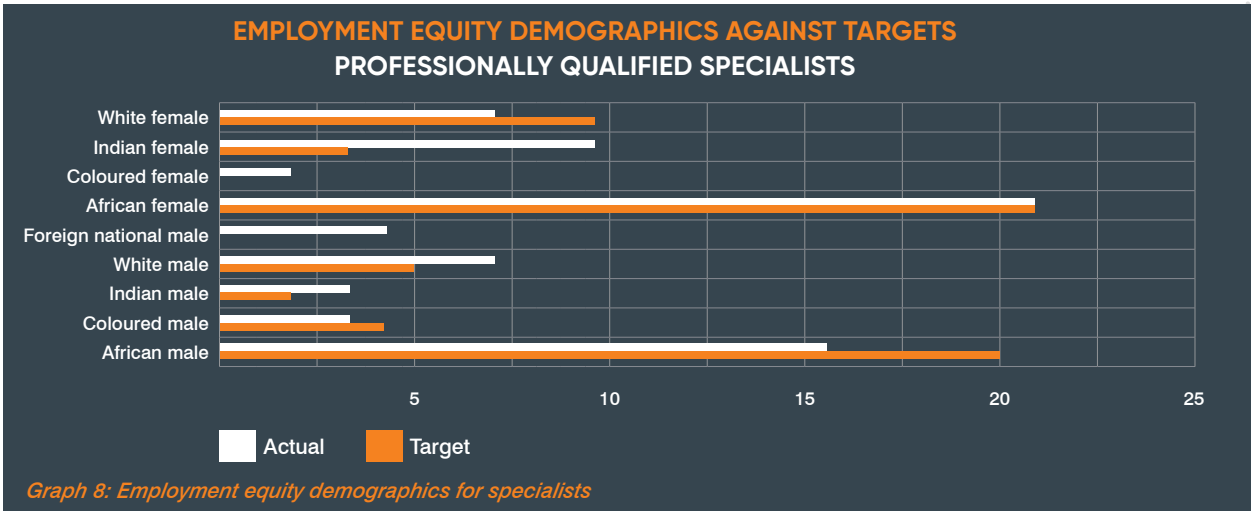
Graph 5: Employment equity demographics for all TIA staff



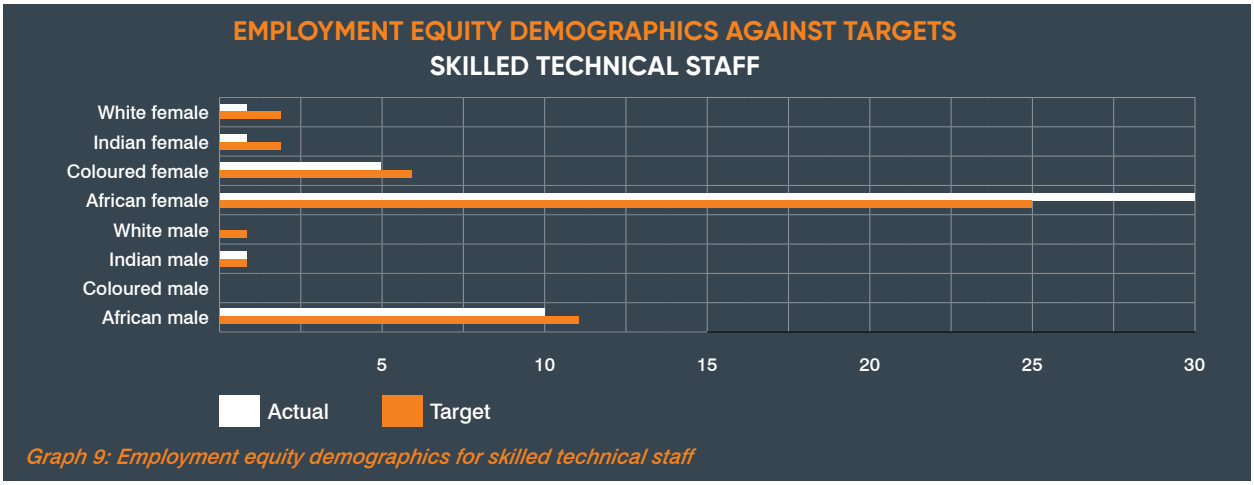
Graph 6: Employment equity demographics for top management



Graph 7: Employment equity demographics for senior management

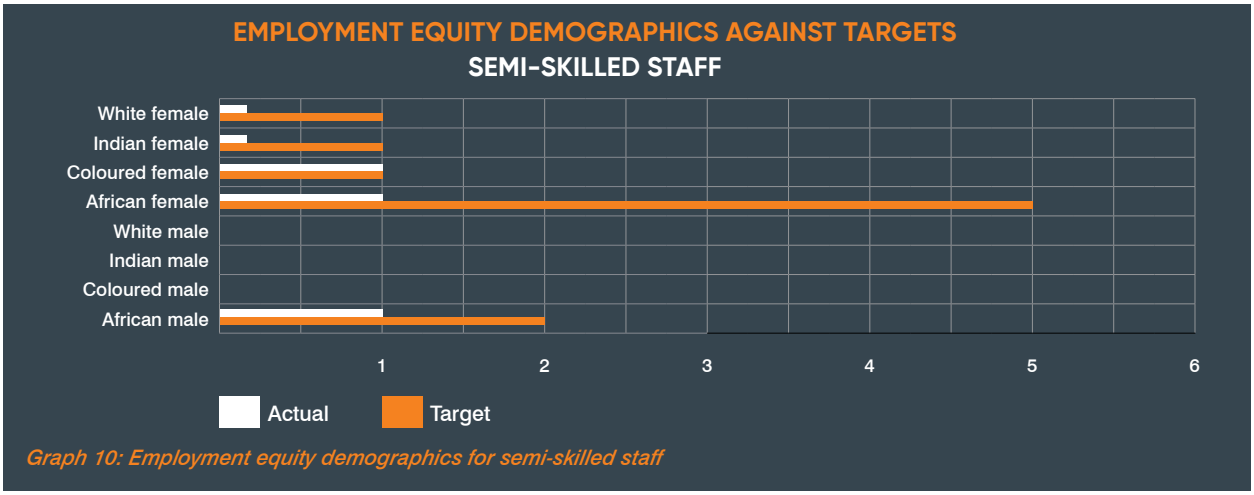


Graph 8: Employment equity demographics for specialists

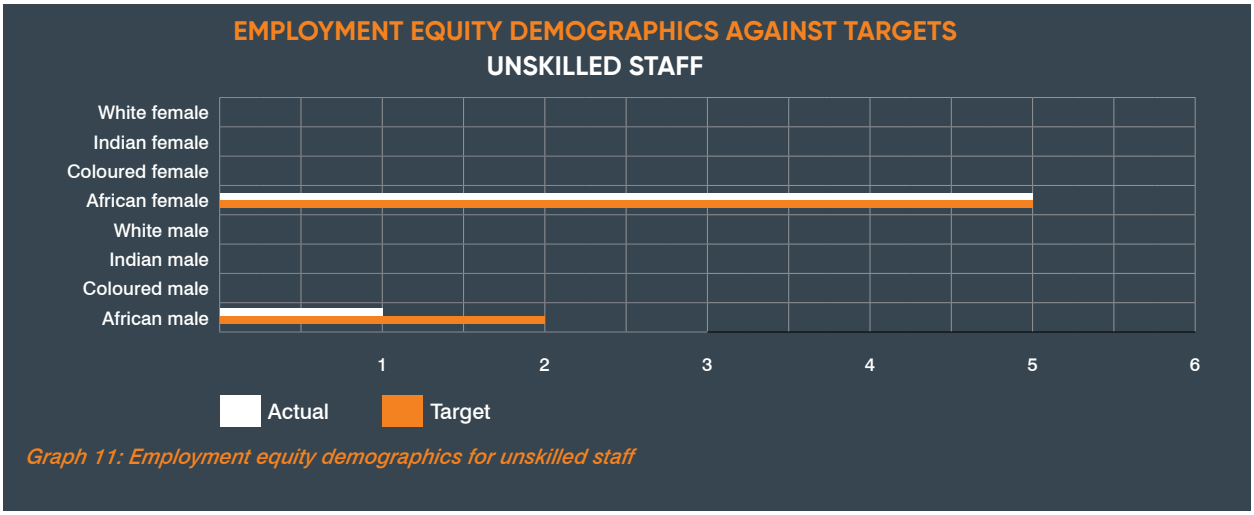


Graph 9: Employment equity demographics for skilled technical staff

As at 31 March 2019, only three of the top management roles were filled against a target of six positions. The realigned organisational structure entails an increase in the number of top management positions. The phased recruitment for these positions will be aligned with targets as per the economically active population.



Graph 10: Employment equity demographics for semi-skilled staff



Graph 11: Employment equity demographics for unskilled staff

In terms of senior management, employment equity targets were exceeded for white females, African females and white males. Recruitment practices will be aligned with targets as per the economically active population.

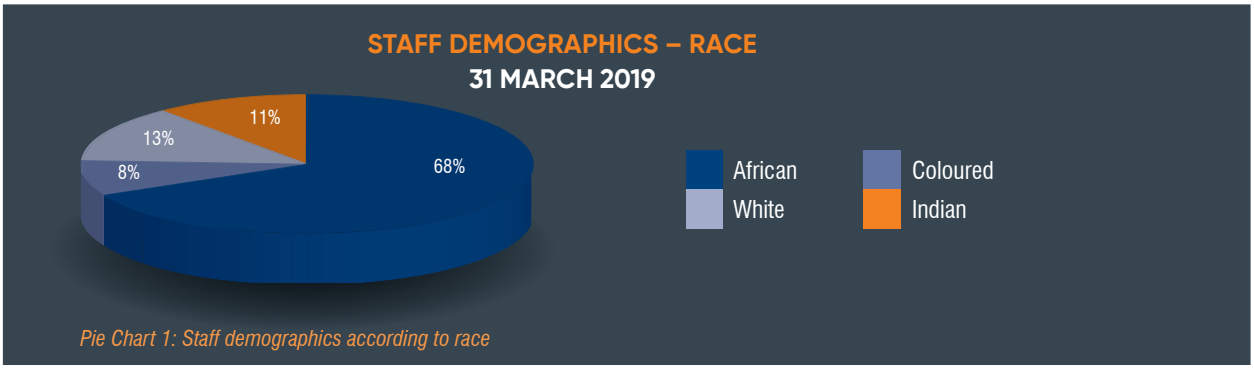
In terms of professionally qualified staff, employment equity targets for Indian females, Indian males, coloured females and white males were exceeded.

In terms of skilled technical employees, employment equity targets for African females were exceeded.

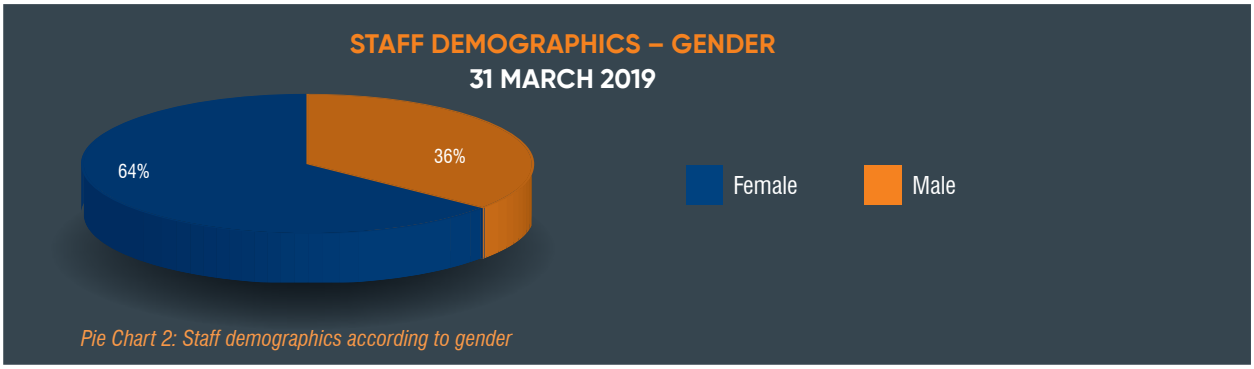
TIA's staff demographics as at 31 March 2019 are illustrated in pie charts 1-4 below.

Staff Demographics will be aligned with the economically active population through focused recruitment practices that prioritise the employment of young people.

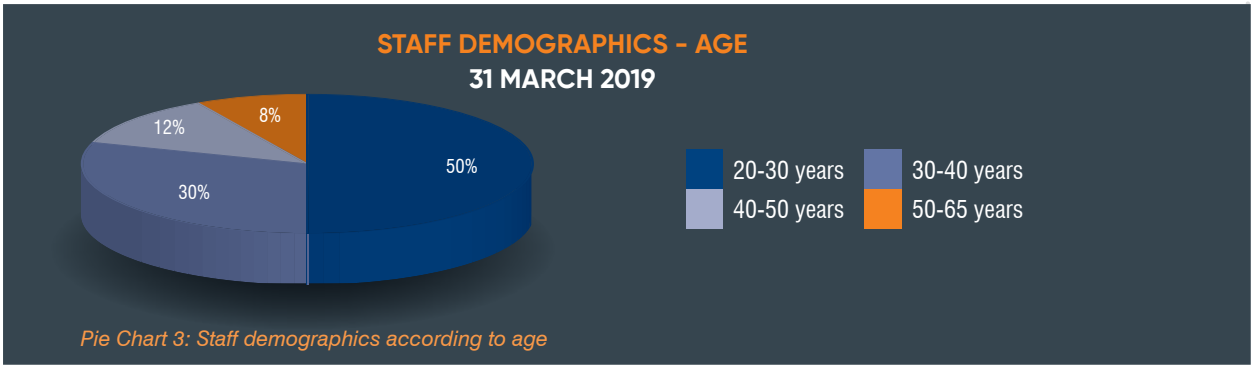
A total of 67% of the staff complement as at 31 March 2019 had been in the employment of TIA for more than five years. This strengthens the institutional memory within TIA and enables a customer-centric culture.



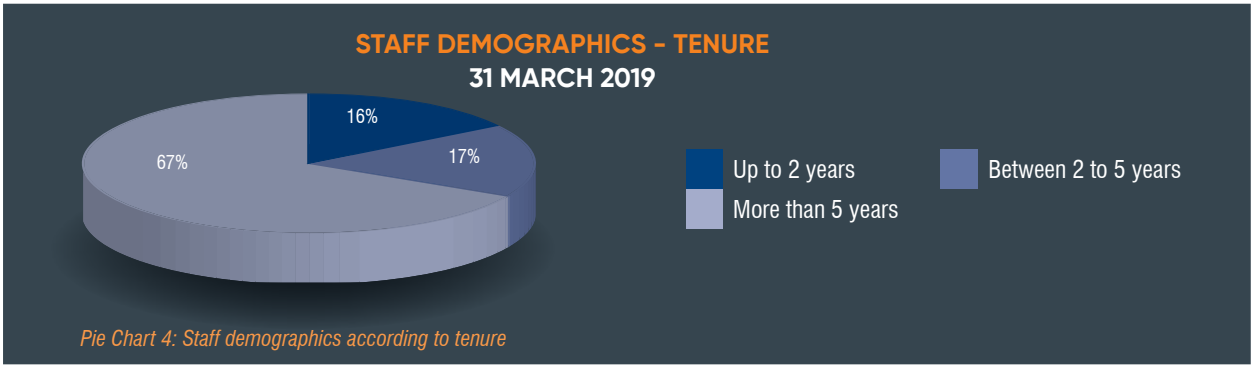
Pie Chart 1: Staff demographics according to race



Pie Chart 2: Staff demographics according to gender



Pie Chart 3: Staff demographics according to age



Pie Chart 4: Staff demographics according to tenure

13.2. Training and development

To ensure continual development while bridging competency gaps and enhancing productivity, during the period under review, TIA provided development opportunities and learning interventions to all its staff. TIA continues to fund three types of training, namely mandatory, statutory and formal qualifications. In addition to these training interventions, TIA hosts numerous staff conferences to engage staff on pertinent organisational matters and educate staff on diversity management in the workplace.

