

ANNUAL REPORT 2022/2023

science & innovation

Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA

technology innovation AGENCY

Taking technology innovation further





Driving Innovation:
Empowering Economies, Transforming Futures

2022/23 PERFORMANCE HIGHLIGHTS

Achieved an efficiency ratio of **13.7%** against a target of **15%**

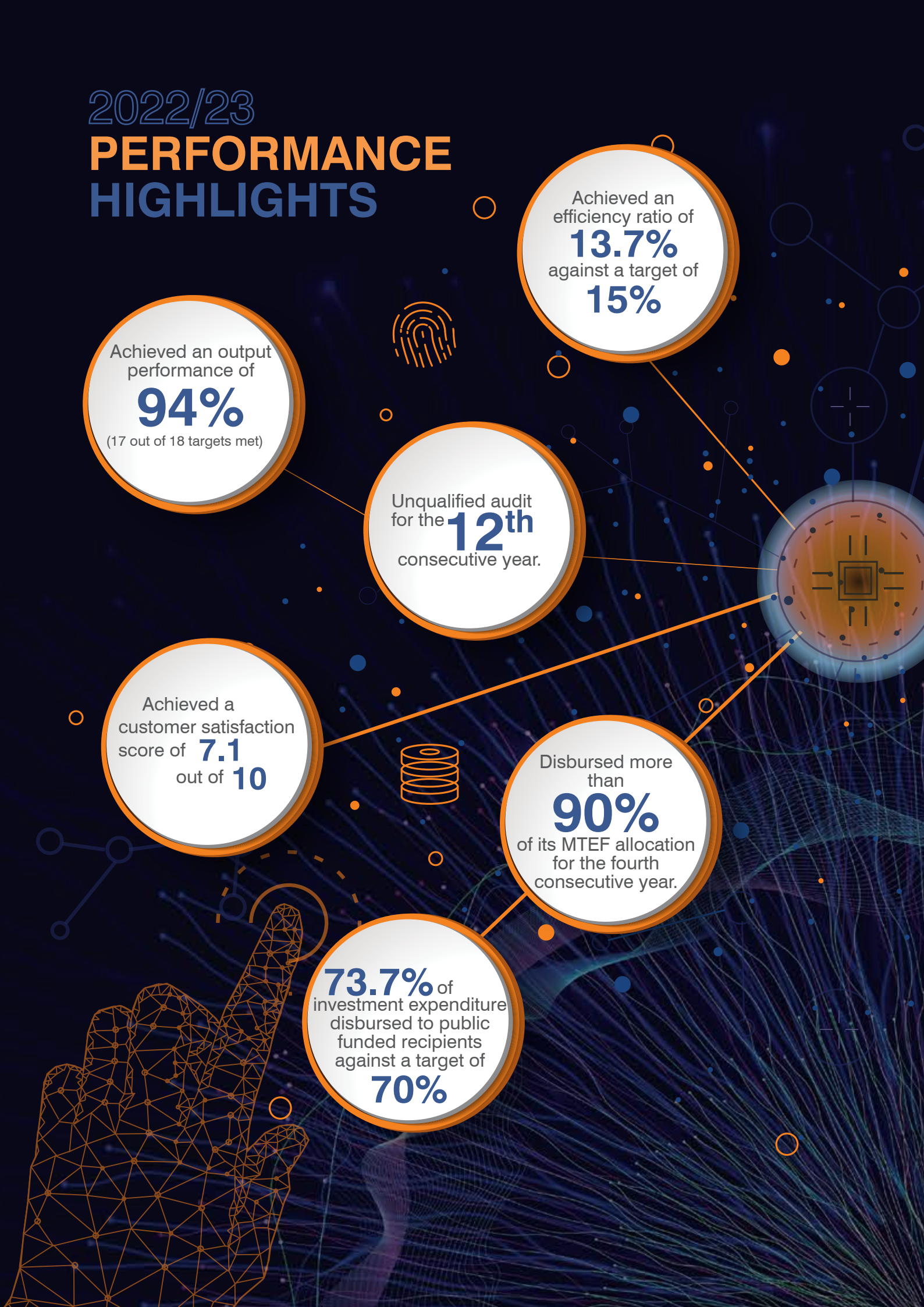
Achieved an output performance of **94%** (17 out of 18 targets met)

Unqualified audit for the **12th** consecutive year.

Achieved a customer satisfaction score of **7.1** out of **10**

Disbursed more than **90%** of its MTEF allocation for the fourth consecutive year.

73.7% of investment expenditure disbursed to public funded recipients against a target of **70%**



61 technologies commercialised against a target of **40**

857 competitiveness improvements provided to SMMEs, with **60** enterprise solutions taken up in the market.

3 more Living Labs established, with a total of **11** Living labs now operating across the country.

37 innovators added to the Grassroots Innovation Programme, with a total of **147** since inception

Output Performance

Indicator	Target	Actual
Technologies licensed or assigned	15	15
Bio-based technologies developed	23	37
Technologies diffused for inclusive development	15	18
Products launched	28	43
IP and knowledge-based innovation products	149	197
Leveraged funds	R250m	R600,9m
Joint collaborations between academia and industry	36	48
SMMEs and cooperatives supported	2 800	2 903
Postgrad students and post-doctoral fellows supported	121	195
New technology and innovation support centres	7	8

Outcome Performance

Indicator	Five-year target	2020/21 performance (target)	2021/22 performance (target)	2022/23 performance (target)	Cumulative achievement (target)
Technologies commercialised	175	26 (9)	49 (31)	61 (40)	136 (80)
Demonstrated bio-based technologies	75	37 (9)	36 (12)	37 (15)	110 (36)
Bio-based entrepreneurs supported	600	165 (105)	45 (110)	67 (120)	277 (335)
SMMEs supported	15 750	1 990 (2 390)	3 167 (3 150)	2 671 (3 250)	7 828 (8 790)

PROJECT HIGHLIGHTS

HEALTH INNOVATION

The Holistic Drug Discovery and Development Centre, a Technology Innovation Agency-funded Technology Platform located at the University of Cape Town, secured funding of R114.6 million over five years from the Bill and Melinda Gates Foundation to support its tuberculosis and malaria drug development programmes. This significant agreement further cements the centre's reputation as a site of world-class research in South Africa for drug development in the areas of malaria and tuberculosis.

Artisan Biomed was supported by TIA through the Innovation Fund to develop various precision medicine offerings based on a set of newly developed or enhanced tests using local genomics capabilities. TIA's loan of R5 million, which has been fully repaid with interest, enabled the company to attract follow-on funding of R70 million from Mediclinic Southern Africa. The Mediclinic investment took the form of a share subscription transaction, and it will help to capitalise the company to acquire equipment, grow its skills base and develop new precision medicine solutions for the public. Previously a subsidiary of the Centre for Proteomic and Genomic Research (CPGR), a Technology Platform supported by TIA, the company offers a suite of tests that diagnose disease, monitor treatment and screen for the probability of occurrence of certain medical conditions. In future, Artisan Biomed, now known as Mediclinic Precise, is expected to scale up data generation in the Southern African Development Community (SADC) and overseas territories and gain access to many patient interactions per annum and more than one million contactable patients in South Africa.

With an increasing burden of communicable and non-communicable diseases in South Africa, the number of individuals receiving chronic therapy is on the rise. Branded "Pelebox", Technovera has developed smart lockers which make it possible for patients to receive their repeat chronic medication in under a minute using electronically controlled and temperature-controlled cubicles. These lockers virtually eliminate the need to queue for hours at public clinics. The system also helps hospitals and clinics to administer their patients' records effectively as they no longer have to register patients manually on collection of medication. In the period under review, Technovera expanded its footprint in Namibia from ten sites installed to a total of 19, based on a partnership with the Ministry of Health Services in that country. This project, previously funded by TIA, also received funding support from the Innovation Fund to commercialise the technology. TIA's continued support to re-risk this technology to commercialisation enabled the company to raise further funding successfully from Google Startups for Africa.



With support from TIA's Seed Fund, Patient Health, which is led by a black youth, has created a platform called Afrinurse.com. Afrinurse.com is a data-driven marketplace for nurses that allows interested organisations, service-providers and other parties to centralise their services onto a single platform that matches offerings with nurses across Africa. The technology was successfully piloted in the target market.

PUBLIC TRANSPORT SAFETY

SpeedFox is a technology that has been designed to reduce vehicle speeding and speeding-related accidents and fatalities. Efforts by GeoInt, a TIA investee, have been focused not only on technology development but also on market validation. Good progress has been achieved in the vehicle and fleet management domain, both locally and internationally. The company is making headway into the African market, having established a partnership with a company in Mauritius to reduce road deaths in that country.

SpeedFOX
Intelligent Speed Assistance

INNOVATION IN EDUCATION



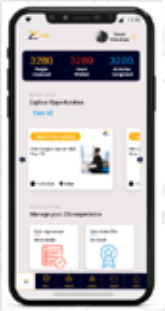
The Midesk project is a ground-breaking wheeled shoulder school bag which is lightweight, waterproof, strong and portable, and can be used as a desk and chair at home and at school. TIA contracted with MiDesk Global (Pty) Ltd, a woman-owned enterprise, through the Innovation Fund, which provided R6.8 million in support of the commercial roll-out of the product. Approximately 1,000 units have been sold to date. Through corporate social investments and donor funding, the project intends to distribute 6,000 desks valued at R10.2 million to underprivileged primary schools in the country. The first order of 500 desks has already been secured through an investment by Cell C, for distribution to underprivileged primary schools in the south of Gauteng.

AGRO-PROCESSING

Steampunk Distilled Products (Pty), a TIA investee, has developed a method to extract food-grade anti-oxidants from rosemary plant material. The anti-oxidant extract will be used as a stabiliser in the food and cosmetics industry, particularly in the edible oils market, where significant growth is projected. The company has developed the technology further, having successfully tested various essential oils (marula, macadamia, rose hip and avocado), resulting in initial commercial sales of the extracts.

Steampunk
distilled products

INNOVATION FOR THE YOUTH



ZIto is a black-youth-owned RLabs social enterprise spinout. The company uses blockchain technology to increase engagement among youths, track positive behaviour via live dashboards and encourage certain behaviour through innovative rewards systems. In response to the development of the National Youth Strategy, TIA commissioned ZIto to develop the youth-tracking tool for the National System of Innovation. This takes the form of a software-based digital platform that facilitates interactions and transactions between users to track the development of young people as a decision-making tool with which to transform youth participation in socio-economic activities.

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PART
A
General
Information

Registered name	Technology Innovation Agency
Registration/constitutional information	Technology Innovation Agency Act (No. 26 of 2008), as amended by the Science and Technology Laws Amendment Act (No. 7 of 2014) and the Science and Technology Laws Amendment Act (No. 9 of 2020)
Registered office address	TIA House, 83 Lois Avenue, Menlyn, Pretoria
Postal address	P.O. Box 172, Menlyn, Pretoria 0181
Telephone	+27(0)12 427 2700
Email	info@tia.org.za
Website	www.tia.org.za
Social media	LinkedIn: www.linkedin.com/company/technology-innovation-agency Twitter: @tiaorgza Facebook: www.facebook.com/TIAORGZA
External auditor	Rakoma & Associates Inc. Block D, Willow Wood Office Park, Cnr. 3rd Ave & Cedar Rd, Johannesburg, 2021
Banker	Standard Bank 30 Baker Street, Rosebank 2196, Johannesburg
Company Secretary	Mr Kobus Louw (Board Secretariat)

This report has been prepared based on National Treasury's Annual Report Guide for Schedule 3A and 3C Public Entities of August 2021.

1. LIST OF ABBREVIATIONS AND ACRONYMS

4IR	Fourth Industrial Revolution
ABIPP	Agriculture Bio-economy Innovation Partnership Programme
AFS	Annual Financial Statements
AI	Artificial intelligence
AMD	Acid mine drainage
API	Active pharmaceutical ingredient
APP	Annual Performance Plan
ARC	Audit and Risk Committee
B-BBEE	Broad-Based Black Economic Empowerment
b	Billion
BEFV	Bovine Ephemeral Fever Virus
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CleanTech	Clean Technology
COVID-19	Coronavirus disease 2019
CPGR	Centre for Proteomic and Genomic Research
CSIR	Council for Scientific and Industrial Research
DSI	Department of Science and Innovation
ELISA	Enzyme-linked immunoassay
FBIC	Forest Bio-economy Innovation Cluster
FMG	Forest Molecular Genetics
GCIP-SA	Global CleanTech Innovation Programme-South Africa
GDP	Gross domestic product
GIP	Grassroots Innovation Programme
GPS	Global positioning system
GRAP	Generally recognised accounting practice
HEI	Higher Education Institution
HR	Human resources
HR&REMCO	Human Resources and Remuneration Committee
IBH	Industrial Biocatalysis Hub
IC4LED	Innovation Champions for Local Economic Development
ICT	Information and Communication Technologies
IDC	Industrial Development Corporation
IFC	Investment and Finance Committee
IID	Innovation for Inclusive Development
IKS	Indigenous knowledge systems
IP	Intellectual property
IRBA	Independent Regulatory Board for Auditors'
ISAs	International Standards on Auditing
ISO	International Organization for Standardization
JET	Just energy transition
KRISP	KwaZulu-Natal Research and Innovation Sequencing Platform
LSDV	Lumpy skin disease virus
m	Million
MeDDIC	Medical Devices and Diagnostic Innovation Clutter
ML	Machine learning
MTEF	Medium-Term Expenditure Framework
NIPP	Natural Indigenous Products Programme
NMU	Nelson Mandela University
NRF	National Research Foundation
NSI	National System of Innovation
NTeMBI	Nuclear Technologies in Medicine and Bioscience Initiative
OBM	Osteogenic Bone Matrix
PAA	Public Audit Act
PFMA	Public Finance Management Act
R&D	Research and development
SABDI	South African BioDesign Initiative
SADC	Southern African Development Community
SAHPRA	South African Health Products Regulatory Authority
SAPS	South African Police Service
SET	Science, engineering and technology
SIIP	Strategic Industrial Bio-innovation Programme
SME	Small and medium enterprise
SMME	Small, medium and micro enterprise
STI	Science, technology and innovation
TIA	Technology Innovation Agency
TPP	Technology Platforms Programme
TSP	Technology Stations Programme
TVET	Technical and Vocational Education and Training
UCT	University of Cape Town
UFS	University of the Free State
UP	University of Pretoria
UTF	University Technology Fund
UWC	University of the Western Cape
WSU	Walter Sisulu University

2. THE TIA BOARD



Ms Matsi Modise
Chairperson



Mr Patrick Krappie
(ex officio)



Ms Anati Canca



Dr Revel Iyer



Ms Lindiwe Matlali



Mr Butana Mboniswa



Ms Sebenzile Matsebula



Mr Thabiso Ramasike



3. FOREWORD BY THE CHAIRPERSON

Ms Matsi Modise

> "You need to be STRONG mentally and to continue BELIEVING IN YOUR DREAM when faced with tough times, so SURROUND YOURSELF with people who INSPIRE YOU."
>
> - Johanna Mukoki
> co-founder, Travel with Flair (South Africa)

I am pleased to present TIA's Annual Report for 2022/23.

Over the past mid-term period, TIA has performed well against its set objectives, with a sharp focus on commercialising a wide range of technologies that address challenges across various sectors of the economy.In line with its core mandate, the organisation has seen more than 70 technologies introduced into the market and a number of enterprises established with no less 700 jobs created.

The Agency played an important role in supporting Government's response to the COVID-19 pandemic. The deployment of TIA's genomics platform and technology stations capabilities played a key role in identifying the various COVID-19 strains and developing appropriate diagnostics and other safety measures. Past efforts have seen TIA effectively supporting government's efforts to respond to health challenges arising from the pandemic, promote economic recovery and address the risks of further marginalisation of communities in distress.

Many reports show that the country is not yet out of the woods in the aftermath of the pandemic. South Africa is faced with a myriad of challenges of low economic growth, a constrained fiscus and deteriorating infrastructure that constrain economic activity and investments. The current electricity and energy crisis now represents the greatest threat to any prospects of a fast recovery. Consequently, all indicators around the triple challenges of poverty, unemployment and inequality are deteriorating. As with many other economies around the world, South Africa is faced with global risks such as high inflationary pressures, supply chain disruptions, rising geoeconomic and geopolitical tensions and climate change.

There is no doubt that our innovation ecosystem is dynamic and remains resilient in the face of these challenges with many start-ups making their mark on both a local and global scale. The South African research and innovation ecosystem is expected to play an important role in enabling the country to overcome these challenges. Significant investments will be required to make the system more responsive to these. The Just Energy Transition Investment Plan unveiled by the President at COP27 represents one such high-impact initiative aimed at achieving decarbonisation of the economy, thereby addressing the challenge of climate change through the reduction of greenhouse gas emissions.

As TIA enters the fourth year of its 2020-2025 Strategic Plan cycle, there has been much reflection on how to increase society's dividend from Government's many years of investments in science, technology and innovation. As the main instrument of Government tasked with the mandate of supporting the commercialising research output from public research organisations and other segments of society, there is no question that this will represent TIA's primary focus for the year ahead. In pursuing this mission, four priority areas will receive attention:

- Intensifying efforts to continue building a strong pipeline of de-risked early-stage technologies from across the NSI, by working with key partners such as universities, science councils and others to identify and support high-potential innovations and large-scale RDI programmes with higher socio-economic impact.
- Packaging solutions and interventions to accelerate commercialisation of the rich portfolio of matured technologies within the TIA portfolio and in the NSI broadly. In this, the DSI's Innovation Fund will be deployed more purposefully, targeting those technologies that require last mile interventions toward market launch and scale-up for successful commercialisation.

- TIA will continue to build on its strong linkages with other key players in the National System of Innovation to bolster the execution of its mandate by increasing funding, leveraging expertise and creating forward linkages for successful commercialisation of innovations. These include many actors in the research space such as higher education, the private sector, institutional investors, venture capital community and the many small, medium and micro enterprises (SMME) that support intermediaries in the country.
- Finally, the conclusion of the Ministerial Review of TIA marks a significant development for the organisation and its future positioning in the NSI. The purpose of the Review was to evaluate the effectiveness of TIA's programmes and its positioning in the NSI, as well as to recommend measures to enhance the agency's execution of its mandate. Following this, a key focus for the year ahead will be to redesign an organisation that is fit for purpose, appropriately geared and capacitated to deliver on its core commercialisation mandate, and able to play an effective curatorship role in the ecosystem.

In all this, the Agency will continue to be guided by the key strategic intents of the White Paper on Science, Technology and Innovation and the Decadal Plan recently approved by Cabinet, along with other key policies such as the Economic Reconstruction and Development Plan, which are all intended to realise the outcomes of the 2030 National Development Plan.

On behalf of the TIA board, I wish to thank our colleagues at the DSI, the Director-General and his senior leadership, the TIA management and staff for all their contributions in putting this plan together.

Modise..

Ms Matsi Modise
Chairperson of the Board



4. THE EXECUTIVE MANAGEMENT TEAM



Mr Patrick Krappie
Acting Chief Executive Officer



Mr Ismail Abdoola
Chief Financial Officer



Ms Matshidiso Matlolane
Acting Executive: Corporate Services



Mr Brian Mphahlele
Executive: Commercialisation



Dr Vuyisile Phehane
Executive: Bio-economy



Mr Vusi Skosana
Acting Executive: Innovation Enabling



5. CHIEF EXECUTIVE OFFICER'S OVERVIEW

Mr Patrick Krappie

I am pleased to present the Annual Report of the Technology Innovation Agency (TIA) for the 2022/23 financial year. This report presents the results of our efforts in advancing the Agency's mandate midway through implementing TIA's 2020–2025 Strategy.

TIA's 2020–2025 Strategy is based on three pillars: first, to build on the gains of the past years in which TIA built a significant portfolio of early-stage technologies that have been de-risked, enabling other investors to take these to the market. In this we have sought to enhance the Agency's commercialisation efforts.

Secondly, increasing the role of the bio-economy as an important contributor to South Africa's economic development. The bio-economy currently contributes significantly to the GDP, and efforts to implement the Bio-economy Strategy aim to grow this contribution significantly in future.

The third pillar is to increase the participation of entrepreneurs, innovators, cooperatives, and small, medium and micro enterprises (SMMEs) in technological innovation by enabling access to key infrastructure capabilities such as Technology Stations and other innovation-enabling interventions.

This is the third year of the assessment of the organisation's performance against its 2020–2025 Strategy. It is important, therefore, to reflect on this journey, which should enable us to better prepare the Agency for enhanced performance towards TIA 2.0, as recommended by the Ministerial Review Report.

During this period, TIA recorded an achievement of 94% of its annual output targets. Acceptable levels of performance were achieved against all but one of the output indicators for the year. There was significant over-achievement against targets for joint collaborations between academia and industry, technologies diffused for inclusive development, products launched, leveraged funds, bio-based technologies developed, high-level human capital development, innovation products produced, transformation initiatives introduced in underserved provinces, and the transformation of TIA's investment portfolio.

The results for the year under review show that TIA has significantly delivered results in its commercialisation objectives. Positive strides were made in advancing several projects to commercialisation through various measures, including second-round funding, business development support and the creation of partnerships from which these investees were able to derive benefits. Through its innovation-enabling programmes, many TIA investees benefited meaningfully from the science, engineering and technology (SET) support, mentorship, entrepreneurship training and participation in a range of innovation competitions that also exposed them to market access opportunities and investors.

The year under review also saw the Agency partnering with many stakeholders in the funding and tech-entrepreneurship ecosystem, which afforded opportunities to no fewer than 75 investees in its portfolio to showcase their innovations and seek funding and customers. TIA launched the Higher Education Institution (HEI) Engagement Programme as part of its efforts to foster improved relations with the research community being at the core of the Agency's mandate as the primary customer. The imperative to maintain TIA's ratio of funding with the greater proportion of this directed to intellectual property (IP) from publicly funded research requires the Agency to work closely with the universities to support the development of a pipeline of investable projects.



I wish to highlight two noteworthy developments that transpired during the period; being the Cabinet's approval of the Decadal Plan and the release of the Ministerial Review Report. The Decadal Plan establishes a firm policy direction foundation for science, technology and innovation (STI), with clearly defined outcomes and Key Performance Indicators. The Ministerial Review Report has served to affirm the mandate of TIA whilst calling for strengthening of the institution to increase its impact in the National System of Innovation (NSI). These two developments will serve as a solid foundation for the organisation to articulate its future strategic positioning in the NSI and increasing its impact.



Mr Patrick Krappie
Acting Chief Executive Officer



6. CHIEF FINANCIAL OFFICER'S OVERVIEW

Mr Ismail Abdoola

Based on TIA's financial results for the period 1 April 2022 to 31 March 2023 (hereinafter "2022/23"), the Agency has maintained sound financial performance despite the prevailing economic climate. Notwithstanding the tough economic climate, TIA received an unqualified audit for the 12th consecutive year. This is in accordance with the Agency's commitment to maintaining a healthy control environment that is governed by sound financial principles and policies.

TIA commenced the financial year with a budget allocation of R458.3 million. Of this, R238 million (51%) represented the total commitment book, with just over R220 million (49%) available for new investments and operational expenditure. With an approximate budget requirement of R163 million for operational expenditure (personnel and administrative costs), only R57 million remained available for disbursement to new projects.

AGENCY'S FINANCIAL PERFORMANCE

TIA realised an actual surplus of R6.2 million for the year. This is attributed largely to the lower than anticipated investment expenditure. Technology development is an inherently high-risk undertaking due to the unpredictable nature of the intended outcomes. In such an environment, there is a high probability that investee project-related milestones will not be achieved as planned, making it difficult to forecast and deliver zero-surplus-deficit actuals at the end of each financial year.

Total income for the year to date amounts to R748.8 million and represents a 15.0% positive variance when compared to the budget for the year. TIA received the entirety of its Medium-Term Expenditure Framework (MTEF) allocation for the year, totalling R458.3 million. Total income from specific contracts resulted in a 52% positive variance when compared to budget. Total expenditure for the year to date amounted to R742 million, which is R92.8 million higher than budgeted for. This was contributed largely by a higher than projected investment expenditure on specific programmes of R91 million.