13.3. Talent management strategy implementation progress

Leadership development and coaching

Following the 360-degree competency assessments and coaching sessions held with senior and executive management in 2017/18, various training initiatives were identified during the period under review to augment management capabilities. The essential development initiatives identified are performance management, leadership coaching, and mentoring and emotional intelligence. The coaching process has improved senior managers' abilities to plan and organise, track the work of direct reports, and mentor others.

Cadet leadership development programme

In conjunction with identifying leadership development initiatives, TIA hosted its first cadet leadership development programme to build leadership capabilities across several divisions. This three-year development programme, which in the period under review had an intake of 26 cadets, was implemented with the aim of developing TIA's leadership pipeline. The programme follows a blended approach comprising 70% work-related group projects intended to shape the organisational culture, 20% on coaching and 10% on classroom learning. The class of 2018 (Figure 34) achieved an 85% pass rate (wherein 22 out of 26 cadets who undertook the assessment passed). The cadets applied the lessons learned in support of the change management interventions implemented during the information sessions with staff on the realigned organisational structure. The programme also empowered the participants with tools for self-regulation and collaboration with others.

13.4. Employee engagement survey

The annual employee engagement survey was conducted by audit firm PricewaterhouseCoopers. Even though the results of the survey were positive, it is imperative for the agency to embark on various initiatives to improve employee engagement. The agency achieved a promoter score of 83%, which indicates that employees are willing to promote TIA to others as an employer of choice. This score improved by 9% from the 74% obtained in the previous financial year.

Figure 34: Cadet leadership development programme – class of 2018

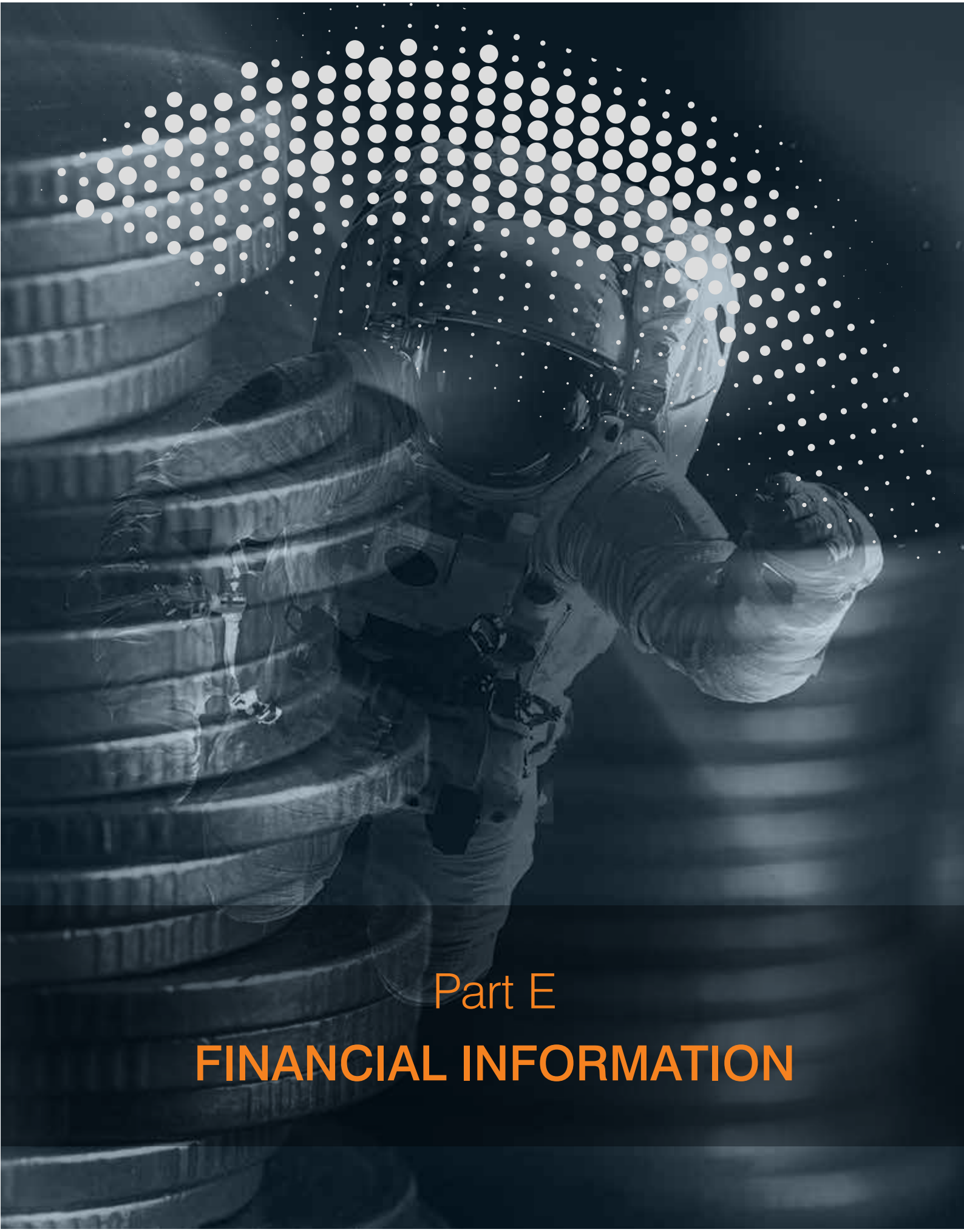
13.5. Positioning TIA as an employer of choice

TIA participates in the Rising Star Awards, which take place annually to identify and showcase future leaders under the age of 40 across various sectors. The outcomes of TIA's talent reviews were used to nominate employees for the 2018 awards. Of the four TIA employees who were nominated, Ms Sarusha Pillay and Mr Frikkie de Lange were selected as finalists in the Service: Public and Private category (Figure 35).

Figure 35: The 2018 Rising Star Awards finalists Ms Sarusha Pillay and Mr Frikkie de Lange

13.6. Total rewards strategy implementation

As part of TIA's performance management philosophy, the agency adopted a policy that ensures employees who exceed their performance targets are recognised and rewarded accordingly. In doing so, high performers were paid performance-related increases.



Part E
FINANCIAL INFORMATION

14. AUDIT AND RISK COMMITTEE **STATEMENT**

The ARC is appointed in terms of section 94(2) of the Companies Act (2008) and section 51 of the PFMA, read with principle 8 of King IV. The committee has performed its duties and carried out its responsibilities in accordance with its annually reviewed charter, and has executed specific duties delegated to it by the Board.

Among other things, the charter empowers the committee to:

- Examine and review the Annual Financial Statements and report on the final results.
- Appoint and evaluate the qualification, appropriateness, eligibility and independence of the external auditor.
- Approve the internal audit plan, internal audit charter and fees of the external auditor.
- Evaluate the scope and effectiveness of the internal audit function to ensure that effective internal controls have been identified and are in place.
- Ensure TIA complies with legal and financial regulatory requirements.
- Evaluate the adequacy and efficiency of the internal control systems, accounting practices, information systems and auditing processes applied in the management of TIA.
- Discharge its duties relating to the safeguarding of assets, the implementation of adequate IT systems, effective control processes and the preparation of accurate financial reporting and statements in compliance with all applicable legal requirements and accounting standards.
- Monitor financial and all other risks, ensuring that mitigating action plans are in place.

Quarterly performance reports to the executive authority

In 2018/19, TIA reported quarterly to its executive authority as per requirements contained in section 5.3.1 of the Treasury Regulations, read together with sections 27(4) and 40 of the PFMA. In the period under review, the ARC ensured compliance with section 5.3.1 for the establishment of such procedures. In consideration of the reports during the year, the committee guided management in reviewing targets and assessing the adequacy of quarterly performance reports against the targets.

Annual Financial Statements

The ARC reviewed the Annual Financial Statements and agreed that the statement presented fairly, in all material respects, the consolidated financial position of TIA. The committee concluded that it was satisfied that the statements complied with generally recognised accounting practice.

Internal audit

The internal audit function remains in-house and the unit has maintained independence. The purpose, authority and responsibility of internal audit are encapsulated in the internal audit charter, which is reviewed and approved annually by the ARC and the Board. The head of the unit reports functionally to the Chairman of the ARC and administratively to the CEO.

Internal controls that are in place are based on established processes and procedures, supported by a sound audit methodology. The effectiveness of these controls is measured through the performance of internal audits, audit reports, advisory engagements and regular reporting to the ARC and CEO.

Internal audit has sufficient capacity, with skilled personnel and an appropriate segregation of duties. An annual rotational system is in place during audits to ensure transparency, fairness and responsible, objective reporting. During the year, the internal audit function is requested by the CEO and Chairman of the ARC to perform ad hoc tasks and investigations.

During the period under review, no evidence was presented to suggest that there were material breakdowns in, or threats to, the internal control environment. No critical areas of weaknesses in financial control have been tabled before the ARC and posed limited threats to the preparation of the Annual Financial Statements. Accordingly, the Annual Financial Statements were recommended to the Board for approval.

A year-on-year comparison in internal audit showed a marked improvement in critical areas. All recommendations provided by internal audit have been appreciated and adopted, where applicable. In terms of critical and repeat findings, management has demonstrated a commitment to remedy and better manage areas of weakness, with noticeable improvements already made.

External audit

The external auditors, Rakoma & Associates Inc., remain on record with oversight by the office of the Auditor-General of South Africa. The ARC was satisfied that the external auditors have complied with sections 90(2)(b) and 94(8) of the Companies Act (2008), as amended, and confirmed that there are no conflicts of interest as determined by the criteria prescribed by the Independent Regulatory Board for Auditors.

The ARC, in consultation with management, agreed to the terms contained in the engagement letter, audit plan and audit fees for the financial year ended 31 March 2019. In consideration of the external audit plan, the committee was satisfied that it is comprehensive and adequately interrogates the risk areas identified. The external auditors remain independent and no non-audit services were provided. In further consideration of their services and engagement with the external auditors, the ARC was satisfied that:

- The quality and effectiveness of their services were appropriate.
- In camera sessions excluding management were held when required.
- A level of assurance was provided to confirm that Rakoma & Associates Inc. maintained its integrity as a firm through open and transparent processes, and accordingly posed no risk to TIA during the execution of its duties.

Going concern

Management provided assurance that TIA is a going concern. Through its annual funding allocation received from its executive authority, income from royalties and interest received, there appeared to be no indicators to suggest that TIA will not continue as a going concern for the next 12 months.

Reportable irregularities

No reportable irregularities were identified by the external auditors.

Fraud prevention

A policy and procedure is in place, along with an anonymous ethics line, to manage potential concerns raised. During the period under review, no complaints or concerns about potential fraud were raised.

Risk management

Risk management remains central to TIA's business. Key strategic risks were identified and deliberated on by management and the Board. Risks were evaluated in terms of impact and likelihood. Appropriate actions and action plans have been considered and implemented, where required, to mitigate risks. Management is aware of the need to improve risk management in so far as the following:

- Better treatment of residual risks.
- Detailed explanations of risks and corresponding actions of mitigation.

Through its Risk Management Committee, management regularly reviews risk-related internal control processes. Actions are delegated to staff with the encouragement to embed risk management in the execution of their daily tasks.

IT governance

The ARC is responsible for monitoring IT governance. The approved IT policies that are in place and the procedures that have been implemented safeguard TIA's IT systems and information, and draw on the agency's disaster recovery plans when necessary. There were no material weaknesses found in TIA's IT environment during the period under review.

Governance on quality

The Board was pleased to learn of management having secured the recertification of TIA's ISO 9001:2015 standard following a surveillance audit in the fourth quarter of 2018/19. This standard is used to demonstrate the agency's ability to consistently provide products and services that meet customer and regulatory requirements.

On behalf of the ARC,

Dr Stephen Lennon
Chairman

15. INDEPENDENT AUDITOR'S **REPORT**

Report on the audit of the consolidated and separate financial statements

Opinion

1. We have audited the consolidated and separate financial statements of the Technology Innovation Agency and its subsidiaries (the Economic Entity) set out on pages 101 to 138, which comprise the consolidated and separate statement of financial position as at 31 March 2019, the consolidated and separate statement of financial performance, statement of changes in net assets, and cash flow statement and statement of comparison of budget and actual amounts for the year then ended, as well as the notes to the consolidated and separate financial statements, including a summary of significant accounting policies.

2. In our opinion, the consolidated and separate financial statements present fairly, in all material respects, the consolidated and separate financial position of the Technology Innovation Agency Group as at 31 March 2019 and their financial performance and cash flows for the year then ended in accordance with Generally Recognised Accounting Practices (GRAP) and the requirements of the Public Finance Management Act of South Africa, 1999 (Act No. 1 of 1999) (PFMA).

Context for the opinion

3. We conducted our audit in accordance with the International Standards on Auditing (ISAs). Our responsibilities under those standards are further described in the auditor's responsibilities for the audit of the consolidated and separate financial statements section of this auditor's report.

4. We are independent of the public entity in accordance with the Independent Regulatory Board for Auditors' Code of professional conduct of registered auditors (IRBA code) and other independence requirements applicable to performing audits of the financial statements in South Africa. We have fulfilled our other ethical responsibilities in accordance with the IRBA code and in accordance other ethical requirements applicable to performing audits in South Africa. The IRBA code is consistent with the International Ethics Standards Board for Accountants' Code of ethics for professional accountants (parts A and B).

5. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Emphasis of matter

6. We draw attention to the matter below. Our opinion is not modified in respect of this matter.

Restatement of corresponding figures

7. As disclosed in note 27 of the financial statements, the corresponding figures for 31 March 2018 were restated as a result of an error in the financial statements of the public entity at, and for the year ended 31 March 2019.

Responsibilities of accounting authority for the financial statements

8. The board of directors, which constitutes the accounting authority is responsible for the preparation and fair presentation of the consolidated and separate financial statements in accordance with GRAP and the requirements of the PFMA and for such internal control as the accounting authority determines is necessary to enable the preparation of consolidated and separate financial statements that are free from material misstatement, whether due to fraud or error.

9. In preparing the consolidated and separate financial statements, the accounting authority is responsible for assessing the public entity's ability to continue as a going concern, disclosing, as applicable, matters relating to going concern and using the going concern basis of accounting unless the appropriate governance structure either intends to liquidate the public entity or to cease operations, or has no realistic alternative but to do so.

Auditor's responsibilities for the audit of the consolidated and separate financial statements

10. Our objectives are to obtain reasonable assurance about whether the consolidated and separate financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance but is not a guarantee that an audit conducted in accordance with the ISAs will always detect a material

misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these consolidated and separate financial statements.

11. A further description of our responsibilities for the audit of the consolidated and separate financial statements is included in the annexure to this auditor's report.