By 31 March 2023, the Agency had funding commitments to projects totalling R209.5 million. Section 53(3) of the Public Finance Management Act (PFMA) stipulates that public entities must submit a request to National Treasury to retain any surplus funds, stipulates that public entities must submit a request to National Treasury to retain any surplus funds, which was submitted by 31 July 2023. No outcome had been received at the time of publishing this report.

INVESTMENT PIPELINE

For the fourth financial year in a row TIA has successfully disbursed more than 90% of its MTEF allocation. Total disbursements to project-related activities totalled R572 million which was 19% in excess of the budget. This was attributable to a greater than budgeted-for disbursement to specific contracted programmes managed on behalf of the Department of Science and Innovation (DSI).

During the year, a total amount of R36.3 million (including R11 million specifically contracted with the DSI) was invested in the Seed Fund portfolio and represents a significant investment in early-stage projects where traditional investors do not deploy funds. Such early-stage investments are expected to create a significant pipeline for investors in the NSI in future.

During the reporting period, efforts were dedicated to not only managing the existing portfolio but also building

a pipeline of investments. At year-end, several projects in the pipeline requiring funding of approximately R251 million were at advanced stages of due diligence withsome approvals expected within the first half of 2023/24. These include projects across several portfolios, including Indigenous Knowledge Systems (IKS) where a larger proportion of the Bio-economy division budget has been allocated together with projects emanating from a Hydrogen call to be funded from the Energy business unit.

INNOVATION FUND

TIA received an allocation of R80 million for a portfolio of 20 projects approved by the DSI under Phase 1 of the Innovation Fund. Under Phase 2 R102.2 million has been received and R100 million under Phase 3. All Phase 1 funds have been committed, including the use of R3.1 million in interest on Phase 1 funds received.

For the period under review a total of R34.5 million has been disbursed against project milestones (R18.9 million against Phase 1 and R15.5 million against Phase 2). To date (i.e. from the commencement of the Innovation Fund until 31 March 2023) a total of R91.6 million has been disbursed against project milestones (R76.1 million against Phase 1 and R15.5 million against Phase 2). A total of R41.4 million has been disbursed to Bio-economy-related projects as at 31 March 2023 and R37.9 million to Commercialisation-related projects.

During March 2023, TIA successfully contracted for a further R100 million as part of funding from Phase 3 of the Innovation Fund. This was following a proposal for further funding submitted in September 2022 on the back of a significant investable pipeline. Several opportunities are at advanced stages of due diligence for evaluation and funding under Phase 3. These include the advancement of transformation in the venture capital space.

PROCUREMENT

TIA's use of the National Treasury's Central Supplier Database allowed the Agency to spread its purchasing reach to smaller suppliers who generally struggle with high barriers to entry into supply chains and procurement expenditure. TIA does not procure goods and/or services from suppliers who are not fully tax compliant, in this way contributing to the fiscus. The procurement strategy continues to focus on increasing expenditure with small businesses and those businesses owned by previously disadvantaged individuals (in line with government priorities and objectives).

EFFICIENCY RATIO

More significantly, management remained committed to and continued the drive to allocate savings from operational expenditure into investments. As a result of strict budgeting and focused spend to investment-related activities, the efficiency ratio improved to 13.7% against a target of 15%.

BUDGET 2023/24

Going into the new year, TIA has an allocation R460.1 million with a commitment book of R209 million and just over R251 million available for investments and operational expenditure. While this funding remains inadequate for the purpose of fulfilling the organisation's mandate effectively, the additional funding from the Innovation Fund (R100 million) and potential funding for the Hydrogen Economy and Vaccine Manufacturing will serve to bridge this funding gap, especially as no inflationary increase has been built into the following financial years in the MTEF. Given the past performance, the organisation is therefore well poised to deploy funds effectively in the NSI and to continue to bolster its funding capacity through the effective leveraging of partnerships.



Mr Ismail Abdoola
Chief Financial Officer



7. STATEMENT OF RESPONSIBILITY AND CONFIRMATION OF THE ACCURACY OF THE ANNUAL REPORT

To the best of my knowledge and belief, I confirm the following:

- All information and amounts disclosed in the annual report are consistent with the Annual Financial Statements (AFS) audited by the Auditor-General.
- The annual report is complete, accurate and free from any omissions.
- The annual report has been prepared in accordance with the guidelines on the annual report as issued by National Treasury.
- The AFS (Part E) have been prepared in accordance with Generally Recognised Accounting Practice (GRAP) standards applicable to a public entity.
- The Accounting Authority is responsible for the preparation of the AFS and for the judgements made in this information.
- The Accounting Authority is responsible for establishing and implementing a system of internal control that has been designed to provide reasonable assurance as to the integrity and reliability of the performance information, the human resources (HR) information and the AFS.
- The external auditors are engaged to express an independent opinion on the AFS.
- In our opinion, the annual report fairly reflects the operations, the performance information, the HR information and the financial affairs of the entity for the financial year ended 31 March 2023.

Mr Patrick Krappie
Acting Chief Executive Officer
Date: 28 July 2023

Ms Matsi Modise
Board Chairperson
Date: 28 July 2023



8. STRATEGIC OVERVIEW

TIA was established to promote the development and use – in the public interest – of discoveries, inventions, innovations and improvements. The objective of the Agency is to support the state in stimulating and intensifying technological innovation in order to improve economic growth and the quality of life for all South Africans.

TIA's 2020–2025 Strategic Plan seeks to position the Agency in the NSI by pursuing three outcomes:

OUTCOME 1 — **Commercialised innovations**

TIA seeks to direct a greater proportion of its resources at the translation and commercialisation of publicly financed IP emanating from universities and science councils.

OUTCOME 2 — **Delivering on the Bio-economy Strategy**

TIA is the main implementer of the Bio-economy Strategy, through which South Africa's unique biological resources, historical biotechnology investments and bio-based capabilities are used for greater socio-economic value.

OUTCOME 3 — **SMMEs supported through strategically informed and regionally distributed Technology Stations**

TIA aims to foster an enabling environment for innovation, with a specific focus on driving transformation and ensuring inclusion by providing SET and enterprise development services.

TIA's vision, mission and values are as follows:

Mission

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

Values

TEAMWORK
Together we can do more. Fostering teamwork creates a TIA work culture that values collaboration and cooperation.

PROFESSIONALISM
At TIA, we apply the most appropriate skills, competencies, experience and knowledge of best practices cohesively in conducting our work.

EXCELLENCE
TIA will be accountable to all stakeholders to deliver exceptionally high standards of work and performance.

TRANSPARENCY
Engage in inclusive open communication and hold one another accountable for our performance and conduct.

INNOVATION
At TIA, we foster a culture where we continually nurture and implement new ideas from our staff and stakeholders that enhance the way we do things and deliver services.

INTEGRITY
At TIA, everyone strives to do what they said they would. "We Keep our word."

Vision

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

9. LEGISLATIVE MANDATE

TIA's mandate is derived from the provisions of the TIA Act 26 of 2008,[1] which establishes TIA as an agency to promote the development and exploitation, in the public interest, of discoveries, inventions, innovations and improvements. TIA's objective is to support the state in stimulating and intensifying technological innovation that improves economic growth and the quality of life of all South Africans.

The Science and Technology Laws Amendment Act 9 of 2020 came into effect on 1 April 2021. Several amendments were made to the TIA Act 26 of 2008, with a key change enabling the Agency to perform any function in any territory outside South Africa. This change empowers TIA to pursue international partnership opportunities more intentionally in order to achieve its objectives in fulfilment of its mandate.

10. ORGANISATIONAL STRUCTURE

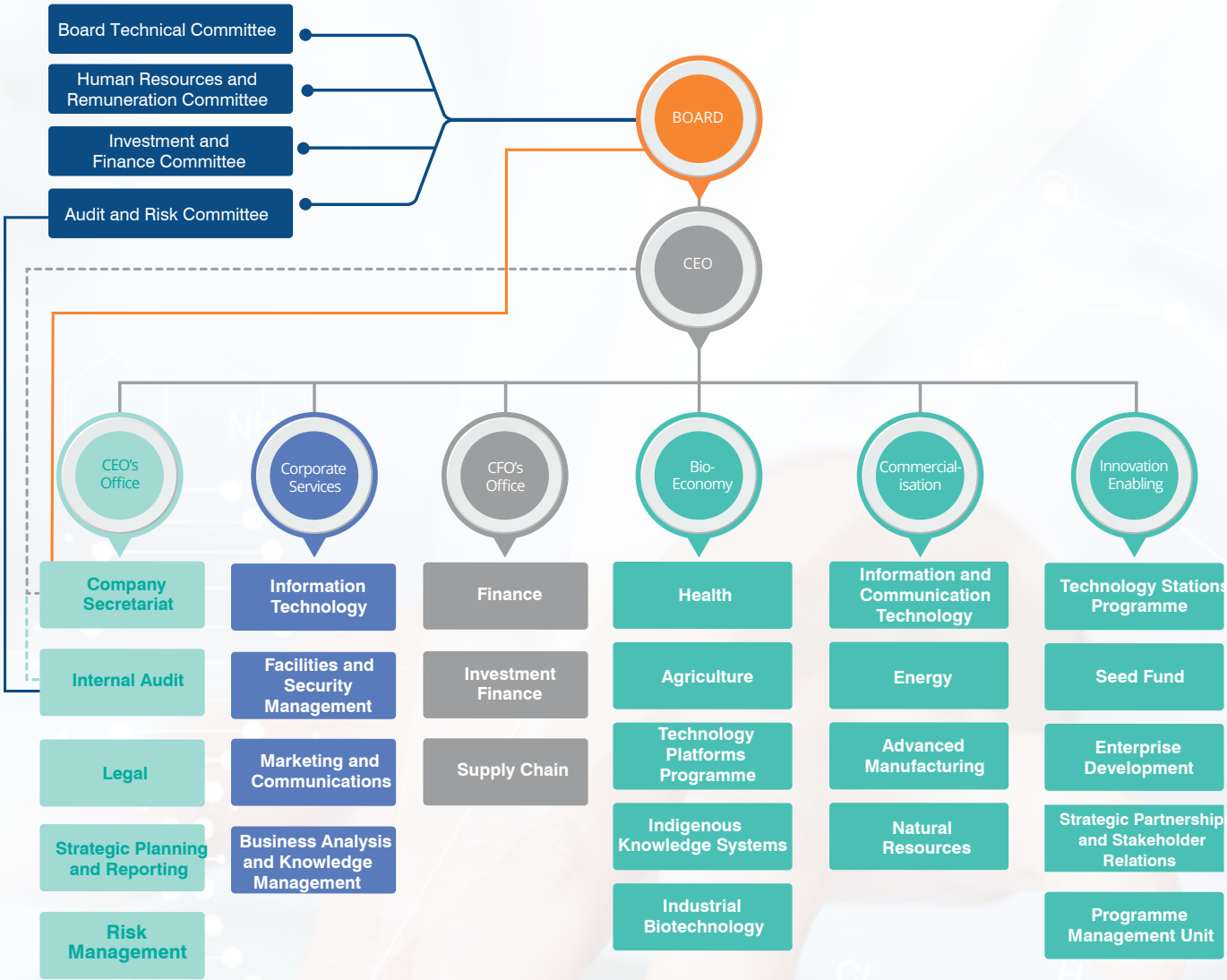


Figure 1: TIA's organisational structure

[1] As amended by the Science and Technology Laws Amendment Act 7 of 2014 and the Science and Technology Laws Amendment Act 9 of 2020, with effect from 1 April 2021.



PART B

Performance Information

11. PERFORMANCE OVERVIEW

Broadly speaking, TIA has maintained its focus on several key matters during the financial year, namely, effective delivery against the 2022/23 Annual Performance Plan (APP), maintaining sound governance and financial management, improving TIA's brand equity in the market, managing the impact of the Ministerial Review process on staff morale and, most recently, positioning itself to respond appropriately to the review findings and recommendations.

11.1 Service delivery environment

TIA recorded a year-end output performance achievement of 94%, representing a total of 17 targets achieved out of 18 output indicator targets for the year. This is a favourable achievement compared to the Agency's performance of 86% in 2021/22. This performance has been achieved in an environment with many challenges, including a period during which there was a worsening of the energy crisis which constrained the activities of many businesses that benefit the economy. This has eroded economic growth and constrained the fiscal environment in which TIA receives its MTEF allocation and leverages funding.

The President's State of the Nation Address confronted many issues that reflected a country grappling with serious socio-economic challenges of loadshedding, crime, corruption, poverty, widening inequality, gender, youth unemployment and rising cost of living, among other issues. The Budget Speech, delivered by the Minister of Finance, painted the picture of a country in serious debt, a shrinking economy, with real gross domestic product (GDP) growth projections revised downward to 1.4% compared to 1.6% in October 2022 and general global risks of a real economic downturn.

The most significant development for TIA in the year was the release of the Ministerial Review Report. The report emerged from a process that commenced in November 2019 which brought about high levels of uncertainty as the outcome of the process was unknown for some time. The release of the report has restored optimism about the future and has led to an attitude that is focused on recalibrating the organisation to a "TIA 2.0".

The second most important development is the Cabinet's approval of the Decadal Plan that has been in the development and drafting process since the publication of the White Paper in 2019. The Decadal Plan embeds the policy direction for the STI, with clearly defined outcomes and indicators. To develop TIA's strategy, the business and operating model on the journey to TIA 2.0 over the ten-year period will need to respond to the priorities defined in the plan.

Through its mandate, TIA strives to ensure that innovations derived from scientific research and technology development make a greater impact on society and the economy while at the same time preserving the environment. TIA has identified several opportunities to launch strategic high-impact innovation programmes to support the execution of the organisation's mandate. These initiatives are intended to position TIA as a thought leader in the NSI, enabling it to play a strategic role as a catalyser, connector and enabler.

11.2 Organisational environment

11.2.1 Operational structure

The organisational structure as approved by the Board and informed by the current TIA Strategy was maintained to ensure its alignment with the business objectives ultimately to improve operational efficiencies and effectiveness. The structure comprised 192 positions, including permanent and fixed-term contractors. The creation of business capabilities and capacity with requisite skills and competencies to deliver the business mandate was essential, given the turbulent market shifts and changing employee demands. Our robust Employee Value Proposition was executed to attract and retain key skills while natural attrition was experienced due to a competitive external market. The use of external expert services was leveraged where skills gaps were identified and filled to enable enhanced investment turnaround time.

11.2.2 Operating environment

TIA has fully embraced digital transformation since the advent of COVID-19, which made it necessary for people, process and technology changes to meet stakeholder demands. Hybrid work arrangements have become the norm, with employees working partly from TIA's offices and partly remotely with guaranteed business efficiency. Business capabilities to enable hybrid work included full process automation, the provision of end-user devices and technology, together with varied information security tools for network and device protection for confidentiality and maintaining business integrity. Change management was one of the key focal areas to create lasting shifts in the way the Agency supports its employees and prepares for the future.

Loadshedding challenges, a struggling economy and the need for a rapid organisational response to change were some of the key issues that continued to have an impact on the ability of business to become agile, modify and move forward. Several strategic interventions were executed to mitigate business risks and to provide optimal support to employees for business continuity and success.

11.2.3 Customer service and quality management

Customers and stakeholders are at the heart of TIA's business, requiring process flexibility, agility and adaptability for operational excellence. The Agency maintained its ISO 9001:2015 certification after a successful annual surveillance for enhanced process effectiveness and compliance with governance requirements.

Annually, TIA conducts a customer satisfaction survey to determine stakeholder sentiment as customers engage with the Agency through its core divisions. The survey seeks to understand the satisfaction levels among TIA clients, partners and other stakeholders that provide complementary services to innovators and to assess the drivers of and barriers to satisfaction and to identify any service-delivery problemss.

Conducted by an external service provider, the survey results show overall satisfaction with the service received from TIA of 7.1 out of 10. Generally, innovators, researchers, SMMEs, our partners and co-funders expressed positive satisfaction, including those applicants whose applications were declined by TIA.

To a proportion of our stakeholders whose expectations of TIA fell short, the Agency will attempt to understand the areas of dissatisfaction based on the outcomes highlighted in the survey and will continually strive to identify ways of improving service levels. In order to improve our relationship with our stakeholders TIA plans to embark on constant communication and engagement programmes through various platforms.

The Customer Relationship Management system is a central point of contact for all stakeholder and customer escalations, including investment support and guidance. The year under review was marked by a reduced number of complaints while the issue of delayed turnaround times for investment approval persisted, with stakeholders citing lengthy internal processes for decision-making.

TIA began implementing a new Enterprise Resource System to automate the investment management process and to integrate existing stand-alone functional systems. The first phase of implementation was undertaken successfully with the launch of a fully fledged TIA Stakeholder Portal. This portal is accessible using the latest digital platforms and devices and offers applicants the ability to check their application status.

11.2.4 TIA's brand visibility

The TIA 2020–2025 Strategic Plan articulates brand visibility as one of the key focus areas for the Agency. In the year under review, TIA has made strides in enhancing its brand awareness in the market by embarking on a number of activities that continue record good performance towards greater brand visibility. This was followed by the development and approval of a Marketing and Communications Strategy and a Stakeholder Strategic Framework to enhance brand equity.

Marketing and communications

There was a continued drive to manage and increase brand equity through tactical and business support initiatives, marketing and communication activities to increase brand awareness, and positioning and communicating the success stories stemming from TIA-supported initiatives. These activities included marketing campaigns, strengthening relations with media, and strengthening of existing and establishment of new owned communication channels.

For the year under review, TIA generated a total of 339 media clippings, with an Advertising Value Equivalence of R21.9 million. Coverage was led by print media, followed by online, broadcast and social media.

In an effort to enhance external engagement, TIA launched a quarterly external digital newsletter, which is shared with stakeholders. The newsletter aims to keep stakeholders informed of developments in the organisation and to communicate TIA's brand story.

Evolving technology continues to present new opportunities for TIA-owned media. Social media have revolutionised marketing and communication practices. A drive aimed at increasing the engagement and presence of TIA in social media was launched. This has resulted in increased followership and more engagement on TIA's social media platforms.

Strategic engagements and events

A vital element in TIA's strategy to deliver on its mandate is continuous engagement with various stakeholders in the NSI, industry, the public sector and HEIs. This is achieved through establishing mutually beneficial partnerships and collaborating with similar organisations locally and internationally.

For the year under review, TIA hosted and participated in 33 events as a strategic partner, headline sponsor and participant in several strategic local and international industry events, which also attracted innovators and government officials. These events included the BIO Africa Convention, the SA Innovation Summit, the AfricArena Grand Summit, the Kenya Innovation Week and the World Climate Summit – The Investment COP 2022.

11.2.5 Office facilities and remote working

TIA formalised hybrid work arrangements by implementing the remote-work policy which enabled employees to work from the offices and home, where necessary. The need for employee collaboration, teamwork and knowledge sharing was a fundamental aspect requiring staff to be in the office on agreed days to foster the organisational culture while keeping the TIA values alive through business operations.

Health and safety regulations and compliance were maintained in the workplace to mitigate the risk of illness or death of TIA's employees. Risk assessments were conducted for all the offices prior to the commencement of office work by means of monitoring measures. Office occupancy was kept at no more than 50% of capacity daily, which allowed for any hazardous impact to be managed proactively. Preventive equipment was provided to employees and open-plan offices were managed to minimise any risks of infection.

11.2.6 Investment approval turnaround times

TIA's assessment process for funding applications is thorough, which ensures that decisions taken on its limited discretionary funding are based on a sound and rigorous due diligence process. The measurement demonstrates the efficiency of TIA's systems and capabilities to assess applications for funding.

Benchmarking the Agency's practices against similar innovation agencies globally in 2021 revealed that similar processes are followed in TIA and that the turnaround times are approximately six months. In 2021/22 the Agency introduced separate turnaround time indicators based on the amount of funding applied for and the associated complexity of each application building and assessment process.

In September 2022, TIA presented a plan to the Board for the additional measures to be undertaken to reduce the long turnaround times for investment approval. Several limiting factors were identified and progress has been made in resolving them. First, an Enterprise Resource System has been developed and was planned to go "live" on 1 April 2023. This is intended to overcome data system limitations. Secondly, funding processes were found not to be tailored to accommodate funding thresholds. The alignment between process turnaround times and the funding thresholds sought was based on an analysis of TIA's portfolio and turnaround times for 2022/23. Tiered and staged milestone-based funding approvals will be used in future for high-value applications.

Thirdly, TIA's limited internal expertise to undertake due diligence of funding applications and deal structuring will be remedied by broadening the range of external expertise available. TIA will identify and appoint additional experts through nationwide advertising that will commence early in 2023/24. Fourthly, the application of funding instruments is inflexible, which results in protracted negotiations with prospective investees. A benchmarking exercise has been undertaken and several deals piloted under a new paradigm in this regard. Finally, TIA's current approach to investment lifecycle management by Portfolio and Programme Managers is leading to portfolio-loading challenges. As a result, TIA will design and implement a Pre-investment, Investment and Post-Investment Management Structure (PIMS) strategy and structure that will be implemented as part of the Agency's Commercialisation Strategy.

A concerted effort towards shortening the turnaround times for investment approval has already begun to yield results. Compared to 2021/22, in which none of the turnaround time targets were met, TIA met two out of the three turnaround time targets in 2022/23. This is a significant improvement, given that the Agency has often been criticised by external stakeholders for its performance in this respect. Nevertheless, going forward and in order to manage stakeholder expectations, TIA will re-examine whether its turnaround time targets are realistic and achievable, particularly in the sub-R1 million range, where the target is four weeks.

11.3 Key policy developments and legislative changes

South Africa is one of the top 20 emitters of greenhouse gases globally, accounting for almost one-third of all of Africa's emissions – mostly due to the country's reliance on coal for electricity generation. This underscores the importance of an energy transition strategy for the country. At a national policy level, the main policy change of relevance to TIA is South Africa's intention to move away from fossil fuel dependence through the establishment of a Just Energy Transition (JET) Partnership during climate talks at COP26 in Glasgow, Scotland. Together with the European Union (EU), France, Germany, the United Kingdom and the United States ("the International Partner Group") have committed to supporting South Africa's energy transition plans, with funding of US$8.5 billion pledged.

South Africa then presented its JET Investment Plan during COP27; this outlined the country's need, and the investments required, to achieve its decarbonisation commitments while promoting sustainable development and ensuring a just transition. The International Partner Group pledged an additional US$10 billion during COP27 to support this plan.

Under the JET Investment Plan, the goal to decarbonise South Africa's economy is supported by interventions in three sectors. The priorities of the electricity sector are decommissioning and repurposing coal-fired power plants, expanding and strengthening the national transmission and distribution infrastructure, and accelerating new renewable energy investments. Concerning new-energy vehicles, the priorities are to decarbonise the industry and support a supply-chain transition to sustainable manufacturing. These priorities include transitioning to manufacturing electric-vehicle parts and vehicles. Finally, the green hydrogen sector aims to overcome emission challenges in the hard-to-abate energy-intensive sectors such as mining, steel and cement manufacturing and heavy transport equipment.

In the year under review, a draft Public Procurement Bill was under development. The Bill repeals the Preferential Procurement Policy Framework Act 5 of 2000 and aims to create a single framework for public procurement and eliminate fragmentation in the laws dealing with public procurement. Significantly, the draft Procurement Bill provides for South Africa's national objectives to be advanced, specifically transformation and the empowerment of women, youth and persons with disabilities. The draft Bill also promotes localisation and supports local innovation and research. It also signals a preference for procurement on the part of SMEs in South Africa. The draft Bill will be considered by parliament in 2023/24.