Report on the audit of the annual performance report

Introduction and scope

12. In accordance with the Public Audit Act of South Africa, 2004 (Act No. 25 of 2004) (PAA) and the general notice issued in terms thereof, we have a responsibility to report material findings on the reported performance information against predetermined objectives for selected programmes presented in the annual performance report. We performed procedures to identify findings but not to gather evidence to express assurance.

13. Our procedures address the reported performance information, which must be based on the approved performance planning documents of the public entity. We have not evaluated the completeness and appropriateness of the performance indicators included in the planning documents. Our procedures also did not extend to any disclosures or assertions relating to planned performance strategies and information in respect of future periods that may be included as part of the reported performance information. Accordingly, our findings do not extend to these matters.

14. We evaluated the usefulness and reliability of the reported performance information in accordance with the criteria developed from the performance management and reporting framework, as defined in the general notice, for the following selected programmes presented in the annual performance report of the public entity for the year ended 31 March 2019:

PROGRAMMES	PAGES IN ANNUAL PERFORMANCE REPORT	OPINION
Programme 2 – Innovation Funding and Pre – Commercialisation Support	36– 49	Unqualified
Programme 3 – Innovation Enabling and Support	50 – 67	Unqualified

15. We performed procedures to determine whether the reported performance information was properly presented and whether performance was consistent with the approved performance planning documents. We performed further procedures to determine whether the indicators and related targets were measurable and relevant, and assessed the reliability of the reported performance information to determine whether it was valid, accurate and complete.

16. We did not raise any material findings on the usefulness and reliability of the reported performance information for these programmes:

    - Programme 2 – Innovation Funding and Pre-Commercialisation Support
    - Programme 3 – Innovation Enabling and Support

Other matters

17. We draw attention to the matter below. Our opinions are not modified in respect of this matter.

Achievement of planned targets

18. Refer to the annual performance report on pages 25 to 26 for information on the achievement of planned targets for the year and explanations provided for the under/ over achievement of a significant number of targets.

Report on the audit of compliance with legislation

Introduction and scope

19. In accordance with the PAA and the general notice issued in terms thereof, we have a responsibility to report material findings on the compliance of the public entity with specific matters in key legislation. We performed procedures to identify findings but not to gather evidence to express assurance.

20. We did not raise material findings on compliance with the specific matters in key legislation set out in the general notice issued in terms of the PAA.

Other information

21. The accounting authority is responsible for the other information. The other information comprises the information included in the annual report. The other information does not include the consolidated and separate financial statements, the auditor's report and those selected programmes presented in the annual performance report that have been specifically reported in this auditor's report.

22. Our opinion on the financial statements and findings on the reported performance information and compliance with legislation do not cover the other information and we do not express an audit opinion or any form of assurance conclusion thereon.

23. In connection with our audit, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the consolidated and separate financial statements and the selected programmes presented in the annual performance report, or our knowledge obtained in the audit, or otherwise appears to be materially misstated.

24. If based on the work performed, we conclude that there is a material misstatement in the other information, we are required to report the fact. We did not identify any material inconsistencies.

Internal control deficiencies

25. We considered internal controls relevant to our audit of the consolidated and separate financial statements, reported performance information and compliance with applicable legislation; however, our objective was not to express any form of assurance on it. We did not identify any significant deficiencies in internal control.

Other reports

26. We draw attention to the following engagements conducted by various parties that had, or could have, an impact on the matters reported in the public entity's financial statements, reported performance information, compliance with applicable legislation and other related matters. These reports did not form part of our opinion on the financial statements or our findings on the reported performance information or compliance with legislation.

Investigation

27. There was an investigation conducted with regards to an investment in an associate that was disposed of in the previous financial year. The conclusion was that the funds invested were not utilised for the purpose for which it was advanced.

Audit-related services and special audits

28. We will perform agreed upon procedures to review the Treasury Pack to ensure conversion adjustments are captured correctly for consolidation purposes by National Treasury.

Auditor tenure

29. In terms of the IRBA rule published in Government Gazette Number 39475 dated 4 December 2015, we report that Rakoma and Associates Incorporated has been the auditor of Technology Innovation Agency Group for one year.

Per: Eugene Lufhugu
Partner
Registered Auditor

31 May 2019

Ground Floor Building B
Monte Circle Office Park
178 Montecasino Boulevard
Fourways
Johannesburg
2191

Annexure – Auditor's responsibility for the audit

1. As part of an audit in accordance with the ISAs, we exercise professional judgement and maintain professional scepticism throughout our audit of the consolidated and separate financial statements, and the procedures performed on reported performance information for selected programmes and on the public entity's compliance with respect to the selected subject matters.

Financial statements

2. In addition to our responsibility for the audit of the consolidated and separate financial statements as described in this auditor's report, we also:
    - identify and assess the risks of material misstatement of the consolidated and separate financial statements whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
    - obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the public entity's internal control.
    - evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the Board, which constitutes the accounting authority.
    - conclude on the appropriateness of the Board, which constitutes the accounting authority use of the going concern basis of accounting in the preparation of the financial statements. We also conclude, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the TIA and its subsidiaries ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements about the material uncertainty or, if such disclosures are inadequate, to modify the opinion on the financial statements. Our conclusions are based on the information available at the date of this auditor's report. However, future events or conditions may cause TIA to cease continuing as a going concern.
    - evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.
    - obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the group to express an opinion on the consolidated financial statements. We are responsible for the direction, supervision and performance of the group audit. We remain solely responsible for our audit opinion

Communication with those charged with governance

3. We communicate with the accounting authority regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.
4. We also confirm to the accounting authority that we have complied with relevant ethical requirements regarding independence and communicate all relationships and other matters that may reasonably be thought to have a bearing on our independence and, where applicable, related safeguards.
5. From the matters communicated to those charged with governance, we determine those matters that were of the most significance in the audit of the consolidated and separate financial statements of the current period and are therefore key audit matters. We describe these matters in this auditor's report unless law or regulation precludes public disclosure about the matter or when, in extremely rare circumstances, we determine that a matter should not be communicated in this auditor's report because the adverse consequences of doing so would reasonably be expected to outweigh the public interest of such communication.

16. BOARD STATEMENT OF RESPONSIBILITY AND **CONFIRMATION OF ACCURACY**

Provisions of the PFMA require the Board to maintain adequate accounting records, and thereby make the Board responsible for the content and integrity of the consolidated and separate financial statements and related financial information included in this Annual Report. Accordingly, it is the Board's responsibility to ensure that the consolidated and separate financial statements fairly present the state of affairs of the entity and its controlled entities (referred to hereinafter as "the economic entity") as at the end of the financial year, and the results of its operations and cash flows for the period then ended. The external auditors were engaged to express an independent opinion on the consolidated and separate financial statements, and, in doing so, were given unrestricted access to all financial records and related data.

The consolidated and separate financial statements have been prepared in accordance with the GRAP including any interpretations, guidelines and directives issued by the Accounting Standards Board. The consolidated and separate financial statements are based on appropriate accounting policies consistently applied and supported by reasonable and prudent judgements and estimates. The Board acknowledges that it is ultimately responsible for the system of internal financial control established by the economic entity, and places considerable importance on maintaining a strong control environment. To ensure that these responsibilities are carried out, the Board sets standards for internal control aimed at reducing the risk of error in a cost-effective manner.

The standards include the proper delegation of responsibilities within a clearly defined framework, effective accounting procedures and adequate segregation of duties to ensure an acceptable level of risk. These controls are monitored throughout the economic entity and all employees are required to maintain the highest level of ethical standards in ensuring the economic entity's business is conducted in a manner that in all reasonable circumstances is above reproach. With regards to risk management, the economic entity focuses on identifying, assessing, managing and monitoring all known forms of risk posed to it. While operating risk cannot be fully eliminated, the economic entity endeavours to minimise it by ensuring that appropriate infrastructure, controls, systems and ethical behaviour are applied and managed within predetermined procedures and constraints.

Based on the information and explanations given by management, the Board is of the opinion that the system of internal control provides reasonable assurance that the financial records may be relied on for the preparation of the financial statements. However, any system of internal financial control can provide only reasonable, not absolute, assurance against material misstatement or deficit. The Board has reviewed the economic entity's cash flow forecast for the year to 31 March 2020 and, in the light of this review and the current financial position, it is satisfied that the economic entity has access to adequate resources to continue in operational existence for the foreseeable future.

The financial statements set out on pages 101 to 138 of this Annual Report, which have been prepared on the going concern basis, were approved by the Board on 30 May 2019 and were signed on its behalf by:

Prof Edward Charles Kieswetter
Chairman

17. STATEMENT OF **FINANCIAL POSITION**

as at 31 March 2019

	Notes	Economic entity 2019 R'000	Economic entity 2018 R'000	Controlling entity 2019 R'000	Controlling entity 2018 R'000
Assets					
Current assets					
Loans and receivables	8	6,055	1,389	6,055	1,389
Trade and other receivables	2	1,891	1,503	1,891	1,503
Prepayments		2,247	2,811	2,247	2,810
Cash and cash equivalents	3	169,242	128,926	166,911	126,664
		179,435	**134,629**	**177,104**	**132,366**
Non-current assets					
Property and equipment	4	15,175	20,501	15,175	20,501
Intangible assets	5	3,434	3,173	3,434	3,173
Investments in controlled entities	6	-	-	-	-
Investments in associates	7	1,085	-	-	-
Loans and receivables	8	15,916	4,345	15,916	4,345
Other financial assets	9	26,300	26,300	26,300	26,300
		61,910	**54,319**	**60,825**	**54,319**
Total assets		**241,345**	**188,948**	**237,929**	**186,685**
Liabilities					
Current liabilities					
Finance lease obligation	10	532	134	532	134
Operating lease liability		341	501	341	501
Trade and other payables	11	61,830	26,070	61,427	25,322
		62,703	**26,705**	**62,300**	**25,957**
Non-current liabilities					
Committed conditional grants and receipts	12	81,120	88,272	81,120	88,272
Total liabilities		**143,823**	**114,977**	**143,420**	**114,229**
Net assets		**97,522**	**73,971**	**94,509**	**72,456**
Net assets attributable to owners of controlling entity					
Reserves					
Accumulated surplus		97,598	74,076	94,509	72,456
		97,598	**74,076**	**94,509**	**72,456**
Non-controlling interest		(76)	(105)	-	-
Total net assets		**97,522**	**73,971**	**94,509**	**72,456**

18. STATEMENT OF **FINANCIAL PERFORMANCE**

for the year ended 31 March 2019

	Notes	Economic entity 2019 R'000	Economic entity 2018 R'000	Controlling entity 2019 R'000	Controlling entity 2018 R'000
Revenue					
Revenue from non-exchange transactions	13	530,417	466,123	530,417	466,123
Other income	14	19,533	7,314	19,533	7,314
Interest received	15	15,647	12,144	15,575	12,072
Profit on sale of investment		-	-	-	3,683
Surplus from equity accounted investments		1,085	130	-	-
Total revenue		**566,682**	**485,711**	**565,525**	**489,192**
Expenditure					
Employee-related costs	16	(105,087)	(98,717)	(105,087)	(98,717)
Project funding expenditure	17	(369,730)	(309,123)	(369,730)	(309,123)
Depreciation and amortisation		(9,372)	(8,031)	(9,372)	(8,031)
Lease rentals on operating lease		(9,706)	(9,194)	(9,706)	(9,194)
Impairment	18	(533)	(1,223)	(533)	(1,223)
Loss on sale of investment		-	(9,717)	-	-
Loss on foreign exchange		-	(47)	-	(47)
Other operating expenses	19	(48,703)	(40,169)	(49,044)	(40,233)
Total expenditure		**(543,131)**	**(476,221)**	**(543,472)**	**(466,568)**
Surplus for the year		**23,551**	**9,490**	**22,053**	**22,624**
Attributable to:					
Owners of the controlling entity		23,522	9,449	22,053	22,624
Non-controlling interest		29	41	-	-
		23,551	**9,490**	**22,053**	**22,624**

19. STATEMENT OF **CHANGES IN NET ASSETS**

for the year ended 31 March 2019

Economic entity	Foreign currency translation reserve R'000	Accumulated surplus R'000	Total attributable to owners of the economic entity / controlling entity R'000	Non-controlling interest R'000	Total net assets R'000
Opening balance as previously reported	(132)	52,700	**52,568**	(8,792)	43,776
Correction of errors	-	11,926	**11,926**	-	11,926
Balance at 1 April 2017 as restated	**(132)**	**64,626**	**64,494**	**(8,792)**	**55,702**
Sale of investment	-	-	**-**	8,646	8,646
Currency translation differences	132	-	**132**	-	132
Net losses recognised directly in net assets	132	-	**132**	8,646	8,778
Surplus for the year as previously reported	-	9,449	**9,449**	41	9,490
Balance at 1 April 2018	**-**	**74,076**	**74,076**	**(105)**	**73,971**
Surplus for the year	-	23,522	**23,522**	29	23,551
Balance at 31 March 2019	**-**	**97,598**	**97,598**	**(76)**	**97,522**

Controlling entity					
Opening balance as previously reported	-	37,906	**37,906**	-	37,906
Correction of errors	-	11,926	**11,926**	-	11,926
Balance at 1 April 2017 as restated	**-**	**49,832**	**49,832**	**-**	**49,832**
Surplus for the year as previously reported	-	22,624	**22,624**	-	22,624
Balance at 1 April 2018	**-**	**72,456**	**72,456**	**-**	**72,456**
Surplus for the year	-	22,053	**22,053**	-	22,053
Balance at 31 March 2019	**-**	**94,509**	**94,509**	**-**	**94,509**

20. CASH FLOW **STATEMENT**

for the year ended 31 March 2019

	Notes	Economic entity 2019 R'000	Economic entity 2018 R'000	Controlling entity 2019 R'000	Controlling entity 2018 R'000
Cash flows from operating activities					
Receipts					
Grants		530,417	466,123	530,417	466,123
Interest income		10,393	10,364	10,321	5,451
Other receipts		19,708	2,755	19,697	14,494
		560,518	**479,242**	**560,435**	**486,068**
Payments					
Employee costs		(105,087)	(98,717)	(105,087)	(98,717)
Project funding expenses		(369,730)	(309,123)	(369,730)	(309,123)
Other payments		(34,563)	(49,622)	(34,549)	(55,841)
		(510,145)	**(457,462)**	**(509,366)**	**(463,681)**
Net cash flows used in operating activities	21	**50,373**	**21,780**	**51,069**	**22,387**
Cash flows from investing activities					
Purchase of property and equipment	4	(5,145)	(5,099)	(5,145)	(5,099)
Disposal of property and equipment	4	-	367	-	367
Purchase of intangible assets	5	(2,314)	(1,807)	(2,314)	(1,807)
Repayment of loans received	8	3,789	5,734	3,789	5,734
Proceeds on sale of investment	6&7	-	6,686	-	6,686
Net cash flows used in investing activities		**(3,670)**	**5,881**	**(3,670)**	**5,881**
Cash flows from financing activities					
Conditional grants received		106,358	92,451	106,358	92,451
Conditional grants paid		(113,510)	(58,622)	(113,510)	(58,622)
Movement in shareholders loan		-	(2,762)	-	-
Net cash flows from financing activities		**(7,152)**	**31,067**	**(7,152)**	**33,829**
Net decrease in cash and cash equivalents		**39,551**	**58,728**	**40,247**	**62,097**
Cash and cash equivalents at the beginning of the year		128,926	70,198	126,664	64,567
Cash and cash equivalents at the end of the year	3	**169,242**	**128,926**	**166,911**	**126,664**

21. STATEMENT OF COMPARISON OF **BUDGET AND ACTUAL AMOUNTS**

for the year ended 31 March 2019

Controlling entity	Approved budget R'000	Adjustments R'000	Final budget R'000	Actual amounts on comparable basis R'000	Difference between final budget and actual R'000	Reference
Statement of Financial Performance						
Revenue						
DST allocation	420,322	-	420,322	420,322	-	
Other income	108,283	-	108,283	134,882	26,599	31.1
Interest received	8,000	-	8,000	10,321	2,321	
Total revenue	**536,605**	**-**	**536,605**	**565,525**	**28,920**	
Expenditure						
Employee-related costs	(118,644)	14,250	(104,394)	(105,087)	(693)	
Project funding expenditure	(346,911)	(19,250)	(366,161)	(369,730)	(3,569)	
Other operating expenses	(71,050)	5,000	(66,050)	(68,655)	(2,605)	
Total expenditure	**(536,605)**	**-**	**(536,605)**	**(543,472)**	**(6,867)**	
Surplus	**-**	**-**	**-**	**22,053**	**22,053**	
Actual amount on comparable basis as presented in the budget and actual comparative statement	**-**	**-**	**-**	**22,053**	**22,053**	

22. ACCOUNTING **POLICIES**

for the year ended 31 March 2019

1. Presentation of Financial Statements

The financial statements have been prepared in accordance with the standards of GRAP, issued by the Accounting Standards Board in accordance with section 91(1) of the PFMA.

These financial statements have been prepared on an accrual basis of accounting and are in accordance with historical cost convention as the basis of measurement, unless specified otherwise. They are presented in South African rand. Amounts are rounded to the nearest thousand.

Assets, liabilities, revenues and expenses were not offset, except where offsetting is either required or permitted by a standard of GRAP.

A summary of the significant accounting policies, which have been consistently applied in the preparation of these financial statements, are disclosed below.

These accounting policies are consistent with the previous period.

1.1 Consolidation

Consolidated financial statements are the financial statements of the economic entity presented as those of a single entity.

The consolidated financial statements incorporate the financial statements of the controlling entity and all controlled entities, including special purpose entities, which are controlled by the controlling entity.

Consolidated financial statements are prepared using uniform accounting policies for like transactions and other events in similar circumstances.

Control exists when the controlling entity has the power to govern the financial and operating policies of another entity so as to obtain benefits from its activities.

The revenue and expenses of a controlled entity are included in the consolidated financial statements from the transfer date or acquisition date, as defined in the standards of GRAP on transfer of functions between entities under common control or transfer of functions between entities not under common control. The revenue and expenses of the controlled entity are based on the values of the assets and liabilities recognised in the controlling entity's financial statements at the acquisition date.

The financial statements of the controlling entity and its controlled entities used in the preparation of the consolidated financial statements are prepared as of the same date.

When the end of the reporting date of the controlling entity is different from that of a controlled entity, the controlled entity prepares, for consolidation purposes, additional financial statements as of the same date as the financial statements of the controlling entity unless it is impracticable to do so. When the financial statements of a controlled entity used in the preparation of consolidated financial statements are prepared as of a date different from that of the controlling entity, adjustments are made for the effects of significant transactions or events that occur between that date and the date of the controlling entity's financial statements. In any case, the difference between the end of the reporting date of the controlled entity and that of the controlling entity is no more than three months. The length of the reporting periods and any difference between the ends of the reporting dates is the same from period to period.

1.1 Consolidation (continued)

Adjustments are made when necessary to the financial statements of the controlled entities to bring their accounting policies in line with those of the controlling entity.

All intra-entity transactions, balances, revenues and expenses are eliminated in full on consolidation.

Non-controlling interest in the net assets of the economic entity are identified and recognised separately from the controlling entity's interest therein, and are recognised within net assets.

Changes in a controlling entity's ownership interest in a controlled entity that do not result in a loss of control are accounted for as transactions that affect net assets.

Investment in associates

An associate is an entity, including an unincorporated entity such as a partnership, over which the investor has significant influence and that is neither a controlled entity nor an interest in a joint venture. Significant influence is the power to participate in the financial and operating policy decisions of an activity but is not control or joint control over those policies.

An investment in associates is accounted for using the equity method. Under the equity method, investments in associates are carried in the consolidated statement of financial position at cost adjusted for post acquisition changes in the economic entity's share of net assets of the associate, less any impairment losses.

The equity method is a method of accounting whereby the investment is initially recognised at cost and adjusted thereafter for the post-acquisition change in the economic entity's share of net assets of the investee. The surplus or deficit of the economic entity includes the economic entity's share of the surplus or deficit of the investee.

The economic entity's share of the surplus or deficit of the investee is recognised in surplus or deficit.

The most recent available financial statements of the associate are used by the economic entity in applying the equity method. When the reporting dates of the economic entity and the associate are different, the associate prepares, for the use of the economic entity, financial statements as of the same date as the financial statements of the economic entity unless it is impractical to do so.

When the financial statements of an associate used in applying the equity method are prepared as of a different date from that of the economic entity, adjustments are made for the effects of significant transactions or events that occur between that date and the date of the economic entity's financial statements. In any case, the difference between the end of the reporting dates of the associate and that of the economic entity is no more than three months. The length of the reporting dates and any difference between the ends of the reporting dates is the same from period to period.

The economic entity's financial statements are prepared using uniform accounting policies for like transactions and events in similar circumstances.

Deficits in an associate in excess of the economic entity's interest in that associate are recognised only to the extent that the economic entity has incurred a legal or constructive obligation to make payments on behalf of the associate. If the associate subsequently reports surpluses, the economic entity resumes recognising its share of those surpluses only after its share of the surpluses equals the share of deficits not recognised.

1.1 Consolidation (continued)

Surpluses and deficits on transactions between the economic entity and an associate are eliminated to the extent of the economic entity's interest therein.

The controlling entity discontinues the use of the equity method from the date that it ceases to have significant influence over an associate and accounts for the investment in accordance with the standards of GRAP on financial instruments from that date, unless the associate becomes a controlled entity or a joint venture, in which case it is accounted for as such. The carrying amount of the investment at the date that it ceases to be an associate is regarded as the fair value on initial recognition as a financial asset in accordance with the standards of GRAP on financial instruments.

1.2 Significant judgements and sources of estimation uncertainty

In preparing the financial statements in conformity with GRAP, management is required to make judgements, estimates and assumptions that affect the amounts represented in the financial statements and related disclosures. Use of available information and the application of judgement is inherent in the formation of estimates. Actual results in the future could differ from these estimates, which may be material to the financial statements. These estimates and underlying assumptions are reviewed by management on an ongoing basis. Revisions to accounting estimates are recognised in the period in which the estimate is revised if the revision affects only that period, or in the period of the revision and future periods if the revision effects both current and future periods.

Loans and receivables

The economic and controlling entity assesses its loans and receivables for impairment at the end of each reporting period. In determining whether an impairment loss should be recorded in surplus or deficit, the economic entity makes judgements as to whether there is observable data indicating a measurable decrease in the estimated future cash flows from a financial asset.

The impairment for loans and receivables is calculated on an individual basis, based on historical losses, the financial position of the entity, repayment terms and the commercial viability of the business.

Impairment testing (non-financial assets)

The recoverable amounts of individual assets has been determined based on the higher of value-in-use calculations and fair values less costs to sell. These calculations require the use of estimates and assumptions. It is reasonably possible that the assumptions used may change, which may then impact our estimations and may then require a material adjustment to the carrying value of tangible assets.

The economic and controlling entity review and test the carrying value of assets when events or changes in circumstances suggest that the carrying amount may not be recoverable. If there are indications that impairment may have occurred, estimates are prepared of expected future cash flows for each asset. Expected future cash flows used to determine the value in use of other assets are inherently uncertain and could materially change over time.

Allowance for doubtful debts

For debtors, an impairment loss is recognised in surplus and deficit when there is objective evidence that it is impaired. The impairment is measured as the difference between the debtor's carrying amount and the present value of estimated future cash flows discounted at the effective interest rate, computed at initial recognition.

1.3 Property and equipment

Property and equipment are tangible, non-current assets that are held for use in the production or supply of goods or services, rental to others, or for administrative purposes, and are expected to be used during more than one period.

The cost of an item of property and equipment is recognised as an asset when:

- it is probable that future economic benefits or service potential associated with the item will flow to the economic entity; and
- the cost of the item can be measured reliably.

Property and equipment is initially measured at cost.

The cost of an item of property and equipment is the purchase price and other costs attributable to bring the asset to the location and condition necessary for it to be capable of operating in the manner intended by management. Trade discounts and rebates are deducted in arriving at the cost.

Where an asset is acquired through a non-exchange transaction, its cost is its fair value as at the date of acquisition.

Where an item of property and equipment is acquired in exchange for a non-monetary asset or monetary assets, or a combination of monetary and non-monetary assets, the asset acquired is initially measured at fair value (the cost). If the acquired item's fair value was not determinable, its deemed cost is the carrying amount of the asset(s) given up.

When significant components of an item of property and equipment have different useful lives, they are accounted for as separate items (major components) of property and equipment.

Costs include: costs incurred initially to acquire or construct an item of property and equipment; and costs incurred subsequently to add to, replace part of, or service it. If a replacement cost is recognised in the carrying amount of an item of property and equipment, the carrying amount of the replaced part is de-recognised.

Recognition of costs in the carrying amount of an item of property and equipment ceases when the item is in the location and condition necessary for it to be capable of operating in the manner intended by management.

Property and equipment is carried at cost less accumulated depreciation and any impairment losses.

Property and equipment are depreciated on the straight line basis over their expected useful lives to their estimated residual value.

The depreciable amount of an asset is allocated on a systematic basis over its useful life.

Each part of an item of property and equipment with a cost that is significant in relation to the total cost of the item is depreciated separately.

The depreciation method used reflects the pattern in which the asset's future economic benefits or service potential are expected to be consumed by the economic entity. The depreciation method applied to an asset is reviewed at least at each reporting date and, if there has been a significant change in the expected pattern of consumption of the future economic benefits or service potential embodied in the asset, the method is changed to reflect the changed pattern. Such a change is accounted for as a change in an accounting estimate.

The economic entity assesses at each reporting date whether there is any indication that the economic entity's expectations about the residual value and the useful life of an asset have changed since the preceding reporting date. If any such indication exists, the economic entity revises the expected useful life and/or residual value accordingly. The change is accounted for as a change in an accounting estimate.

1.3 Property and equipment (continued)

The depreciation charge for each period is recognised in surplus or deficit unless it is included in the carrying amount of another asset.

Items of property and equipment are de-recognised when the asset is disposed of or when there are no further economic benefits or service potential expected from the use of the asset.

The gain or loss arising from the de-recognition of an item of property and equipment is included in surplus or deficit when the item is de-recognised. The gain or loss arising from the de-recognition of an item of property and equipment is determined as the difference between the net disposal proceeds, if any, and the carrying amount of the item.

1.4 Intangible assets

An asset is identifiable if it either:

- is separable, i.e. is capable of being separated or divided from an entity and sold, transferred, licensed, rented or exchanged, either individually or together with a related contract, identifiable assets or liability, regardless of whether the entity intends to do so; or
- arises from binding arrangements (including rights from contracts), regardless of whether those rights are transferable or separable from the economic entity or from other rights and obligations.

A binding arrangement describes an arrangement that confers similar rights and obligations on the parties to it as if it were in the form of a contract.

An intangible asset is recognised when:

- it is probable that the expected future economic benefits or service potential that are attributable to the asset will flow to the economic entity; and
- the cost or fair value of the asset can be measured reliably.

The economic entity assesses the probability of expected future economic benefits or service potential using reasonable and supportable assumptions that represent management's best estimate of the set of economic conditions that will exist over the useful life of the asset.

Where an intangible asset is acquired through a non-exchange transaction, its initial cost at the date of acquisition is measured at its fair value as at that date.

Intangible assets are carried at cost less any accumulated amortisation and any impairment losses.

An intangible asset is regarded as having an indefinite useful life when, based on all relevant factors, there is no foreseeable limit to the period over which the asset is expected to generate net cash inflows or service potential. Amortisation is not provided for these intangible assets, but they are tested for impairment annually and whenever there is an indication that the asset may be impaired. For all other intangible assets, amortisation is provided on a straight line basis over their useful life.

The amortisation period and the amortisation method for intangible assets are reviewed at each reporting date. Amortisation is provided to write down the intangible assets, on a straight line basis, to their residual values as follows:

Item	Useful life
Computer software	2-3 years

1.5 Investments in controlled entities

Controlling entity financial statements

In the entity's separate financial statements, investments in controlled entities are carried at cost. The entity applies the same accounting method for each category of investment.

The entity recognises a dividend or similar distribution in surplus or deficit in its separate financial statements when its right to receive the dividend or similar distribution is established.

Investments in controlled entities that are accounted for in accordance with the accounting policy on financial instruments in the consolidated financial statements are accounted for in the same way in the controlling entity's separate financial statements.

1.6 Investments in associates

Controlling entity financial statements

An investment in an associate is carried at cost.

The entity applies the same accounting method for each category of investment.

The entity recognises a dividend or similar distribution in surplus or deficit in its separate financial statements when its right to receive the dividend or similar distribution is established.

1.7 Financial instruments

Classification

The entity has the following types of financial assets (classes and category) as reflected on the face of the statement of financial position or in the notes thereto:

Class	Category
Investment in controlled entities	Financial assets at cost
Investment in associates	Financial assets at cost
Other financial assets	Financial assets at cost
Cash and cash equivalents	Financial assets at amortised cost
Loans and receivables	Financial assets at amortised cost

The entity has the following types of financial liabilities (classes and category) as reflected on the face of the statement of financial position or in the notes thereto:

Class	Category
Trade and other payables	Financial liability measured at amortised cost
Finance lease obligation	Financial liability measured at amortised cost

1.7 Financial instruments (continued)

Initial recognition

The entity recognises a financial asset or a financial liability in its statement of financial position when the entity becomes a party to the contractual provisions of the instrument.

The entity recognises financial assets using trade date accounting.

Initial measurement of financial assets and financial liabilities

The entity measures a financial asset and financial liability initially at its fair value plus transaction costs that are directly attributable to the acquisition or issue of the financial asset or financial liability.

The entity first assesses whether the substance of a concessionary loan is in fact a loan. On initial recognition, the entity analyses a concessionary loan into its component parts and accounts for each component separately. The entity accounts for that part of a concessionary loan that is a social benefit in accordance with the framework for the preparation and presentation of financial statements, where it is the issuer of the loan.

Subsequent measurement of financial assets and financial liabilities

The entity measures all financial assets and financial liabilities after initial recognition using the following categories:

- Financial instruments at amortised cost;
- Financial instruments at cost.

All financial assets are subject to an impairment review.

Reclassification

The entity does not reclassify a financial instrument while it is issued or held unless it is:

- a combined instrument that is required to be measured at fair value; or
- an investment in a residual interest that meets the requirements for reclassification.

Gains and losses

For financial assets and financial liabilities measured at amortised cost or cost, a gain or loss is recognised in surplus or deficit when the financial asset or financial liability is de-recognised or impaired, or through the amortisation process.

Impairment and uncollectibility of financial assets

The entity assess at the end of each reporting period whether there is any objective evidence that a financial asset or group of financial assets is impaired. The impairment is calculated on an individual basis, based on historical losses, the financial position of the entity, repayment terms and the commercial viability of the business.