Specific to the NSI, the most significant development for TIA in the year under review was the release of the Ministerial Review Report. An institutional review process commenced in November 2019, with an expert panel



appointed in 2021 by the Minister of Higher Education, Science and Innovation to undertake a supplementary institutional review of TIA. The brief provided to the expert panel was to formulate scenarios and recommendations regarding TIA's prospects in the NSI based on a ten-year retrospective perspective of TIA. Specifically, the panel was requested to determine whether there is an ongoing need for TIA and, if so, whether it should be in its current or a different form.

The resulting institutional review report, dated 30 April 2022, was received by TIA in December 2022. The review report reflected a fair and constructive process based on comprehensive engagements with various stakeholders in the NSI. As acknowledged, the entity has faced several challenges in the execution of its mandate during the period of its operation, challenges influenced by a number of internal and external factors. Despite this, the Agency has shown a positive trajectory in the fulfilment of its mandate and boasts a number of initiatives that have had a significant influence and impact within the innovation ecosystem.

The report of the expert panel affirmed that TIA's mandate to respond to the market failure challenge (innovation chasm) remains relevant, and that the Agency is correctly positioned in the highest risk location in the innovation ecosystem. The panel observed that TIA's implementation record was fair and that its COVID-19 response was commendable. The Agency's fundamentals are in place: productive investments and a promising, albeit sub-optimal investment pipeline.

A "TIA 2.0" model was recommended, with this new TIA possessing the requisite functionalities and capabilities to commercialise research successfully. As part of TIA 2.0, the panel recommended that a new business case should be developed with bold new initiatives supported by the DSI for expansion and capital scale-up over the next ten years.

In December 2022 the Cabinet approved the Decadal Plan on Science, Technology and Innovation. The plan is the roadmap and implementation plan of the 2019 White Paper on Science, Technology and Innovation, which commits South Africa to furthering the role of STI in economic and social development and emphasises inclusivity, transformation and partnerships for an innovative society and economy.

The plan has five thematic focus areas: (1) modernisation of the agricultural, manufacturing and mining sectors; (2) exploitation of new sources of growth, particularly the digital and circular economy; (3) health and energy research and innovation programmes; (4) using STI to support a capable state; and (5) addressing key societal grand challenges: climate change and environmental sustainability, the future of education, skills development and work, and the future of society. Towards the development of TIA's strategy, the business and operating model on the journey to TIA 2.0 will accordingly respond to the priorities defined in the Decadal Plan.

12. PROGRESS TOWARDS ACHIEVING INSTITUTIONAL IMPACTS AND OUTCOMES

TIA's 2020–2025 Strategic Plan seeks to improve the quality of life of all South Africans through innovation. In order to position the activities of TIA within the framework of the Medium-Term Strategic Framework, the National Development Plan, and other DSI priorities, TIA's 2020–2025 Strategic Plan and its 2022/23 APP were structured around three outcomes for directing the initiatives of the Agency during this period.

Outcome 1: Commercialised Innovations contributes directly to TIA's mandate, which emphasises supporting the development and exploitation of technological innovations by translating knowledge into market-ready innovations. The planned focus for TIA's five-year strategic cycle is to support advancements that revitalise and transform key industry sectors of the economy and new-venture creation through commercialising the maturing TIA investment portfolio.

The conversion of these investments in technological innovations into the creation of new industrial ventures will contribute to dealing with South Africa's triple challenges of poverty, unemployment and inequality. The efforts and rigour in full investment lifecycle management has unearthed possible redemption opportunities and rising royalty income in the commercialisation division. This affirms the true potential of these technologies to contribute to meaningful economic transformation and realise equitable acquisitions that will grow the financial position of the Agency. In doing so, the Agency will be better placed to service its mandate and foster the transformation agenda in collaboration with Broad-Based Black Economic Empowerment (B-BBEE) candidates identified with the support of the Black Business Council.

For the period 2020/21–2022/23 TIA has recorded a performance of 136 technological innovations introduced into the market against a three-year target of 80. The Agency is well positioned to achieve its five-year target of 175 by the end of 2023/24, the fourth year of the five-year strategic cycle.

Outcome 2: Delivering on the Bio-economy Strategy gives effect to TIA's implementation of the Bio-economy Strategy. This strategy seeks to support the translation of South Africa's knowledge resources into sustainable bio-based solutions that respond to societal challenges while contributing to sustainable economic growth. This outcome will also contribute to increased productivity across the four sectors identified in the strategy: agriculture, health, industry, environment and indigenous knowledge-based (IK-based) innovation.

During the period 2020/21–2022/23, the Agency supported 110 bio-based technologies, products or services compared to the three-year target of 36: TIA has already exceeded its five-year target of 75 by a significant margin. Over the same period, TIA unfortunately did not achieve its target of having 335 bio-based entrepreneurs and organisations access high-end SET support, recording only 277 during this period. TIA will intensify its efforts to achieve this target by the end of 2024/25, the final year of the five-year strategic cycle.

Outcome 3: SMMEs supported through strategically informed and regionally distributed technology stations. Through this outcome TIA aims to increase access to SET knowledge, expertise and high-end equipment in technology innovation, process improvements and product development to innovators and SMMEs to enable them to grow and become more competitive. The Technology Stations Programme (TSP) entails partnering with other role-players in the NSI and investing in technological infrastructure. The TSP and other similar initiatives driven by TIA are closely aligned to relevant industrial sectors so as to promote innovation-led industrialisation, localisation and export promotion.

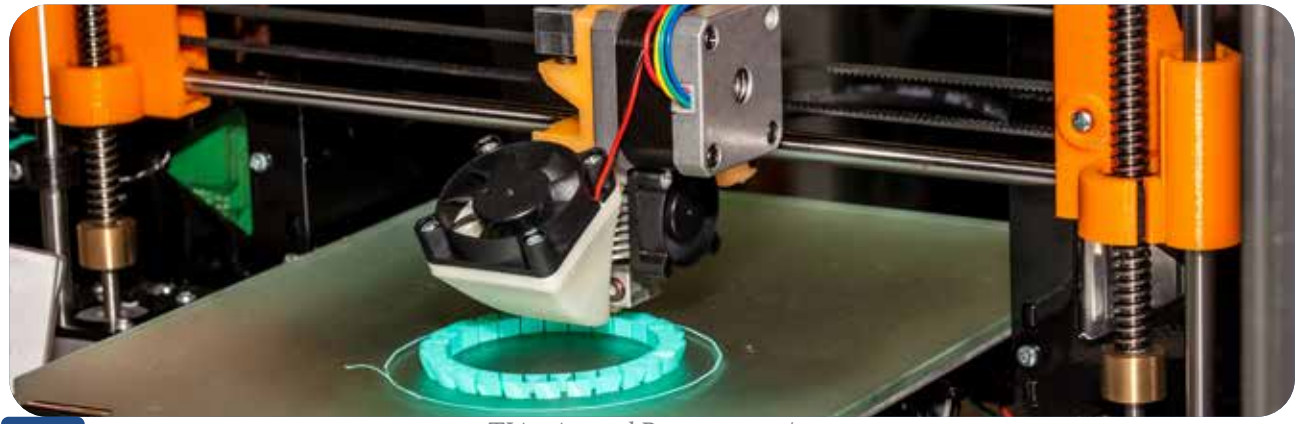
For the three-year 2020/21–2022/23 period, TIA unfortunately achieved a total of only 7,828 SMMEs supported as against a target of 8,790. The Agency is at risk of not achieving its five-year target of 15,750 by the end of 2023/24, but will strive to do everything possible in its attempt to achieve a performance of 90% (14,715) of the target.

Through these three outcomes, TIA responds primarily to Priority 2 (economic transformation and job creation) of the government's 2019–2024 Medium-Term Strategic Framework, but also Priority 3 (education, skills, and health).

TIA's performance against its three outcomes is summarised in Table 1.

Table 1: TIA's performance in 2022/23 against its three outcomes and associated outcome indicators

Outcome	Outcome indicator	Outcome definition	Baseline	Planned five-year target	2020/21 performance	2021/22 performance	2022/23 performance	Cumulative achievement and target	Comments on 2022/23 performance
1. Commercialised innovations	1.1 Number of technologies commercialised	Number of technological innovations that have been introduced into the market for social benefit or commercial gain, directly or indirectly (products, processes or services)	77	175	26 against a target of 9	49 against a target of 31	61 against a target of 40	136 against a target of 80	Target exceeded
2. Delivering on the Bio-economy Strategy	2.1 Number of successfully demonstrated bio-based technologies	Bio-based technologies, products or services that have reached demonstration stage in agriculture, health, industrial biotechnology, IKS and other bio-based domains	–	75	37 against a target of 9	36 against a target of 12	37 against a target of 15	110 against a target of 36	Target exceeded
	2.2 Number of bio-based entrepreneurs and organisations accessing high-end SET services	Bio-based entrepreneurs and organisations accessing high-end SET support for the purposes of developing innovative, bio-based products or services through the financial or non-financial support of the Technology Platforms network	–	600	165 against a target of 105	45 against a target of 110	67 against a target of 120	277 against a target of 335	TIA will continue to pursue this target through improved reporting mechanisms implemented at Technology Platforms
3. SMMEs supported through strategically informed and regionally distributed Technology Stations	3.1 Number of SMMEs accessing SET services	SMMEs that access SET support for the purposes of developing innovative products or services through the financial or non-financial support of the Technology Stations network	10,530	15,750	1,990 against a target of 2,390	3,167 against a target of 3,150	2,671 against a target of 3,250	7,828 against a target of 8,790	Performance for 2022/23 was not at an acceptable level at 82% of the target. The Agency is closely monitoring the progress to achieve the target of 15,750 for the 2020–2025 Strategic period



13. INSTITUTIONAL OUTPUT PERFORMANCE

TIA recorded a year-end output performance achievement of 94%, representing a total of 17 targets achieved out of 18 output indicator targets for the year. This is a favourable achievement compared to the Agency's historical performance, as shown in Figure 2.



Figure 2: TIA's historical performance against its output indicator targets

TIA met or achieved an acceptable level of performance against all its output indicators for the year except for investment decision turnaround time for funding applications (<R1 million category). TIA over-achieved significantly against targets for joint collaborations between academia and industry, technologies diffused for inclusive development, products launched, leveraged funds, bio-based technologies developed, high-level human capital development, innovation products produced, transformation initiatives in underserved provinces and the transformation of TIA's investment portfolio.

Tables 2, 3 and 4 present the Agency's performance against its three outcomes for the Agency's 2022/23 APP targets. Furthermore, Table 5 presents TIA's performance against its administration-related targets.

Table 2: TIA's performance in 2021/22 against Outcome 1: Commercialised innovations

Output *(Output Indicator)*	Audited Performance 2020/21	Audited Performance 2021/22	Planned Target 2022/23	Actual Achievement 2022/23	Deviation for 2022/23	Comments
1.1 Technologies licensed or assigned *(Number of licensed or assigned technologies)*	6	10	15	15	–	Licences continue to dominate as a preferred IP transaction modality compared to assignments. This trend is expected to continue under the Intellectual Property Rights from publicly financed Research and Development Act.
1.2 Joint collaborations between academia and industry *(Number of projects involving industry being executed)*	29	34	36	48	+12	Targets have been exceeded under this metric for the year. This is in accord with established "triple helix" principles under which the likelihood of successful innovation increases when industry participates in research and development (R&D).
1.3 Technologies diffused for inclusive development *(Number of successfully diffused technologies)*	5	12	15	18	+3	TIA exceeded its target for the year due to continued successful implementation of the Innovation for Inclusive Development (IID) programme on behalf of the DSI.
1.4 Products launched *(Number of products launched)*	21	37	28	43	+15	TIA significantly over-achieved against its target for the year. This achievement was on the back of multiple product launches which are the subject of revenue-bearing agreements. Once more, the role of publicly funded R&D organisations featured in multiple launches as well as small and transformed small businesses.
1.5 Leveraged funds *(Total rand value leveraged)*	R1.37b	R746.5m	R250m	R600.9m	+R350.9m	One of the indicators proving the extent to which TIA funding decisions are aligned with the market is the rate at which such funded projects can attract co-funding and/or follow-on funding from the market. This continues to demonstrate the de-risking role TIA plays in helping high-risk technologies progress towards the market.