1.7 Financial instruments (continued)

Financial assets measured at amortised cost:

If there is objective evidence that an impairment loss on financial assets measured at amortised cost has been incurred, the amount of the loss is measured as the difference between the asset's carrying amount and the present value of estimated future cash flows (excluding future credit losses that have not been incurred) discounted at the financial asset's original effective interest rate. The carrying amount of the asset is reduced through the use of an allowance account. The amount of the loss is recognised in surplus or deficit.

If, in a subsequent period, the amount of the impairment loss decreases and the decrease can be related objectively to an event occurring after the impairment was recognised, the previously recognised impairment loss is reversed by adjusting an allowance account. The reversal does not result in a carrying amount of the financial asset that exceeds what the amortised cost would have been had the impairment not been recognised at the date the impairment is reversed. The amount of the reversal is recognised in surplus or deficit.

Financial assets measured at cost:

If there is objective evidence that an impairment loss has been incurred on an investment in a residual interest that is not measured at fair value because its fair value cannot be measured reliably, the amount of the impairment loss is measured as the difference between the carrying amount of the financial asset and the present value of estimated future cash flows discounted at the current market rate of return for a similar financial asset. Such impairment losses are not reversed.

De-recognition

Financial assets

The entity de-recognises financial assets using trade date accounting. The entity de-recognises a financial asset only when:

- the contractual rights to the cash flows from the financial asset expire, are settled or waived; or
- the entity transfers, to another party, substantially all of the risks and rewards of ownership of the financial asset.

On the de-recognition of a financial asset in its entirety, the difference between the carrying amount and the sum of the consideration received is recognised in surplus or deficit.

If a transfer does not result in de-recognition because the entity has retained substantially all the risks and rewards of ownership of the transferred asset, the entity continues to recognise the transferred asset in its entirety and recognise a financial liability for the consideration received. In subsequent periods, the entity recognises any revenue on the transferred asset and any expense incurred on the financial liability. Neither the asset and the associated liability, nor the revenue and the associated expenses are offset.

Financial liabilities

The entity de-recognises a financial liability (or a part of a financial liability) from its statement of financial position when it is extinguished – i.e. when the obligation specified in the contract is discharged, cancelled, expires or waived.

The difference between the carrying amount of a financial liability (or part of a financial liability) extinguished or transferred to another party and the consideration paid, including any non-cash assets transferred or liabilities assumed, is recognised in surplus or deficit. Any liabilities that are waived, forgiven or assumed by another entity by way of a non-exchange transaction are accounted for in accordance with the standards of GRAP on revenue from non-exchange

1.7 Financial instruments (continued)

transactions (taxes and transfers).

Presentation

Interest relating to a financial instrument or a component that is a financial liability is recognised as revenue or expense in surplus or deficit.

Dividends or similar distributions relating to a financial instrument or a component that is a financial liability is recognised as revenue or expense in surplus or deficit.

Losses and gains relating to a financial instrument or a component that is a financial liability is recognised as revenue or expense in surplus or deficit.

Distributions to holders of residual interests are recognised by the entity directly in net assets. Transaction costs incurred on residual interests are accounted for as a deduction from net assets.

A financial asset and a financial liability are offset and the net amount presented in the statement of financial position only when the entity has a legally enforceable right to set off the recognised amounts and intends either to settle on a net basis, or to realise the asset and settle the liability simultaneously.

In accounting for a transfer of a financial asset that does not qualify for de-recognition, the entity does not offset the transferred asset and the associated liability.

1.8 Leases

A lease is classified as a finance lease if it transfers substantially all the risks and rewards incidental to ownership. A lease is classified as an operating lease if it does not transfer substantially all the risks and rewards incidental to ownership.

When a lease includes both land and building elements, the entity assesses the classification of each element separately.

Finance leases – lessee

Finance leases are recognised as assets and liabilities in the statement of financial position at amounts equal to the fair value of the leased property or, if lower, the present value of the minimum lease payments.

The discount rate used in calculating the present value of the minimum lease payments is the interest rate implicit in the lease.

Minimum lease payments are apportioned between the finance charge and reduction of the outstanding liability. The finance charge is allocated to each period during the lease term so as to produce a constant periodic rate on the remaining balance of the liability.

Operating leases – lessor

Operating lease revenue is recognised as revenue on a straight line basis over the lease term.

Initial direct costs incurred in negotiating and arranging operating leases are added to the carrying amount of the leased asset and recognised as an expense over the lease term on the same basis as the lease revenue.

1.8 Leases (continued)

Income for leases is disclosed under revenue in statement of financial performance.

Operating leases – lessee

Operating lease payments are recognised as an expense on a straight-line basis over the lease term. The difference between the amounts recognised as an expense and the contractual payments are recognised in the statement of financial position as an operating lease asset or liability.

1.9 Impairment of cash-generating assets

Cash-generating assets are assets used with the objective of generating a commercial return. Commercial return means that positive cash flows are expected to be significantly higher than the cost of the asset.

Impairment is a loss in the future economic benefits or service potential of an asset, over and above the systematic recognition of the loss of the asset's future economic benefits or service potential through depreciation (amortisation).

The carrying amount is the amount at which an asset is recognised in the statement of financial position after deducting any accumulated depreciation and accumulated impairment losses thereon.

A cash-generating unit is the smallest identifiable group of assets used with the objective of generating a commercial return that generates cash inflows from continuing use that are largely independent of the cash inflows from other assets or groups of assets.

Costs of disposal are incremental costs directly attributable to the disposal of an asset, excluding finance costs and income tax expense.

Depreciation (amortisation) is the systematic allocation of the depreciable amount of an asset over its useful life.

Fair value less costs to sell is the amount obtainable from the sale of an asset in an arm's length transaction between knowledgeable, willing parties, less the costs of disposal.

The recoverable amount of an asset or a cash-generating unit is the higher of its fair value less costs to sell and its value in use.

Useful life is either:

- the period of time over which an asset is expected to be used by the economic entity; or
- the number of production or similar units expected to be obtained from the asset by the economic entity.

Value in use

Value in use of a cash-generating asset is the present value of the estimated future cash flows expected to be derived from the continuing use of an asset and from its disposal at the end of its useful life.

When estimating the value in use of an asset, the economic entity estimates the future cash inflows and outflows to be derived from the continuing use of the asset and from its ultimate disposal, and the economic entity applies the appropriate discount rate to those future cash flows.

1.10 Budget information

The economic entity is typically subject to budgetary limits in the form of appropriations or budget authorisations, which is given effect through authorising appropriation via a vote.

General purpose financial reporting by the economic entity shall provide information on whether resources were obtained and used in accordance with the legally adopted budget. The standard applies to entities that are required or elect to make publicly available their approved budgets; in the economic entity's case, this principle applies only to the budget of the controlled entity.

The approved budget is prepared on an accrual basis and presented by economic classification. The approved budget covers the financial period from 1 April 2018 to 31 March 2019.

The financial statements and the budget are on the same basis of accounting therefore a comparison with the budgeted amounts for the reporting period have been included in the statement of comparison of budget and actual amounts.

1.11 Related parties

A related party is a person or an entity with the ability to control or jointly control the other party, or exercise significant influence over the other party, or vice versa, or an entity that is subject to common control or joint control.

Control is the power to govern the financial and operating policies of an entity so as to obtain benefits from its activities.

A related-party transaction is a transfer of resources, services or obligations between the reporting entity and a related party, regardless of whether a price is charged.

Significant influence is the power to participate in the financial and operating policy decisions of an entity, but is not control over those policies.

Management are those persons responsible for planning, directing and controlling the activities of the economic entity, including those charged with the governance of the economic entity in accordance with legislation, in instances where they are required to perform such functions.

Close members of the family of a person are considered to be those family members who may be expected to influence, or be influenced by, that management in their dealings with the economic entity.

The economic entity is exempt from disclosure requirements in relation to related-party transactions if that transaction occurs within normal supplier and/or client/recipient relationships on terms and conditions no more or less favourable than those which it is reasonable to expect the economic entity to have adopted if dealing with that individual entity or person in the same circumstances, and terms and conditions are within the normal operating parameters established by that reporting entity's legal mandate.

Where the economic entity is exempt from the disclosures in accordance with the above, the economic entity discloses narrative information about the nature of the transactions and the related outstanding balances to enable users of the entity's financial statements to understand the effect of related party transactions on its financial statements.

1.12 Employee benefits

Employee benefits are all forms of consideration given by an entity in exchange for services rendered by employees. Termination benefits are employee benefits payable as a result of either:

- an entity's decision to terminate an employee's employment before the normal retirement date; or
- an employee's decision to accept voluntary redundancy in exchange for those benefits.

Short-term employee benefits

Short-term employee benefits are employee benefits (other than termination benefits) that are due to be settled within 12 months after the end of the period in which the employees render the related service.

Short-term employee benefits include items such as:

- wages and salaries;
- short-term compensated absences (such as paid annual leave and paid sick leave) where the compensation for the absences is due to be settled within 12 months after the end of the reporting period in which the employees render the related employee service;
- bonus, incentive and performance related payments payable within 12 months after the end of the reporting period in which the employees render the related service; and
- non-monetary benefits (for example, medical care, and free or subsidised goods or services such as housing, cars and cellphones) for current employees.

The expected cost of compensated absences is recognised as an expense as the employees render services that increase their entitlement or, in the case of non-accumulating absences, when the absence occurs. The entity measures the expected cost of accumulating compensated absences as the additional amount that the entity expects to pay as a result of the unused entitlement that has accumulated at the reporting date.

The entity recognises the expected cost of bonus, incentive and performance-related payments as accruals when the entity has a present legal or constructive obligation to make such payments as a result of past events and a reliable estimate of the obligation can be made. A present obligation exists when the entity has no realistic alternative but to make the payments.

Post-employment benefits: Defined contribution plans

Defined contribution plans are post-employment benefit plans under which an entity pays fixed contributions into a separate entity (a fund) and will have no legal or constructive obligation to pay further contributions if the fund does not hold sufficient assets to pay all employee benefits relating to employee service in the current and prior periods. The entity contributes to a pension fund under this definition.

1.13 Contingencies

Contingent assets and contingent liabilities are not recognised in the statement of financial position, but are disclosed as a note to the financial statements.

1.14 Revenue from exchange transactions

Revenue is the gross inflow of economic benefits or service potential during the reporting period when those inflows result in an increase in net assets, other than increases relating to contributions from owners.

1.14 Revenue from exchange transactions (continued)

Exchange transactions are transactions in which one entity receives assets or services, or has liabilities extinguished, and directly gives approximately equal value (primarily in the form of cash, goods, services or use of assets) to another entity in exchange.

Fair value is the amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties in an arm's length transaction.

Revenue from exchange transactions includes interest, royalties and dividends earned, as well as profit on sale of assets.

Measurement

Revenue is measured at the fair value of the consideration received or receivable, the net of trade discounts and the volume of rebates.

Interest, royalties and dividends

Revenue arising from the use by others of entity's assets yielding interest, royalties and dividends is recognised when:

- it is probable that the economic benefits or service potential associated with the transaction will flow to the entity; and
- the amount of the revenue can be measured reliably.

Interest is recognised, in surplus or deficit, using the effective interest method.

Royalties are recognised in surplus or deficit, as they are earned in accordance with the substance of the relevant agreements.

Dividends or their equivalents are recognised, in surplus or deficit, when the entity's right to receive payment has been established.

1.15 Revenue from non-exchange transactions

Revenue comprises gross inflows of economic benefits or service potential received and receivable by an entity, which represents an increase in net assets, other than increases relating to contributions from owners.

Conditions on transferred assets are stipulations that specify that the future economic benefits or service potential embodied in the asset is required to be consumed by the recipient as specified, or future economic benefits or service potential must be returned to the transferor.

Control of an asset arises when the entity can use or otherwise benefit from the asset in pursuit of its objectives, and can exclude or otherwise regulate the access of others to that benefit.

Exchange transactions are transactions in which one entity receives assets or services, or has liabilities extinguished, and directly gives approximately equal value (primarily in the form of cash, goods, services, or use of assets) to another entity in exchange.

Non-exchange transactions are transactions that are not exchange transactions. In a non-exchange transaction, an entity either receives value from another entity without directly giving approximately equal value in exchange, or gives value to another entity without directly receiving approximately equal value in exchange.

1.15 Revenue from non-exchange transactions (continued)

Restrictions on transferred assets are stipulations that limit or direct the purposes for which a transferred asset may be used, but do not specify that future economic benefits or service potential is required to be returned to the transferor if not deployed as specified.

Stipulations on transferred assets are terms in laws or regulation, or a binding arrangement, imposed upon the use of a transferred asset by entities external to the reporting entity.

Transfers are inflows of future economic benefits or service potential from non-exchange transactions, other than taxes.

Recognition

An inflow of resources from a non-exchange transaction recognised as an asset is recognised as revenue, except to the extent that a liability is also recognised in respect of the same inflow.

As the entity satisfies a present obligation recognised as a liability in respect of an inflow of resources from a non-exchange transaction recognised as an asset, it reduces the carrying amount of the liability recognised and recognises an amount of revenue equal to that reduction.

Measurement

Revenue from a non-exchange transaction is measured at the amount of the increase in net assets recognised by the entity.

When, as a result of a non-exchange transaction, the entity recognises an asset, it also recognises revenue equivalent to the amount of the asset measured at its fair value as at the date of acquisition, unless it is also required to recognise a liability. Where a liability is required to be recognised, it will be measured as the best estimate of the amount required to settle the obligation at the reporting date, and the amount of the increase in net assets, if any, recognised as revenue. When a liability is subsequently reduced, because of a taxable event or a condition is satisfied, the amount of the reduction in the liability is recognised as revenue.

1.16 Investment income

Investment income is recognised on a time-proportion basis using the effective interest method.

1.17 Finance costs

Borrowing costs are interest and other expenses incurred by an entity in connection with the borrowing of funds. Borrowing costs are recognised as an expense in the period in which they are incurred.

1.18 Irregular and fruitless and wasteful expenditure

Irregular expenditure means expenditure incurred in contravention of, or not in accordance with, requirements of any applicable legislation, including the PFMA.

Fruitless and wasteful expenditure means expenditure that was made in vain and would have been avoided had reasonable care been exercised.

All irregular and fruitless and wasteful expenditure are charged against the respective class of expenditure in the statement of financial performance in the period in which they are incurred and disclosed in a note in the period in which it is identified.

1.19 Segment information

A segment is an activity of an entity:

- that generates economic benefits or service potential (including economic benefits or service potential relating to transactions between activities of the same entity);
- whose results are regularly reviewed by management to make decisions about resources to be allocated to that activity and in assessing its performance; and
- for which separate financial information is available.

Reportable segments are the actual segments reported on in the segment report. They are the segments identified above or alternatively an aggregation of two or more of those segments where the aggregation criteria are met.

2. Trade and other receivables

	Economic entity		Controlling entity	
	2019 R'000	2018 R'000	2019 R'000	2018 R'000
Trade receivables	1,472	767	1,472	767
Deposits	323	322	323	322
Other receivables	96	414	96	414
	1,891	**1,503**	**1,891**	**1,503**

Fair value of trade and other receivables

The entity is of the opinion that the carrying value approximates the fair value of trade and other receivables at the end of the period, due to the short-term nature of these balances.

Trade and other receivables past due but not impaired.

Trade and other receivables that are less than three months past due are not considered to be impaired.