Legend

Performance fully met or exceeded

Table 3: TIA's performance in 2022/23 against Outcome 2: Delivering on the Bio-economy Strategy

Output *(Output Indicator)*	Audited Performance 2020/21	Audited Performance 2021/22	Planned Target 2022/23	Actual Achievement 2022/23	Deviation for 2022/23	Comments
2.1 Bio-based technologies developed *(Number of successfully demonstrated bio-based technologies)*	37	36	23	37	+14	TIA significantly over-achieved against this target due to successfully implementing the DSI's Bio-economy Strategy.
2.2 Technology Platforms managed and supported *(Number of Technology Platforms that are operational and functional)*	7	8	8	8	–	This indicator assesses the performance of the TIA-funded Technology Platforms against several metrics that are critical in determining whether TIA supports a portfolio of world-class facilities. Each Technology Platform is assessed on its activities in relation to technology development, commercialisation support, provision of routine services, capacity development initiatives and the establishment of appropriate quality-control and governance systems to conduct credible scientific research.
2.3 Technology Innovation Clusters managed and supported *(Number of existing Technology Innovation Clusters that are operational and functional)*	5	7	7	7	–	TIA has established and supports Technology Innovation Clusters to promote the adoption of technologies that will improve the competitiveness and growth of various sectors in agriculture, forestry and medical devices.

Table 4: TIA's performance in 2022/23 against Outcome 3: SMMEs supported through strategically informed and regionally distributed Technology Stations

Output *(Output Indicator)*	Audited Performance 2020/21	Audited Performance 2021/22	Planned Target 2022/23	Actual Achievement 2022/23	Deviation for 2022/23	Comments
3.1 New centres established and supported *(Number of new technology and innovation support centres providing SET and enterprise development support in targeted regions)*	1	3	7	8	+1	TIA exceeded its annual target.
3.2 SET and enterprise support provided to SMMEs[2] and cooperatives *(Number of SMMEs and cooperatives receiving SET and enterprise development support)*	1,990	3,167	2,800	2,903	+103	TIA exceeded its annual target.
3.3 High-level human capital development for competitiveness and new industry development *(Number of high-level students and post-doctoral fellows admitted)*	125*	96	121	195	+74	TIA's cumulative performance for the year has exceeded its annual target by a significant margin.
3.4 Innovation products produced *(Number of IP - and knowledge-based innovation products produced)*	137*	179	149	197	+48	TIA significantly over-achieved against its annual target notwithstanding the removal of scientific knowledge-based products from this metric (e.g. journal publications).

Legend

Performance fully met or exceeded

[2] SMMEs include grassroots innovators.

Table 5: TIA's performance in 2022/23 against its administration-related output targets

Output *(Output Indicator)*	Audited Performance 2020/21	Audited Performance 2021/22	Planned Target 2022/23	Actual Achievement 2022/23	Deviation for 2022/23	Comments
A1.1 Good financial governance *(Achieve an unqualified external audit opinion with no financial matters in the audit report)*	Unqualified audit	Unqualified clean audit	Unqualified external audit opinion with no financial matters in the audit report	Clean audit opinion (unqualified audit opinion with no matters of emphasis)	Over-achieved	The statutory audit for 2021/22 was completed in Q2 and TIA's final approved AFS were submitted before the statutory deadline of 31 July 2022.
A1.2(a) Improved investment decision turnaround time for funding applications *(Investment decision turnaround time for funding <R1m)*	–	Target not achieved	Achieve a four-week turnaround time	48 out of 93 applications assessed within four weeks (52%)	Not achieved	Many applications in this category originate from the IID. Such applicants exist outside of formal innovation systems and hence the application-building process is protracted, lengthening turnaround times.
A1.2(b) Improved investment decision turnaround time for funding applications *(Investment decision turnaround time for funding >R1m & <R15m)*	–	Target not achieved	Achieve a 15-week turnaround time	89 out of 107 applications assessed within 15 weeks (83%)	Acceptable achievement	TIA considers its performance as acceptable for A1.2(c) as the Agency met the targeted turnaround times in at least 70% of instances.
A1.2(c) Improved investment decision turnaround time for funding applications *(Investment decision turnaround time for funding >R15m)*	–	Target not achieved	Achieve a 26-week turnaround time	2 out of 2 applications assessed within 26 weeks (100%)	-	Target achieved
A1.3 Support transformation initiatives in underserved provinces *(Allocation of funds to underserved provinces: At least 30% of available investment funds allocated)*	–	–	R19.70m	R43.63m	+R23.93m	Target over-achieved
A1.4 Support the transformation of TIA's investment portfolio *(Allocation of funds to transformed recipients: At least 30% of available investment funds allocated)*	–	–	R19.70m	R30.83m	+R11.13m	Target over-achieved

Legend

Performance fully met or exceeded | **Performance acceptable but not fully met** | **Performance not acceptable**

13.1 Commercialised innovations

For the reporting year, the Agency's performance was commendable across all indicators in this outcome. The number of TIA-funded technologies which are the subject of IP transactions with industry increased markedly; the number of projects involving industry in their execution shot up, demonstrating the much-needed collaboration between academia and industry. More technologies were diffused for inclusive development, more products were launched with a corresponding rise in returns for TIA and, finally, the funding decisions continue to be validated by funds leveraged from the market by way of co-funding or follow-on funding raised by the TIA pipeline.

Technologies licensed or assigned

In the year under review, TIA saw 15 of its supported technologies under its portfolio commercialised through licensing and assignments. As in the previous year, licences continued to dominate as a preferred IP transaction modality compared to assignments.

Medsol AI Solutions, a TIA investee supported through the Industry Matching Fund, offers early and accurate diagnosis solutions for breast cancer, leading to a significant reduction in associated mortality rates. A key advantage of the company's solution is its ability to determine the type of breast cancer upon diagnosis, which helps to determine in real time the type of medication and interventions a patient requires. The company entered into an agreement with Melusi clinics to demonstrate its artificial intelligence (AI)-based breast cancer diagnostic solution. This will allow the technology to be rolled out in rural and township communities, therefore bringing the technology to areas where it is most needed.

MEDSOL AI SOLUTIONS
Delivering Early and Accurate Detection

Free Radical Process Design is a process-engineering start-up that has developed the Rotowinner® containerised demonstration plant – a novel and versatile continuous-electrowinning technology. The technology promises to increase mine production rates, decrease electrical costs and improve operator health and safety. Rotowinner® combines electrowinning and cathode-stripping into a single continuous operation by reshaping existing parallel-plate electrodes into a rotating cylinder configuration. The technology has been licensed to Orion Minerals to evaluate the treatment of hard mine wastewater from its Prieska site in the Northern Cape to recover calcium and magnesium and to produce a saleable water product.

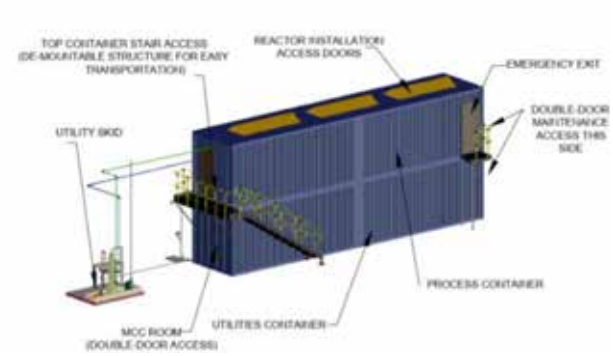


Figure 3: Rotowinner plant container design

Next generation cattle-tick vaccine: An increase in acaricide resistance due to the over-use of chemicals to control tick infestations poses a threat to livestock farmers in sub-Saharan Africa. With TIA funding support, a next-generation cattle-tick vaccine with an efficacy of 90% has been developed by the University of Pretoria (UP) in collaboration with the Council for Scientific and Industrial Research (CSIR) based on defined molecular interactions between hosts, ticks and the pathogen. A promising novel antigen TC-X has been developed that achieves the desired efficacy levels when combined with the currently used antigen Bm86. The resulting IP has been licensed to Afrivet (Pty) Ltd for commercialisation and product distribution.

Kraalbos biostimulant product: The Galenia africana plant species, also known as "kraalbos" or "geelbos", is endemic to southern Africa, occurring in Namaqualand and the western and southern Karoo. The plant is used by the Khoi-San people to relieve toothache and treat wounds. TIA funded a University of the Western Cape (UWC) project in 2008 in the amount of R8.7 million to develop a kraalbos biostimulant product. The resulting product called iBATECH® contains flavonoids with plant disease-control properties and causes an increased polyphenolic content in plants. The product is intended for use in the agrochemical industry as a value-adding pesticide and fertiliser that improves overall crop health, quality and yield. A South African adjuvant patent was filed in 2010, an international biostimulant patent was filed in 2015, an adjuvant registration in 2010, and a kraalbos biostimulant registration in June 2019. Subsequent field trials were successful and UWC has licensed iBATECH® to KBHP (Pty) Ltd for commercial scale-up and sales.



Figure 4: The iBATECH® product

Noot-A-Bug: Applied Protein Biotechnologies (Pty) Ltd is an SMME incubated through the Industrial Biocatalysis Hub, a TIA-funded initiative with the support of the DSI. The company entered into an agreement with the CSIR for the development and transfer of a new technology for the production of Noot-A-Bug. This product is a potent natural insect repellent and insecticide that is non-toxic to human beings but effective against insects such as mosquitoes, house flies, ticks, bed bugs and aphids. Noot-A-Bug is produced through a process of enzymatic oxidation of a blend of cold-pressed natural citrus oils. The insect repellent market is segmented into natural and synthetic insect repellents and globally there is an increasing trend to adopt the use of natural insect repellents due to rising concerns pertaining to the use of synthetic repellents that has been shown to contribute to environmental degradation.

CreditAIs (Pty) Ltd has received support from TIA through the Industry Matching Fund to develop an application programming interface that uses alternative metadata and machine learning (ML) to score the credit-worthiness of SMMEs accurately. CreditAIs predict the capability and propensity of SMMEs to repay a loan, with an accuracy of more than 86%. This will improve the lender's ability to provide credit to SMMEs and give them a better view of their client's credit-worthiness. The company's ML models will also improve credit assessments and ongoing credit monitoring in addition to facilitating the process of securing loans through financial service-providers. Based on accurately the successful development of the technology, the company has entered into a software licensing agreement with Royal Finance Legacy (Pty) Ltd.

The WHC Leak-Less Valve™ technology is an economically viable patented water-control valve designed to be retrofitted into conventional toilet systems. A household toilet can waste 75–150 l of water a day through leaks, this being up to 60% of the monthly average household water consumption. The WHC Leak-Less Valve™ has the potential to reduce water wastage by up to 70% in a toilet system by shutting off the inlet water once the cistern has been filled, and in so doing preventing water leakages from going undetected over long periods of time. TIA supported the development of the technology and the market testing, validation and product pilot rollout. Wagienience (Pty) Ltd, a black youth-owned company and the developer of the technology, has licensed the WHC Leak-Less Valve™ to Massmart (Pty) Ltd. Through this agreement, the company will supply the product to Makro, Jumbo and Game stores in Limpopo, with the potential to further expand into Massmart-owned retailers nationally.

Joint collaborations

At the start of the year, TIA had planned to support a total of 36 initiatives to be undertaken jointly between academia and industry working in collaboration. However, TIA closed the year with 48 such projects undertaken, reflecting an increase in the Agency's partnership efforts with industry.

Vibration testing of batteries: The uYilo e-Mobility Technology Innovation Programme was launched to fast track the development, support and commercialisation of electric vehicles, charging infrastructure, electric power trains and battery systems in South Africa. Nelson Mandela University (NMU) via uYilo partnered with First National Battery for the purpose of battery testing, specifically to provide vibration-testing services for the company according to EN50342-1:2015. Vibration testing is important for First National Battery in order to achieve compliance with the required quality standards and for security for potential customers. The company produces more than 2.2 million batteries a year.

The Eastern Cape Hydropanel Installation is a technology demonstrator project which entails the installation of 400 solar-powered Hydropanels to equip homes with off-grid, infrastructure-free SOURCE Hydropanels. This equipment relies solely on sunlight and air to produce high-quality drinking water in a variety of climates, from very humid to very dry, using solar photovoltaic technology. Source Global CC secured donor funding of USD1 million to provide access to water to the Cutwini, Lujazu, Luphoko and Mthambalala villages in the Eastern Cape. The University of Johannesburg's (UJ's) Process Energy and Environmental Technology Station provided support to the project in the form of site selection, community engagement and technology demonstration, working closely with Source Global and a local engineering firm, EnergiaWater, who oversaw the installation.

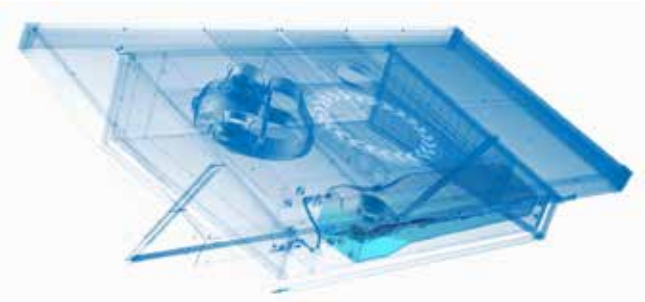


Figure 5: A cutaway animation still of a residential SOURCE Hydropanel

The **evaluation of smallholder pig-production systems** project focuses on the improvement of pig-production efficiency which relies upon the knowledge and understanding of existing farming systems. Adequate knowledge and understanding of the smallholder pig-production systems will allow for the development and adoption of appropriate animal breeding, health, feeding and marketing management practices and technologies, and increase pig supplies and market access for smallholder farmers. This intervention serves to make smallholder farmers more productive by mitigating high feed processes and low farm-gate prices (and therefore low profitability), which were the greatest contributors to the exodus of pork farmers in 2022. The rapid transition of smallholder farmers into commercial farmers with improved production systems will allow these farmers to supply pork to China and Singapore, whose pork consumption is expected to increase. In this regard, the Red Meat Industry Research Association entered into an agreement with Stellenbosch University to further the objectives of the project.

The **Holistic Drug Discovery and Development Centre**, hosted at the University of Cape Town (UCT) and one of TIA's Technology Platforms, entered into an agreement with GlaxoSmithKline (Pty) Ltd and Novartis (Pty) Ltd. The intention of this collaboration is to leverage AI and ML methodology, starting with processing large-scale PGt/x data related to hundreds of drugs and thousands of variants, based on the relatively scarce data specific to malaria and tuberculosis in African populations. This approach has been demonstrated to drastically reduce the time and cost to bring drug candidates into approval for commercialisation. A further agreement was entered into with the Helmholtz Institute for Pharmaceutical Research Saarland LLC to investigate the potential application of synthetic compounds and natural products and their derivatives to the treatment of tuberculosis. The significance of this is that solutions to multi-drug-resistant tuberculosis can be found for use especially in resource-poor regions where it is endemic.

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Lodox collaboration: The Underwriters Laboratories Northbrook and Lodox collaboration agreement entails the development of a new-generation Photon Counting Detection-based Full-Body X-ray Imaging Scanner. This technology will produce high-resolution and diagnostic-quality images at relatively low X-ray doses, faster acquisition times, and with lower radiation exposure to both the patient and the operator. Lodox also aims to include ML as part of the offering that will enable medical specialists to review other previous case studies with similar interventions.

Eezee Holdings (Pty) Ltd, an electronic waste-processing company, entered into a collaboration with the Vaal University of Technology to host one of the six portable electronic waste-shredder unit prototypes built by the university for market readiness testing, data collection and user experience. The portable technology is aimed at shredding the hard drives of laptops and computers on site to ensure that the data stored in them are irretrievable. A further five units will be deployed at Technology Stations or electronic waste-processing companies for further field testing.



Figure 6: An Eezee Holdings electronic waste-collection van and a portable electronic waste shredder

Technologies diffused for inclusive development

TIA is mandated to achieve an impact on both society and the economy. Concerning social impact, technological diffusion entails the deployment of mature or new technologies in society to achieve a social impact, with economic gain in the form of income generation a consideration for beneficiaries. TIA supported the diffusion of 18 technologies in 2022/23, which was three more than the 15 technologies it had aimed to diffuse prior to the start of the year.

AddressDox is a data crowdsourcing and geocoding platform which ensures that residential addresses in rural and informal areas can be harvested, assigned, managed and made accessible to rural households on demand. The platform can also help organisations requiring proof of residence for various operational and compliance requirements to verify residential addresses. AddressDox ensures that the data harvested are also able to help local municipalities and traditional authorities with spatial planning. The entrepreneur, Tsholofelo Ramokoka, launched the AddressDox innovation at Tsitsing Primary School to introduce and create awareness of the solution to the Tsitsing community and to distribute the solution to community leaders for further diffusion and deployment.

AddressDox

The **VulAmanz Water Purification Microfilter** is a green engineering technology platform for decentralised water treatment and re-use. The technology is used in three application areas to treat contaminated surface water, specifically rural water filtration, pool wastewater treatment filtration and a pre-treatment filtration. Through the good working relationship between TIA's IID business unit and specific municipalities, the project was successfully diffused to the Harry Gwala and Raymond Mahaba districts in the KwaZulu-Natal and Eastern Cape provinces respectively.



Figure 7: A VulAmanz Water Purification Microfilter in use

Opencharge Wireless Power Technologies (Pty) Ltd is a start-up that develops wireless charging systems for mobile handsets that have in-built wireless charging functionality and those that do not for use in the hospitality and workspace industries. The technology was developed through a partnership between Opencharge and Grind 4 Coffee Pty Ltd. The solution was successfully piloted with a branch of Tigers Milk (Life & Brand Portfolio) in the Western Cape through a digital menu and Wi-Fi connection offering which saw the customer engagement rate increase by 500% compared to a QR code-only offering. A rollout into other Life & Brand Portfolio companies, and piloting and rolling out to other lifestyle, hospitality and retail holding companies is under discussion.



Figure 8: Opencharge wireless charging systems inset in a countertop in a hospitality setting

The Medical Device and Diagnostic Innovation Cluster (**MeDDIC)** was formed by TIA in partnership with the South African Medical Research Council (SAMRC) to assist medical device manufacturers with regulatory and other support to allow them to enter the market. Circumcision is not only of cultural but also of health significance to the local male population as a first-line measure to reduce the spread of HIV and other sexually transmitted diseases. MeDDIC supported Circumfort, which is owned by a young black entrepreneur based in Soweto. The innovation supported is a medical device that promotes wound healing and reduces pain after circumcision.

Memeza Shout (Pty) Ltd is a black woman-owned social enterprise that has developed a public alarm system endorsed by the national government and the South African Police Service (SAPS). The system is designed and built for low-income communities and seeks to improve the safety of the most vulnerable people in society (woman, children, the elderly and persons with disabilities) and in public schools and SMMEs who do not have access to the private security industry. Memeza deployed 350 community alarms in Ugu District in the KwaZulu-Natal province.

Products launched

Launching a product in the market is one of the principal goals of TIA as proof that it is delivering on its mandate to commercialise public-funded IP. TIA significantly over-achieved against this objective for the year. A total of 43 products were launched, almost double the planned 28 products.

CapeBio Technologies is exploring a new approach using ML and AI to develop Africa's first Biomanufacturing Platform using indigenous microbial data. Traditionally, microbes are detected by culturing them in a laboratory. The company has undertaken identification of the DNAseI enzyme and the ensuing production, purification and functional analysis. The enzymes were recombinantly produced in *E. coli* and purified by Ni-NTA affinity chromatography. Market demonstration has taken place with customers, who have evaluated the product and its performance expressing satisfaction.

Kingfisher Medical, was funded by MeDDIC as part of its localisation technology initiative aimed at the local manufacture of products with expired patents. The company has successfully manufactured and commercialised medical cutting burs, which are used in surgery for cutting hard tissue such as teeth and bone. The first locally manufactured burs were used in surgery in July 2022 at Life Hospital Faerie Glen in Gauteng.



Figure 9: Sterile, round ball and fluted burr produced by Kingfisher Medical for use in surgical procedures

Quickloc8 has developed a low-cost passenger-counting device to curb the problem of revenue leakages in the taxi industry. The purpose of the AI-based solution is to continuously monitor and count commuters coming in and out of a working taxi during the day. The device is linked to a mobile application used by the taxi owner to receive insights into and intelligence about daily operations such as passengers per load, daily loads, compliance with traffic rules, real-time global positioning system (GPS) tracking and daily revenue. The solution has gained significant interest with an influential stakeholder, the South African National Taxi Council. This saw the initial product uptake of four TAXICAM and 48 DASHCAM installations.



Figure 10: Quickloc8 smartphone visualisations

Funds leveraged

The extent to which TIA funding decisions are aligned to the market is reflected in the extent to which funded projects attract co-funding or follow-on funding from external parties. TIA aimed to leverage R250 million according to its formal 2022/23 APP target, although it set itself a "stretch" target of R600 million internally. Accordingly, TIA achieved R600.9 million in the year under review.

According to best practice and in line with the annual National R&D Survey undertaken for South Africa, the funds leveraged have been categorised by five different types of organisation: Business, Government, Science Councils, Not-for-Profit and Higher Education, as shown in Figure 11.

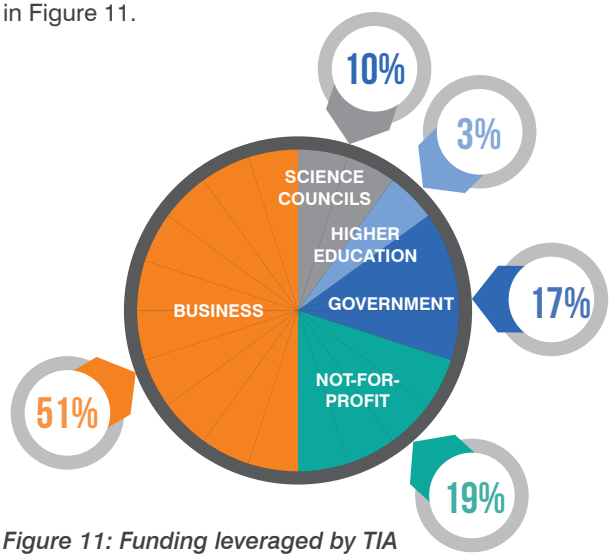


Figure 11: Funding leveraged by TIA in 2022/23 according to organisation type

The greatest portion of funding leveraged was from the Business sector, accounting for R306.5 million (51%), followed by the Not-for-Profit sector at R115.1 million (19%) and Government R100.1 million (17%). This is followed by the Science Councils sector at R58.0 million (10%) and the Higher Education sector at R21.2 million (3%).

The more than half of the funds leveraged from Business or the private sector demonstrates the de-risking role TIA plays in helping to commercialise high-risk technologies by progressing them towards the market.

13.2 Delivering on the Bio-economy Strategy

TIA met all its output targets under Outcome 2: Delivering on the Bio-economy Strategy for the year under review, reflecting TIA's consistent commitment to implementing the Bio-economy Strategy.

Bio-based technologies developed

TIA is the primary implementing partner of the DSI's Bio-economy Strategy, of which the development of bio-based technologies is a key measure. TIA has significantly over-delivered against its goal to develop 23 bio-based technologies in the year with 37 such technologies developed.

Upland rice development and production: The Agricultural Research Council's project to establish upland rice development and production in South Africa entails evaluating 160 foreign rice germplasm. The aim is to create a pre-breeding programme to adapt upland rice genotypes for multiplication for further development under upland growth conditions. Positive results were achieved from data collected from seeds planted and plants harvested and also from the analysis that was conducted in the glasshouse and field trials. The outcome showed a remarkable achievement in the successful demonstration of the adaptation of at least three upland rice accessions under dryland conditions.

Sawubona Mycelium (Pty) Ltd, a bio-based SMME supported by the TIA Bioprocessing Platform, has used fermentation technology to develop two beta-glucan-based bioproducts. One product can be used in the formulation of face ointments or serum, whereas the second can be used as an ingredient in the formulation of skin lotions or moisturisers (anti-ageing and hydrating properties). Dermatological tests were conducted by an independent laboratory to demonstrate their safety for human use and efficacy against wrinkles, and in skincare formulations. These cosmetic beta-glucan-based skincare products are available to the market under the Blu Beryl™ brand.