The ageing of amounts past due but not impaired is as follows:

Three months past due	-	75	-	75

Trade and other receivables impaired

The amount of the provision for impairment is R1,062,489 as of 31 March 2019 (2018: R533,168).

The ageing of these balances is as follows:

3 to 6 months	1,062	-	1,062	-
More than 6 months	-	322	-	322

Reconciliation of provision for impairment of trade and other receivables

Opening balance	533	322	533	322
Provision for impairment	531	224	531	224
Amounts written off as uncollectable	(2)	(13)	(2)	(13)
	1,062	**533**	**1,062**	**533**

The creation and release of the provision for impaired receivables has been included in operating expenses in the Statement of Financial Performance. Amounts charged to the allowance account are generally written off when the recovery of such amounts is improbable.

No collateral is held as security.

3. Cash and cash equivalents

Cash and cash equivalents consist of:

Cash on hand	20	19	20	19
Bank balances	169,222	128,907	166,891	126,645
	169,242	**128,926**	**166,911**	**126,664**

The entity is of the opinion that the carrying value approximates the fair value of cash and cash equivalents at the end of the period, due to the short-term nature of the balance.

4. Property and equipment

Economic entity	2019 Cost	2019 Accumulated depreciation /impairment	2019 Carrying value	2018 Cost	2018 Accumulated depreciation /impairment	2018 Carrying value
Land and buildings	-	-	-	2,700	(1,000)	1,700
Furniture and office equipment	30,667	(19,287)	11,380	28,165	(15,498)	12,667
Motor vehicles	371	(227)	144	303	(201)	102
Leasehold improvements	6,989	(6,721)	268	6,483	(4,226)	2,257
Other property and equipment	-	-	-	15	(15)	-
Laboratory equipment	10,944	(7,561)	3,383	10,311	(6,536)	3,775
Total	**48,971**	**(33,796)**	**15,175**	**47,977**	**(27,476)**	**20,501**

Controlling entity	2019 Cost	2019 Accumulated depreciation /impairment	2019 Carrying value	2018 Cost	2018 Accumulated depreciation /impairment	2018 Carrying value
Land and buildings	-	-	-	2,700	(1,000)	1,700
Furniture and office equipment	30,667	(19,287)	11,380	28,023	(15,356)	12,667
Motor vehicles	371	(227)	144	299	(197)	102
Leasehold improvements	6,989	(6,721)	268	6,483	(4,226)	2,257
Laboratory equipment	10,944	(7,561)	3,383	10,311	(6,536)	3,775
Total	**48,971**	**(33,796)**	**15,175**	**47,816**	**(27,315)**	**20,501**

Reconciliation of property and equipment – Economic entity (2019)

	Opening balance	Additions	Disposals	Other changes, movements	Depreciation	Closing balance
Land and buildings	1,700	-	(1,700)	-	-	-
Furniture and office equipment	12,667	3,778	(27)	166	(5,204)	11,380
Motor vehicles	102	71	-	-	(29)	144
Leasehold improvements	2,257	506	-	-	(2,495)	268
Laboratory equipment	3,775	790	-	-	(1,182)	3,383
	20,501	**5,145**	**(1,727)**	**166**	**(8,910)**	**15,175**

Reconciliation of property and equipment – Economic entity (2018)

	Opening balance	Additions	Disposals	Other changes	Depreciation	Impairment loss	Closing balance
Land and buildings	3,431	-	-	(731)	-	(1,000)	1,700
Furniture and office equipment	15,617	2,177	(260)	(186)	(4,681)	-	12,667
Motor vehicles	128	-	-	-	(26)	-	102
Leasehold improvements	1,066	2,652	-	-	(1,461)	-	2,257
Laboratory equipment	5,243	270	(107)	(170)	(1,461)	-	3,775
	25,485	**5,099**	**(367)**	**(1,087)**	**(7,629)**	**(1,000)**	**20,501**

4. Property and equipment (continued)

Reconciliation of property and equipment – Controlling entity (2019)

	Opening balance	Additions	Disposals	Other changes, movements	Depreciation	Closing balance
Land and buildings	1,700	-	(1,700)	-	-	-
Furniture and office equipment	12,667	3,778	(27)	166	(5,204)	11,380
Motor vehicles	102	71	-	-	(29)	144
Leasehold improvements	2,257	506	-	-	(2,495)	268
Laboratory equipment	3,775	790	-	-	(1,182)	3,383
	20,501	**5,145**	**(1,727)**	**166**	**(8,910)**	**15,175**

Reconciliation of property and equipment – Controlling entity (2018)

	Opening balance	Additions	Disposals	Depreciation	Impairment loss	Closing balance
Land and buildings	2,700	-	-	-	(1,000)	1,700
Furniture and office equipment	15,431	2,177	(260)	(4,681)	-	12,667
Motor vehicles	128	-	-	(26)	-	102
Leasehold improvements	1,066	2,652	-	(1,461)	-	2,257
Laboratory equipment	5,073	270	(107)	(1,461)	-	3,775
	24,398	**5,099**	**(367)**	**(7,629)**	**(1,000)**	**20,501**

Pledged as security

None of the assets above have been pledged as security or have restrictions on title.

The carrying value of assets included in furniture and office equipment under finance leases: R532,000 (2018: R134,235). (See note 10)

Depreciation related to the Technology Platform Programme is included in project expenditure.

Depreciation rates

Item	Depreciation method	Average useful life
Furniture and office equipment	Straight line	2-13 years
Motor vehicles	Straight line	2-12 years
Leasehold improvements	Straight line	Shorter of the period of the lease agreement or the useful life
Laboratory equipment	Straight line	5-10 years

5. Intangible assets

	2019			2018		
Economic entity	Cost	Accumulated amortisation /impairment	Carrying value	Cost	Accumulated amortisation /impairment	Carrying value
Computer software	10,496	(7,062)	3,434	8,213	(5,040)	3,173

	2019			2018		
Controlling entity	Cost	Accumulated amortisation /impairment	Carrying value	Cost	Accumulated amortisation /impairment	Carrying value
Computer software	10,496	(7,062)	3,434	8,182	(5,009)	3,173

Reconciliation of intangible assets – Economic entity (2019)

	Opening balance	Additions	Amortisation	Total
Computer software	3,173	2,314	(2,053)	3,434

Reconciliation of intangible assets – Economic entity (2018)

	Opening balance	Additions	Other changes, movements	Amortisation	Total
Computer software	3,459	1,807	(37)	(2,056)	3,173

Reconciliation of intangible assets – Controlling entity (2019)

	Opening balance	Additions	Amortisation	Total
Computer software	3,173	2,314	(2,053)	3,434

Reconciliation of intangible assets – Controlling entity (2018)

	Opening balance	Additions	Amortisation	Total
Computer software	3,422	1,807	(2,056)	3,173

Restricted title

None of the above intangible assets have restrictions in title or have been pledged as security.

6. Investments in controlled entities

Name of company	Reporting period end	% holding 2019	% holding 2018	Carrying amount 2019	Carrying amount 2018
Active investments					
Bio2Biz (Pty) Ltd	31 Dec	58.75 %	58.75 %	-	-
Investments in deregistration/liquidation					
Capelands Nurseries (Pty) Ltd	31 Mar	100.00 %	100.00 %	-	-
Ithemba Pharmaceuticals (Pty) Ltd	31 Dec	50.10 %	50.10 %	-	-
Natural Carotenoids South Africa (Pty) Ltd	31 Jul	98.83 %	98.83 %	-	-
				-	-

6. Investments in controlled entities (continued)

The carrying amounts of controlled entities are shown net of impairment losses.

Controlled entities with different reporting dates from that of the controlling entity

Some of the controlled entities have reporting dates that differ from the controlling entity. If the reporting date is within three months of the reporting period of the controlling entity, the Annual Financial Statements for that period were used in consolidating the results of the entity. The management accounts for the entities were reviewed in order to ensure that no significant changes took place between the reporting date and 31 March 2019.

Where the reporting dates differ by more than three months, a review of the financial affairs of the entity is performed up to the reporting date of the controlling entity and this is used for consolidation purposes.

7. Investments in associates

Name of entity	Reporting period end	% holding 2019	% holding 2018	Carrying amount 2019	Carrying amount 2018	Fair value 2019	Fair value 2018
Active Investments							
Life Assay Diagnostics (Pty) Ltd	28 Feb	26.00 %	26.00 %	-	-	1,085	-
Ribotech (Pty) Ltd	31 Aug	35.00 %	35.00 %	-	-	-	-
Tenacent SA (Pty) Ltd	28 Feb	20.00 %	20.00 %	-	-	-	-
Investments in deregistration/ liquidation							
Bio Career Technology (Pty) Ltd	28 Feb	51.00 %	51.00 %	-	-	-	-
Commercial Aquaculture (Pty) Ltd	28 Feb	34.00 %	34.00 %	-	-	-	-
Control Maze (Pty) Ltd	28 Feb	51.00 %	51.00 %	-	-	-	-
Edgi Tech (Pty) Ltd	28 Feb	26.00 %	26.00 %	-	-	-	-
Eyeborn (Pty) Ltd	31 Mar	25.00 %	25.00 %	-	-	-	-
Femtech (Pty) Ltd	28 Feb	69.00 %	69.00 %	-	-	-	-
Geratech Zirconium Benefication (Pty) Ltd	28 Feb	34.00 %	34.00 %	-	-	-	-
Mycoroot (Pty) Ltd	28 Feb	25.00 %	25.00 %	-	-	-	-
Niocad (Pty) Ltd	28 Feb	22.00 %	22.00 %	-	-	-	-
Nkomazi Chemicals (Pty) Ltd	30 Jun	35.74 %	35.74 %	-	-	-	-
Silverlake Trading (Pty) Ltd	28 Feb	28.00 %	28.00 %	-	-	-	-
Stellenbosch Wind Energy Technologies (Pty) Ltd	31 Mar	26.00 %	26.00 %	-	-	-	-
				-	**-**	**1,085**	**-**

The carrying amounts of investments in associates are shown net of impairment losses.

Although the controlling entity holds more than 50% of the voting powers in some of the entities, the investment is not considered a controlled entity because the controlling entity does not have control over the entity due to voting rights/the appointment powers of directors. These investments are therefore classified as investments in associates.

7. Investments in associates (continued)

	Economic entity		Controlling entity	
	2019 R'000	2018 R'000	2019 R'000	2018 R'000

Movements in carrying value

Opening balance	-	5,605	-	3,013
Share of surplus	1,085	130	-	-
Sale of investment in associate	-	(5,735)	-	(3,013)
	1,085	**-**	**-**	**-**

Principal activities

Legal name	Principal activity
LifeAssay Diagnostics (Pty) Ltd	Manufacturer of vitro diagnostics test kits
Ribotech (Pty) Ltd	Manufacturing of rHOG-CSF. Product is used in cancer treatment
Tenacent (Pty) Ltd	Development and sales of technical devices for the control of containers

All the above entities are incorporated in South Africa.

Summary of controlling entity's interest in associates

Total assets	30,515	22,871
Total liabilities	(156,001)	(153,208)
Net liabilities	**(125,486)**	**(130,337)**
Revenue	40,865	4,300
Deficit	(3,111)	(10,165)

Associates with different reporting dates

A number of associate entities have reporting dates that differ from that of the controlling entity. If the reporting date is within three months period of the reporting period end of the controlling entity, the Annual Financial Statements for that period were used in the results of the entity using equity accounting. The management accounts for the entities were reviewed in order to ensure that no significant changes took place between reporting date and 31 March 2019.

Unrecognised share of losses of associates

The economic entity has discontinued recognising its share of the deficit of associate companies, as the investment is held at R0 and the economic entity has no obligation for any deficit of the associate. The total unrecognised deficit for the current period amounts to R1,690,376 (2018: R3,697,116). The accumulated unrecognised deficit to date amounts to R57,449,873 (2018: R55,269,373).

8. Loans and receivables

Other entities

Agriprotein (Pty) Ltd	15,631	-	15,631	-
The loan has fixed monthly interest accrues at prime				
GeoAxon Holdings (Pty) Ltd	1,484	-	1,484	-
The loan has fixed monthly interest that accrues at 15,5%				
Synexa (Pty) Ltd	4,856	5,734	4,856	5,734
This loan has fixed quarterly repayment terms over a period of 6 years and accrues interest at prime				
Short-term portion of long-term loans	(6,055)	(1,389)	(6,055)	(1,389)
	15,916	**4,345**	**15,916**	**4,345**

Carrying amounts of loans and receivables are shown net of impairment losses.

8. Loans and receivables (continued)

	Economic entity		Controlling entity	
	2019 R'000	2018 R'000	2019 R'000	2018 R'000

Loans to associates and other entities impaired

As at 31 March 2019, loans to associates and other entities of R150,417,691 (2018: R163,653,818) were impaired and provided for. The movement from the prior year to the current year includes the sale of previously impaired investee companies as well as current year impairment.

The creation and release of provision for impaired receivables has been included in operating expenses in the Statement of Financial Performance. Amounts charged to the allowance account are generally written off when the recovery of such amounts is improbable.

The economic entity does not hold collateral as security.

9. Other financial assets

The Biologicals and Vaccines Institute of SA (Pty) Ltd *12,5% shareholding*	26,300	26,300	26,300	26,300

10. Finance lease obligation

Minimum lease payments due				
- within one year	234	134	234	134
- in second to fifth year inclusive	298	-	298	-
	532	**134**	**532**	**134**
Present value of minimum lease payments	532	134	532	134
Present value of minimum lease payments due				
- within one year	234	134	234	134
- in second to fifth year inclusive	298	-	298	-
	532	**134**	**532**	**134**

It is the economic entity's policy to lease certain office equipment under finance leases.

The average lease term is three years and the average effective borrowing rate is 0% (2018: 0%).

11. Trade and other payables

Trade payables	19,577	16,120	19,174	15,372
Employee-related accruals	9,485	9,468	9,485	9,468
Other payables	32,768	482	32,768	482
	61,830	**26,070**	**61,427**	**25,322**

12. Committed conditional grants and receipts

	Economic entity		Controlling entity	
	2019 R'000	2018 R'000	2019 R'000	2018 R'000
Committed conditional grant balances comprise:				
Unspent conditional grants and receipts				
Advanced manufacturing technology strategy	-	3,531	-	3,531
Africa programme	3,763	1,729	3,763	1,729
Agriculture Bio-economy Partnership Programme	10,396	5,585	10,396	5,585
Bio-entrepreneurship programme	-	45	-	45
Bio fuels	-	3,869	-	3,869
Biosafety communication strategy	8	1,044	8	1,044
Fibrelux technology diffusion initiative	33	30	33	30
Forest Molecular Genetics Programme	64	4,034	64	4,034
ICT flagship programme	3,000	3,000	3,000	3,000
Innovation bridge	221	1,796	221	1,796
Innovation for Inclusive Development	34,785	31,450	34,785	31,450
Joint technology innovation programme	1,200	-	1,200	-
Limpopo agri-food technology station	115	107	115	107
Nuclear medicine	2,000	-	2,000	-
South African BioDesign Initiative	21,316	24,083	21,316	24,083
Strategic Industrial Bio-Innovation Programme	680	-	680	-
Social innovation housing	-	202	-	202
Sugarcane research projects	2,265	2,108	2,265	2,108
Technology Stations Programme	1,274	5,522	1,274	5,522
Technology stations expansion programme	-	137	-	137
	81,120	**88,272**	**81,120**	**88,272**

13. Revenue from non-exchange transactions

DST allocation received during the year	420,322	396,732	420,322	396,732
Committed conditional grant funding recognised for:				
Africa programme	1,205	628	1,205	628
Agricultural Bio-economy Partnership Programme	15,909	-	15,909	-
Bio-entrepeneurship programme	-	10	-	10
Biosafety communication strategy	336	297	336	297
CHUMA (NRF Newton Fund)	-	505	-	505
Forest Molecular Genetics Programme	6,688	-	6,688	-
Innovation bridge	(132)	2,735	(132)	2,735
Innovation for Inclusive Development	10,682	1,707	10,682	1,707
South African BioDesign Initiative	4,490	3,333	4,490	3,333
Seed Fund Programme	-	15,312	-	15,312
Social housing programme	215	-	215	-
Strategic Industrial Bio-Innovation Programme	8,360	-	8,360	-
Technology Stations Programme	62,342	44,864	62,342	44,864
	530,417	**466,123**	**530,417**	**466,123**

14. Other income

	Economic entity		Controlling entity	
	2019 R'000	2018 R'000	2019 R'000	2018 R'000
Royalties received	1,291	1,362	1,291	1,362
Sundry receipts	438	218	438	218
EWSETA funding received	2,865	-	2,865	-
Reversal of provision	14,939	4,661	14,939	4,661
UNIDO funding received	-	1,073	-	1,073
	19,533	**7,314**	**19,533**	**7,314**

15. Investment income

Interest received				
Interest earned – Loans and receivables	5,254	1,943	5,254	1,943
Interest earned – Bank	10,393	10,201	10,321	10,129
	15,647	**12,144**	**15,575**	**12,072**

16. Employee-related costs

Remuneration	97,535	91,438	97,535	91,438
Defined contribution plans	7,552	7,279	7,552	7,279
	105,087	**98,717**	**105,087**	**98,717**

Employee costs for the internal technology platforms are included in project funding expenditure disclosed in note 17.

17. Project funding expenditure

Project grants – third party	369,730	309,123	369,730	309,123
Project funding expenditure is made up of the following:				
Technology development	106,699	92,435	106,699	92,435
Technology Innovation Cluster Programme	22,155	13,781	22,155	13,781
Technology Station Programme	100,543	98,617	100,543	98,617
Technology Platform Programme	66,534	51,034	66,534	51,034
Youth Technology Innovation Programme	2,171	4,695	2,171	4,695
Seed fund programme	38,530	35,259	38,530	35,259
Innovation skills development programme	12,700	6,266	12,700	6,266
Thought leadership	3,630	3,831	3,630	3,831
Other	-	869	-	869
Global Cleantech Innovation Programme	4,879	-	4,879	-
Innovation for Inclusive Development	10,684	1,708	10,684	1,708
Africa programme	1,205	628	1,205	628
	369,730	**309,123**	**369,730**	**309,123**

18. Impairment

Impairment of property and equipment	-	1,000	-	1,000
Impairment of financial assets at amortised cost	533	223	533	223
	533	**1,223**	**533**	**1,223**

19. Other operating expenses

	Economic entity		Controlling entity	
	2019 R'000	2018 R'000	2019 R'000	2018 R'000
Other operating expenses include expenditure such as:				
Auditor's remuneration	568	1,319	568	1,319
Cleaning	629	468	629	468
Consulting and professional fees	10,135	8,173	10,135	8,239
IT expenses	5,843	5,457	5,843	5,457
Marketing	3,081	1,409	3,081	1,409
Placement fees	1,481	801	1,481	801
Security	1,154	1,290	1,154	1,290
Staff welfare	636	1,064	636	1,064
Telephone and fax	911	758	911	758
Training	5,602	4,210	5,602	4,210
Travel and accommodation	8,972	7,309	8,972	7,309
Electricity	1,573	1,425	1,573	1,425
Subscription and certification costs	3,277	2,898	3,277	2,898
Sponsorships	2,332	60	2,332	60

20. Taxation

The controlling entity is exempt from income tax in terms of the provisions of section 10(1)(cA)(i) of the Income Tax Act (1999).

21. Net cash flows used in operating activities

Deficit	**23,551**	**9,490**	**22,053**	**22,624**
Adjustments for:				
Depreciation and amortisation	10,963	9,683	10,963	9,683
Loss on foreign exchange	-	132	-	-
Profit from equity accounted investments	(1,085)	(130)	-	-
Assets written off	1,561	(1,124)	1,561	-
Loss/(profit) on sale of investments	-	9,717	-	(3,683)
Impairment	533	1,223	533	1,223
Reversal of provision	(15,301)	(4,661)	(15,301)	(4,661)
Interest on loan accounts	(5,254)	(1,780)	(5,254)	(1,780)
Changes in working capital:				
Trade and other receivables	(390)	4,388	(390)	1,703
Prepayments	563	768	563	768
Trade and other payables	35,999	(5,926)	36,341	(3,490)
	51,138	**21,780**	**51,069**	**22,387**

22. Related parties

	Economic entity		Controlling entity	
	2019 R'000	2018 R'000	2019 R'000	2018 R'000

Relationships

Members	Refer to members' report note
Controlled entities	Refer to note 6
Associates	Refer to note 7
National department	Department of Science and Technology
National government business enterprises	Council for Scientific and Industrial Research
National public entities	Agricultural Research Council/Onderstepoort Medical Research Council of South Africa

Related party balances

Commitments with related parties				
Department of Science and Technology			(32,535)	-
Committed conditional grants				
Department of Science and Technology			(81,120)	(88,272)

Related party transactions

Royalties received from related parties				
TIA – Royalties received from associates			-	(346)
Allocations received				
TIA – Department of Science and Technology			(526,680)	(489,183)
Project funds returned				
TIA – Department of Science and Technology			10,024	-
Transactions with				
TIA – Council for Scientific and Industrial Research			16,584	19,228
TIA – Agricultural Research Council			-	13,354
TIA – Medical Research Council of South Africa			4,451	-

23. Members' emoluments

Executive: 2019	Emoluments R '000	Bonus R '000	Allowances* R '000	Total R '000
Mr B Manilal (CEO)	3,012	-	15	3,027
Mr W van der Merwe	2,348	324	26	2,698
Ms S Pillay (Acting)	964	152	156	1,272
Mr V Skosana (Acting)	1,087	141	160	1,388
Ms M Matlolane (Acting)	1,260	175	191	1,626
Ms J Hechter (Acting)	1,250	198	184	1,632
	9,921	**990**	**732**	**11,643**

* Allowances include the following: Cellphone, car, acting, travel and subsistence.

23. Members' emoluments (continued)

Executive: 2018	Emoluments R '000	Bonus R '000	Allowances* R '000	Total R '000
Mr B Manilal (CEO)	2,876	233	4	3,113
Mr W van der Merwe	2,207	182	20	2,409
Ms F Pienaar	1,745	141	1	1,887
Dr BM Sehlapelo	1,717	-	4	1,721
Ms B Lue-Marais (until 30/09/2017)	889	-	-	889
Ms S Pillay (Acting since 01/10/2017)	461	-	68	529
Mr V Skosana (Acting since 01/10/2017)	520	-	80	600
Ms M Matloane (Acting since 01/12/2017)	402	-	63	465
Ms J Hechter (Acting since 15/03/2018)	52	-	-	52
	10,869	**556**	**240**	**11,665**

* Allowances include the following: Cellphone, car, acting, travel and subsistence.

Board: 2019	Members' fees R '000	Committees fees R '000	Total R '000
Prof EC Kieswetter	94	-	94
Dr J Coates (resigned on 27/02/2019)	127	7	134
Dr SJ Lennon	92	11	103
Ms F Levy-Hassen	120	4	124
Dr M Madikizela	127	13	140
Ms JSP Matsebula	69	7	76
Dr PL Mlengana	61	-	61
Mr TG Ramasike	133	22	155
Dr J van de Loosdrecht	106	-	106
	929	**64**	**993**

Board: 2018	Members' fees R '000	Committees fees R '000	Total R '000
Ms K Njobe (until 30/04/2017)	10	-	10
Ms H Brown (until 30/04/2017)	8	-	8
Prof D Hildebrandt (until 30/04/2017)	8	-	8
Prof D Kaplan (until 30/04/2017)	13	-	13
Adv M Ralefatane (until 30/04/2017)	5	-	5
Dr P Terblanche (until 30/04/2017)	8	-	8
Prof EC Kieswetter (from 01/05/2017)	60	-	60
Dr J Coates (from 01/05/2017)	71	-	71
Dr S Lennon (from 01/05/2017)	93	-	93
Ms F Levy-Hassen (from 01/05/2017)	-	2	2
Dr M Madikizela (from 01/05/2017)	83	-	83
Prof RD Marcus (from 01/05/2017) (resigned on 07/03/2018)	33	-	33
Ms JSP Matsebula (from 01/05/2017)	64	-	64
Dr PL Mlengana (from 01/05/2017)	45	-	45
Mr TG Ramasike (from 01/05/2017)	99	-	99
Dr J van de Loosdrecht (from 01/05/2017)	86	-	86
	686	**2**	**688**

	Economic entity		Controlling entity	
	2019 R'000	2018 R'000	2019 R'000	2018 R'000

24. Contingencies

Contingent liabilities

Project funding in terms of funding agreements.

Funding agreements	50,410	154,656	50,410	154,656

These agreements will be funded using surplus cash and funds to be allocated in the financial periods in which these agreements become payable.

25. Commitments

Authorised capital expenditure

Already contracted for but not provided for

• Property and equipment	-	781	-	781

Authorised operational expenditure

Already contracted for but not provided for

• Travel	184	-	184	-
• Consultancy	2,424	-	2,424	-
• Other	550	-	550	-
• 2017/18 retained surplus	15,300	-	15,300	-
	18,458	**-**	**18,458**	**-**

Contracted investment expenditure payable within 12 months

• Project funding expenditure	**90,062**	**-**	**90,062**	**-**

Total operational commitments

Already contracted for but not provided for	18,458	-	18,458	-
Contracted investment expenditure payable within 12 months	90,062	-	90,062	-
	108,520	**-**	**108,520**	**-**

Operating leases – as lessee (expense)

Minimum lease payments due

- within one year	10,232	7,627	10,232	7,627
- in second to fifth year inclusive	11,477	1,189	11,477	1,189
	21,709	**8,816**	**21,709**	**8,816**

Operating lease payments represent rentals payable by the economic entity for certain of its offices. Leases are negotiated for an average term of five years and rentals are fixed for an average of three years. No contingent rent is payable.

26. Risk management

Capital risk management

The economic entity's objectives when managing capital is to safeguard its ability to continue as a going concern in order to provide benefits to its stakeholders and to maintain an optimal capital structure to reduce the cost of capital.

The capital structure of the economic entity consists of cash and cash equivalents disclosed in note 3 and reserves as disclosed in the Statement of Financial Position.

There are no externally imposed capital requirements and there were no changes in what the entity does to manage capital.

Financial risk management

The economic entity's activities expose it to a variety of financial risks: market risk (including currency risk, foreign currency risk and cash flow interest rate risk), credit risk and liquidity risk.

Liquidity risk

The economic entity manages liquidity risk through the compilation and monitoring of cash flow forecasts as well as ensuring that there are adequate banking facilities.

The maturity profiles of the financial instruments are summarised as follows:

Economic entity

At 31 March 2019	Less than 1 year R'000	Between 1 and 2 years R'000	Between 2 and 5 years R'000	More than 5 years R'000
Trade and other payables	61,830	-	-	-
Finance lease liability	532	-	-	-

At 31 March 2018	Less than 1 year R'000	Between 1 and 2 years R'000	Between 2 and 5 years R'000	More than 5 years R'000
Trade and other payables	26,070	-	-	-
Finance lease liability	134	-	-	-

Controlling entity

At 31 March 2019	Less than 1 year R'000	Between 1 and 2 years R'000	Between 2 and 5 years R'000	More than 5 years R'000
Trade and other payables	61,427	-	-	-
Finance lease liability	532	-	-	-

At 31 March 2018	Less than 1 year R'000	Between 1 and 2 years R'000	Between 2 and 5 years R'000	More than 5 years R'000
Trade and other payables	25,322	-	-	-
Finance lease liability	134	-	-	-

26. Risk management (continued)

Interest rate risk

Changes in interest rates will affect the revenue from exchange transaction revenue stream as the return on investment of surplus funds is linked to the prime rate.

Cash flow interest rate risk

Financial instrument	Current interest rate	Due in less than a year	Due in 1-2 years	Due in 2-3 years	Due in 3-4 years	Due after 5 years
Cash reserves at CPD	7,06 %	152,894	-	-	-	-
Cash reserves at Standard Bank of South Africa	4,65 %	13,998	-	-	-	-
Other cash reserves at commercial banks	- %	2,350	-	-	-	-

Credit risk

Potential concentrations of credit risk consist mainly of cash and cash equivalents, and trade receivables. The economic entity limits its counterparty exposures from its bank accounts by investing surplus funds with well-established financial institutions with a high-quality credit standing. The credit exposure to any one counterparty is managed by monitoring transactions.

Loans and receivables, investment in controlled entities, investment in associates and other investments consist mainly of funding granted to start-up companies. The exposure to credit risk is managed through ongoing review of the operating results and financial position of the investee companies. Should the entity have doubt over the recoverability of the loan or the value of the investment, the loan/investment is impaired and further funding is carefully considered.

Financial assets exposed to credit risk at year-end were as follows:

Financial instrument	Economic entity - 2019	Economic entity - 2018	Controlling entity - 2019	Controlling entity - 2018
Cash and cash equivalents	169,242	128,926	166,911	126,664
Trade and other receivables	1,891	1,503	1,891	1,503
Loans and receivables	21,971	5,734	21,971	5,734

The entity has little doubt over the recoverability of trade and other receivables not considered to be impaired at year-end.

The entity has reviewed the financial position of each of the entities where they have not impaired the loan disbursed or investment made to the investee company and, based on this, management is of the opinion that at the end of the period the amount is recoverable.

Foreign exchange risk

Foreign currency exposure arises from the sale of goods by entities within the economic entity.

The economic entity reviews its foreign currency exposure, including commitments, on an ongoing basis.

27. Prior period errors

	Economic entity		Controlling entity	
	2019 R'000	2018 R'000	2019 R'000	2018 R'000

The useful life of R0 valued property and equipment was reassessed during the current financial year. These assets are being used beyond their initial expected useful lives. It is foreseen that these assets will be used in the medium term as the entity is experiencing budget constraints and therefore need to reprioritise to ensure that maximum benefit is derived. Therefore, the useful lives have been adjusted accordingly.

Statement of Financial Position

Property and equipment	-	9,541	-	9,541
Opening accumulated surplus	-	(11,926)	-	(11,926)

Statement of Financial Performance

Depreciation	-	2,385	-	2,385

28. Irregular expenditure

Opening balance	7,923	7,923	-	-

Economic entity: 13 controlled entities were inherited when the trusts (Biopad, Lifelab, Plantbio, Thumisano, Innovation Fund, Cape Biotech Trust) were combined to form TIA. The entities were not set up to comply with the detail requirements of Treasury Regulation 16A6.1. The controlling entity is continuing to exit these entities, and of the original 13, only five are remaining.

Controlling entity: No irregular expenditure was incurred during 2018/19.

29. Fruitless and wasteful expenditure

Opening balance	80	80	-	-

Economic entity: The nature of the expenses that could have been avoided are interest and penalties on PAYE for two controlled entities that were subsequently deregistered.

30. Losses through Criminal Conduct

Losses through criminal conduct

Losses during the financial year	18	30	18	30
Losses recovered	(20)	(65)	(20)	(65)
	(2)	**(35)**	**(2)**	**(35)**

Controlling entity: Losses relate mainly to laptops. Insurance claims were lodged to minimise the losses.

31. Budget differences

Material differences between budget and actual amounts

The controlling entity continued to clamp down on operational expenditure to increase the efficiency with which it operates. A further focus was to ensure that the right human resources were recruited as well as the optimisation of the human resources already employed, which resulted in savings on employee-related costs. Savings realised were redeployed and made available for project funding. Furthermore, the controlling entity reviewed the innovation landscape and prioritised investment into the technology enabling environment through additional investment into the Seed Fund Programme and the Technology Stations Programme. This necessitated a budget amendment during the year.

31.1 The controlling entity recapitalised loans and interest on loans for previous investments that were impaired. This was due to the financial position of these entities reflecting significant improvement. It is for this reason that the other income budget was exceeded in the financial year under review.

32. Segment information

General information Identification of segments

The economic entity is organised and reports to management on the basis of three major functional areas: technology development, technology enabling and support, and administrative activities. The segments were organised around the type of service delivered and the target market within the National System of Innovation. Management uses these same segments for determining strategic objectives.

Information reported about these segments is used by management as a basis for evaluating the segments' performances and for making decisions about the allocation of resources. The disclosure of information about these segments is also considered appropriate for external reporting purposes.

Segment surplus or deficit, assets and liabilities

Controlling entity – 2019	Technology development R'000	Technology enabling and support R'000	Administration and strategic engagements R'000	Total R'000
Revenue				
Revenue from non-exchange transactions	97,930	262,043	170,444	530,417
Other income	16,230	3,256	47	19,533
Interest received	5,254	-	10,321	15,575
Total segment revenue	**119,414**	**265,299**	**180,812**	**565,525**
Entity's revenue				**565,525**
Expenditure				
Salaries and wages	27,458	14,993	62,636	105,087
Other expenses	2,713	4,409	61,533	68,655
Project funding expenditure	106,699	263,031	-	369,730
Total segment expenditure	**136,870**	**282,433**	**124,169**	**543,472**
Total segmental surplus				**22,053**

32. Segment information (continued)

Controlling entity – – 2018	Technology development R'000	Technology enabling and support R'000	Administration and strategic engagements R'000	Total R'000
Revenue				
Revenue from non-exchange transactions	88,563	214,417	163,143	466,123
Other income	1,172	1,291	4,851	7,314
Interest received	1,943	-	10,129	12,072
Profit on sale of investment	3,683	-	-	3,683
Total segment revenue	**95,361**	**215,708**	**178,123**	**489,192**
Entity's revenue				**489,192**
Expenditure				
Salaries and wages	28,691	15,778	54,248	98,717
Other operating expenditure	2,765	2,636	53,327	58,728
Project funding expenditure	92,435	216,688	-	309,123
Total segment expenditure	**123,891**	**235,102**	**107,575**	**466,568**
Total segmental surplus				**22,624**

Appendix 1: TIA's cumulative performance over the period 2013/14-2018/19

Table 16: TIA's cumulative achievement and impact over the 2013/14-2018/19 period.

MANDATE	INDICATOR	ACHIEVEMENT	IMPACT
Stimulate	Number of SMMEs supported	14 622	Contribution of R7,5 billion in GDP to the national economy 18 536 jobs created Average multiplier effect of R3,10 of economic activity for every R1 spent
Intensify	Number of knowledge products developed	413	
	Number of technology innovation initiatives undertaken by TIA	296	
	Grants disbursed to support technology development and infrastructure	R2,2 billion	
Improve economic growth	Number of technological innovation projects taken up by the market	63	
	Royalties received from projects supported	R 11,6 million	
	Receipts from the disposal/sale of mature technology development projects	R70,6 million	
	Interest on loans for technology development projects	R20 million	
	Revenue generated by companies after receiving funding support from TIA[1]	R 10,7 billion	
	Economic impact multiplier (average over the period)	3,1	

Improve quality of life	**Element**	**Performance**	**Impact: Link to NDP**
	Health	1. Investment in SLIEK (Pty) Ltd to further develop and optimise the production process of lactase enzymes to enable lactose-intolerant individuals to benefit from consuming dairy products. 2. Investment in Altis Biologics (Pty) Ltd, a regenerative medicine development company focused on developing and bringing to market new biomaterials and regenerative biological products, with a particular emphasis on orthopaedic and dental tissue regeneration. 3. Investment in SA Cardiosynthetics (Pty) Ltd, a company that develops synthetic heart valves aimed at replacing metal or tissue based alternatives. 4. Investment in Strait Access Technologies (Pty) Ltd, a company that has developed a medical device for replacing diseased heart valves in low resource settings. 5. Investment in Chemical Process Technologies Pharma (Pty) Ltd to develop active pharmaceutical ingredients for the manufacture of human and animal health products. 6. Investment in the Drug Discovery and Development Platform for the development of new drugs for malaria and tuberculosis. 7. Investment in Para-Tube, a technology that assists persons confined to wheelchairs to utilise ablution facilities. 8. Investment in MARTI TB Diagnostics (Pty) Ltd, a company that has developed a point of care device for the rapid diagnosis of tuberculosis using a droplet of blood instead of sputum. The test could have the impact of reaching more remote areas and aid earlier diagnosis, leading to better treatment outcomes and a reduction in government's expenditure on tuberculosis-related treatment and complications. 9. Investment in Enzyme Technologies (Pty) Ltd, a company that has developed, optimised and scaled up processes to extract and stabilise bromelain from pineapple waste for use in animal and human health markets.	Quality health care for all

[1] The figure quoted is based on financial information received from companies in which the agency has/had equity. Financial information is received through reporting obligations in the sale of shareholding agreements.

Improve quality of life	Element	Performance	Impact: Link to NDP
	Agriculture	1. Investment in AgriProtien Technologies (Pty) Limited, who convert organic waste to animal feed protein. 2. Investment in Dairy and Beef Genetically Enhanced Breeding Values to improve the quality of livestock. 3. Investment in Mabu Casing Soils (Pty) Limited regarding a technology that provides 100% natural soil casing pith to be used as a substitute for peat in the growing of mushrooms. 4. Investment in an insect milk production technology that enables the production of food from alternative sources of protein through environmentally friendly insect farming that requires very little water and land and produces negligible greenhouse gases. 5. A maize breeding programme has been implemented in partnership with the Climate Resilience Consortium. Its focus is on developing hybrid varieties with increased resilience to drought and heat stress, with high yielding traits. Smallholder farmers will benefit through access to these improved maize varieties. 6. Through the Agricultural Bio-Economy Innovation Partnership Programme, TIA is a member of the Crop Protection Consortium which screens the agricultural domain for soil- and seed-borne diseases with a view to develop and manage an early warning system for disease outbreak. 7. TIA has partnered with the Oil and Protein Seeds Development Trust to support the soybean food and nutrition programme which is aimed at developing appropriate technologies and disseminating them to smaller farmers and rural communities for promoting the production and processing of soybeans. 8. The Bio-innovation Aquaculture Programme was established under the Agricultural Bio-Economy Innovation Partnership Programme to support projects in the areas of freshwater and marine production systems, particularly those that seek to increase production output or yield; aquatic animal feed; health and disease management technologies and aquaculture value addition and post-harvest technologies for food security and nutrition. 9. Agricultural Bio-Economy Innovation Partnership Programme-funded agro-processing initiatives for niche commodities in support of marula, honeybush and Cape aloe are aimed at developing and commercialising these indigenous crops, which offer a great nutritional content and new market opportunities. 10. The Department of Science and Technology, through its Agri-Parks initiative, is co-funding Grain South Africa's farmer development support initiative (which is also supported by the Jobs Fund) to provide additional innovation incentives and alternative sources of nutrition and revenue in communities through crops such as beans and maize.	
	Energy	1. Investment into the development of membrane electrode assembly to produce hydrogen fuel cells that generate clean energy. 2. Investment in InnoVenton Institute which is exploring the possibility of generating biofuels using a colony of micro-algae strands. 3. Investment in a compressed air energy storage technology solution which uses compressed air rather than conventional technologies such as batteries, to provide cost-effective, clean and stable power. 4. Investment in a waste-to-energy gasifier technology wherein the gasifier treats organic waste on site through a thermal process by converting organic material into highly combustible syngas to produce heat and generate electricity.	Energy supply security, affordability and climate change mitigation
	Natural resources	1. Investment in Settled Bed Detector Probe technology designed to minimise blockages in slurry pipelines for ore mining tailings. 2. Investment in Blue Cube Systems (Pty) Ltd that designs, manufactures, distributes and supports in-line mineral quantification instruments to help mining companies extract more mineral rich ore. 3. Investment in KNeW (potassium nitrate ex waste) technology, a novel, patented, multi-step process that incorporates neutralisation, filtration and precipitation and will later incorporate a nitrate dissolver and ion exchange processes for treating harmful industrial and mining effluents such as acid mine drainage. 4. Investment in a technology package to produce biofuels from algae using wastewater as a nutrient and water source, thereby providing tertiary treatment, which could assist wastewater treatment plants in meeting discharge standards.	

Education and training	1.	11 474 students were on-boarded under the national community colleges through the 'Skillzbook' e-platform. The programme is aimed at on-boarding and capacitating a significant portion (21 500 to 40 000) of the 320 000 students in the Community Education Training Centres and providing access to Critical Thinking L2, as well as various other empowerment tools.	The education, training and innovation system should cater for different needs and produce highly skilled individuals
	2.	300 candidates (60% African and 55% female) have undertaken the Foresight, Leadership and Innovation Programme. The programme aims to fill the critical management skills gap undermining South Africa's economy by introducing proven methods in long-range problem-solving, foresight skills and leadership developed at Stanford University, United States. Targeted at business and government leaders, the programme is designed to help them tackle strategic challenges in innovation and become more effective in long-term planning and leadership. The National School of Government in partnership with TIA will be rolling out the programme to all provinces and government departments to have access to the programme.	

Table 17: TIA's performance against selected indicators mapped to the organisation's mandate.

MANDATE	KEY PERFORMANCE INDICATOR	2015/16	2016/17	2017/18	2018/19
Stimulate	Number of SMMEs supported	2 197	2 261	2 800	3 272
Intensify	Number of internships (local and international)	219	684	607	115
	Number of youth supported in technology development	1 003	1 167	1 092	1 380
	Number of women supported in technology development	664	619	794	1 481
Improve economic growth	Economic Impact Assessment multiplier	2,87	3,38	3,55	3,26
Improve quality of life	Transformation: Number of historically disadvantaged individuals (HDIs) receiving support	1 347	1 458	1 475	2 660
	Transformation: Number of people with disabilities receiving support	24	103	11	55

Table 18: TIA's performance against the organisation's 2015-2020 Strategic Plan targets.

PERFORMANCE INDICATOR	2015-2020 STRATEGIC PLAN TARGET	2015/16	2016/17	2017/18	2018/19
Amounts received from third parties investing in TIA-funded projects	R551m	R98m	R182m	R117m	R379m
Number of knowledge innovation products developed	350	76	64	98	110
Number of small, medium and micro enterprises assisted by TIA	14 200	2 197	2 261	2 800	3 272
Number of projects reaching the market	51	9	21	19	14
Number of youth projects receiving funding	300	52	31	29	26
Number of Seed Fund projects funded	600	275	123	58	63
Economic impact multiplier	3,7	2,82	3,38	3,55	3,26

Table 19: TIA's contribution to enterprise and supplier support via direct procurement spend, mapped to the organisation's mandate.

MANDATE	METRIC	2015/16	2016/17	2017/18	2018/19
Improve economic growth	Number of suppliers engaged	176	350	475	451
	Number of black-owned suppliers engaged	65	78	71	159
	Average satisfaction index for suppliers engaged	81%	83%	70%	86%
	Average turnaround time for vendor payments	7 days	5 days	3 days	3 days
	Percentage procurement from broad-based black economic empowerment (BBBEE) Level 1 enterprises	17%	23%	15%	50%
	Percentage procurement from BBBEE Level 2 enterprises	51%	39%	15%	16%
	Percentage procurement from BBBEE Level 3 enterprises	14%	5%+	Nil	1%
	Percentage procurement from BBBEE Level 4 enterprises	6%	21%	28%	16%
	Percentage procurement from non-BBBEE compliant enterprises (Level 5 onwards and those that have not been assessed)	11%	10%	13%	17%
	Percentage procurement from SMMEs	44%	44%	18%	52%
	Percentage procurement from women-owned enterprises	10%	12%	7%	30%
	Percentage procurement from youth-owned enterprises	5%	5%	3%	13%

Appendix 2. Strategic Risk Summary Report

Table 20: TIA's strategic risk summary report as at 31 March 2019.

RISK NO.	RISK TITLE	LINKED OBJECTIVES	CONTRIBUTING FACTOR
1.	Inadequacy of business processes	Strategic objective 3: Develop an effective and efficient internal environment to successfully execute the strategy.	Legacy organisational design that lead to a structure and processes that struggle to attend fully to the agency's mandate.
2.	Not managing possible poor reputation	Strategic objective 1: Provide technology development funding and support in strategic high-impact areas.	Lengthy turnaround times for operational procedures due to dated systems and processes in use.
3.	Inability to manage political transitions	Strategic objective 2: Provide thought leadership and an enabling environment for technology innovation in collaboration with other role players.	Shifts in the decision-making bodies within government that is caused by changes in the political structures of government. (Change in Ministers.)
4.	Possible deficiencies in alignment with national policies affecting TIA mandate	Strategic objective 1: Provide technology development funding and support in strategic high-impact areas.	Review of the National System of Innovation's performance over the past five years. The lapse of the DST's decadal plan, the new White Paper on Science and Technology and its impact on the agency's deliverables and mandate.
5.	Possible negative impact of economic conditions affecting the realisation of the TIA mandate	Strategic objective 1: Provide technology development funding and support in strategic high-impact areas.	Impact of global geopolitical tensions that impacts on investors' confidence which results in a reluctance to invest in South Africa.
6.	Possible non-alignment with shareholders' expectations	Strategic objective 2: Provide thought leadership and an enabling environment for technology innovation in collaboration with other role players.	Inability to demonstrate adequate levels of organisational performance during the course of the year. Ability to show aforesaid occurring mostly in quarter four.
7.	Non-aligned organisational structure and operational capability	Strategic objective 3: Develop an effective and efficient internal environment to successfully execute the strategy.	Legacy organisational design and inadequate or inappropriate competency levels and processes.
8.	Possible poor performance of investment portfolio	Strategic objective 1: Provide technology development funding and support in strategic high-impact areas.	Inadequate management of legacy investment portfolio and the lack of funding for a substantial pipeline of project proposals/investment applications.

NOTES

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technology innovation
AGENCY
Innovating Tomorrow Together

GAUTENG OFFICE

Switchboard: +27 (0) 12 472 2700

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

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

KWAZULU-NATAL OFFICE

Switchboard: +27 (0) 31 220 3100

Postal Address
P.O. Box 30603
Mayville, Durban, 4062

Physical Address
4th Floor, 102 Stephen Dlamini Road
Musgrave
Durban, 4062

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, 7925

RP177/2019

ISBN: 978-0-621-47453-4