Figure 12: Sawubona Mycelium's Blu BeryITM products

TIA's **Bioprocessing Platform** has provided technical support to the South African Sugarcane Research Institute to develop monoclonal antibodies that can detect the bacterium ***Leifsonia xyli xyli***, the causative agent of Ratoon Stunting disease. The antibodies developed from the project have undergone external validation at the Funulwazi Development Academy. The two monoclonal antibodies (Anti-Lxx-1 and Anti-Lxx-2) have been demonstrated as a detection assay in an agriculture setting to detect the pathogen that causes Ratoon Stunting disease.

The **Active Pharmaceutical Ingredients (API) Cluster Programme** is a local strategic initiative aimed at the creation of APIs used in the manufacture of critical medicines. Funding through the cluster-enabled demonstration activities for two APIs was used to treat hypertension and malaria which will undergo further development. Through local API manufacturing, the aim is to reduce costs and reliance on global counterparts and also ensure security of supply.

Under the **South African Biodesign Initiative (SABDI) programme** a deliverable of the Open Genome Project was the creation of the open genome registry which houses critical genetic, exomic, biochemical and physiological information of different cancer aetiologies. Students and health professionals from the public and private sectors successfully used the registry to classify cancers and adopt suitable treatment for new patients, which included genetic counselling.

13.3 Innovation enabling and SMME support

TIA manages several initiatives that are intended to increase the participation of entrepreneurs, innovators and SMMEs in technological innovation. This includes enabling access to key infrastructure capabilities (such as Technology Stations) and other innovation-enabling interventions (such as Innovation Skills Development and Enterprise Development – the Grassroots Innovation Programme or GIP). These are key offerings that contribute to Outcome 3 of TIA's 2020–2025 Strategic Plan.

TIA continues to support broader society, from universities (HEIs) and science councils to cooperatives and communities. TIA's portfolio has diversified, particularly in the Seed Fund, where the majority of the new projects invested in are for the translation and commercialisation of publicly funded IP emanating from HEIs and science councils. More than half of these new projects are aligned with the bio-economy.

New technology and innovation support centres providing SET support in targeted regions

TIA has established new centres in Technical and Vocational Education and Training (TVET) college-linked entities and government agencies to increase access by SMMEs to suitable facilities. The intention is to expand TIA's reach to many SMMEs that do not have access to existing SET infrastructure. These efforts supplement SET and enterprise development support extended to SMMEs primarily through TIA's Technology Stations, but also other initiatives such as the existing Technology Platforms and Living Labs.

The Zenzeleni Connectivity Initiative model seeks to provide a solution to the prevailing digital divide in rural South Africa. The initiative is implemented by the UWC and relates to the provision of an affordable telecommunications connectivity to citizens, and the uptake and effective use of the network. The model seeks to catalyse the rural digital ecosystem in a way that users of the network can access the social and economic benefits which result from the use of information communication technologies (ICTs).

In Phase I of the Zenzeleni Connectivity Initiative the objective was to test its scalability through seeding a new co-operative. The aim of Phase II is to address other elements of the model, which are not yet well understood, to ensure the development of a comprehensive model for a community network ecosystem that is sustainable. Two ICT hubs were established in the village of Mankosi in the period under review. These hubs are equipped with digital tools and digital media that enable ICT-linked businesses and new enterprises to introduce digital innovation into their business processes.

Three Living Labs were established in the period under review. The Rakgatla CLC Living Lab aims to stimulate innovation and support innovators in Segwaelane village and surrounding villages through offering innovators access to the labs' infrastructure and offering innovation support programme offerings to beneficiaries. The purpose of the Mecwi Living Lab is to provide the community with the necessary skills required to take advantage of opportunities in the Fourth Industrial Revolution (4IR) and in so doing mitigate the impacts of digital poverty. Finally, the Bhongweni CLC Living Lab is focused on creating start-ups and skilled employable youths with new skills aligned to the evolution of economic development sectors in Kokstad.

Textiles Centre: the Gauteng Department of Economic Development has committed R4.65 million to the initial phase of establishing the Textiles Centre at the Tshwane South TVET College, Odi Campus, in Mabopane. The contract with the TVET is predominantly focused on capacity-building and training. In addition, piloting and testing the viability of the required infrastructure will take place over the next three to five years as the Textiles Centre is brought into operation with the support of the Technology Station in Clothing and Textiles at the Cape Peninsula University of Technology.

Digital Entrepreneurship and Innovation Ecosystem/ Centre: This DSI- and TIA-funded initiative for mLab and the Durban University of Technology entails establishing a youth-centred Digital Entrepreneurship and Innovation Ecosystem/Centre in the Imbali Education and Innovation Precinct to enable youths to participate actively and become productive citizens in the digital economy. The objectives of the initiative include building a digital innovation ecosystem that enables the youths to participate in the digital economy. Other aims are to improve the digital skills of unemployed youths, and in so doing enhancing their employment or entrepreneurial opportunities, and building a cohort of entrepreneurs who can use, build and commercialise technological solutions that solve community challenges.

A **Virtual Training Lab** was established by TIA together with Foi Science. The black female-owned micro-enterprise beneficiates organic waste products to create wound-care products, cosmetics and detergents. Fish scales, eggshell membranes and tree fellings are processed to make intermediate products such as biopolymers, collagen, hyaluronic acid, cosmetic actives and activated charcoal. These are blended with medicinal plants and vitamins to make products that accelerate the healing rate of scars, burns and skin conditions. The Foi Science Virtual Hub received R1 million from TIA and trains unemployed women and youths to make and sell such products to communities through a mini-franchise model.





Figure 13: Training being delivered in the classroom and laboratory by Foi Science to community members

Innovation products produced

A key output of the invention and innovation process and efforts to commercialise local innovations is the production of IP and knowledge-based innovation products. TIA planned to support 149 invention disclosures, prototypes, technology demonstrators and technology assistance packages, and significantly over-achieved this, with 197 innovation products produced.

Fusion is a perfusion pumping system connected to a cadaver for surgeons and medical students to practise and obtain surgical skills training in a simulated environment. The system is controlled from a smartphone app. Existing models used to simulate a patient to undertake surgical skills training either do not accurately replicate live human tissue and physiological parameters or are prohibitively costly and technically limited. The system developed is more cost-effective and more suitable and affordable to the developing world market; it is also expected to improve surgical training and accelerate clinical trials on medical devices. TIA supported the project to optimise a prototype and conduct a series of market tests in clinical settings by a neurosurgeon. The prototype was successfully demonstrated and two universities have shown an interest in using the technology.

Ibhayi Dental Solutions has developed a Bespoke Smart Mouthguard product geared to the management and

protection of sportsmen and women against concussion, head and neck injuries, protecting future mental health and, among other things, player longevity and quality of life. With TIA support, the company successfully developed a fully functional and validated prototype of the mouthguard with a revolutionary charging base, linked to a mobile app, including informatics and many more needed features with fully embedded electronics.

The **Institute for Advanced Tooling** at Walter Sisulu University (WSU) designed and manufactured an eco-friendly rapid asphalt plastic pavement machine prototype. Training was given to staff in an engineering environment to operate the machine and produce a surfacing mix to fill potholes and create new road layouts. The innovation has the potential to create approximately ten direct youth jobs and approximately 10–15 indirect jobs.

13.4 TIA's transformation efforts

In line with national imperatives to resolve the triple challenges of poverty, inequality and unemployment through supporting transformation broadly and inclusive innovation specifically, TIA tracks the number of women, youths and persons with disabilities supported (or businesses owned by these groupings). Furthermore, in line with TIA's mandate to support publicly funded IP and underserved provinces, TIA also tracks the value of support it provides to publicly funded research organisations and beneficiaries in underserved provinces.

Support to women, youths and persons with disabilities

At the output performance level, sub-targets are set for women, youths and persons with disabilities. TIA's performance against these targets for 2021/22 and 2022/23 are shown in Figures 14, 15 and 16.

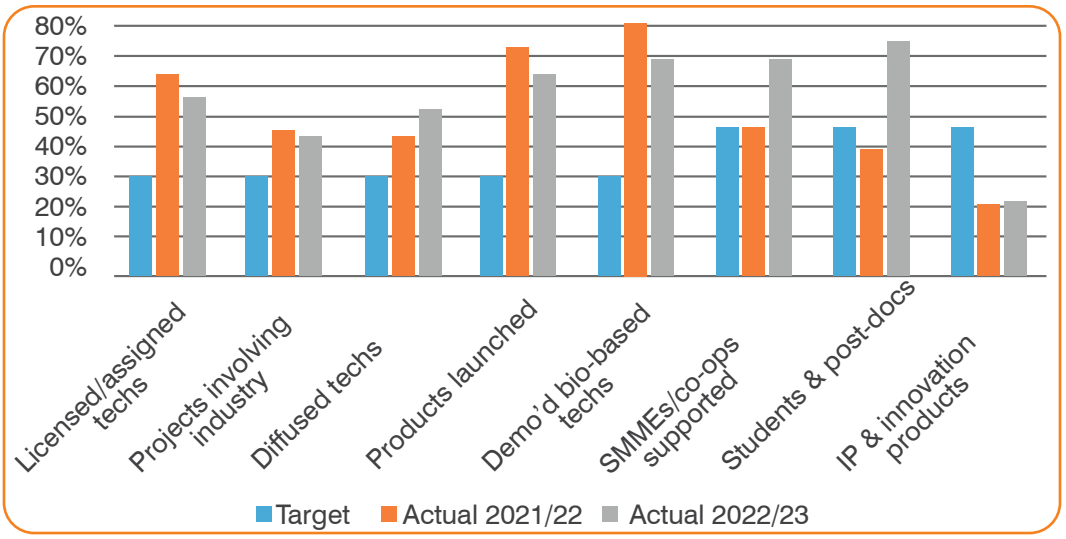


Figure 14: TIA's performance against output targets in 2021/22 and 2022/23 for women

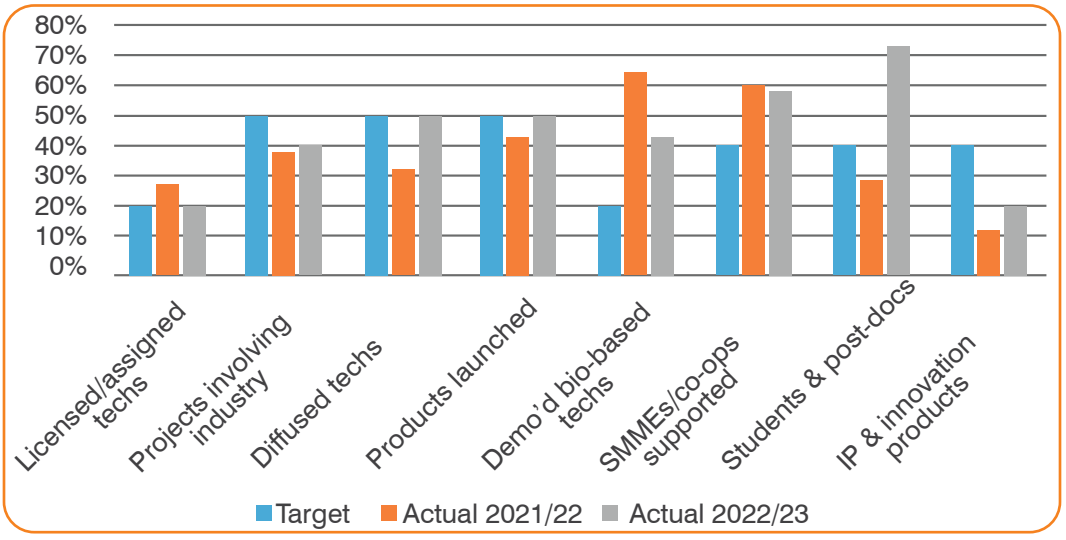


Figure 15: TIA's performance against output targets in 2021/22 and 2022/23 for youth

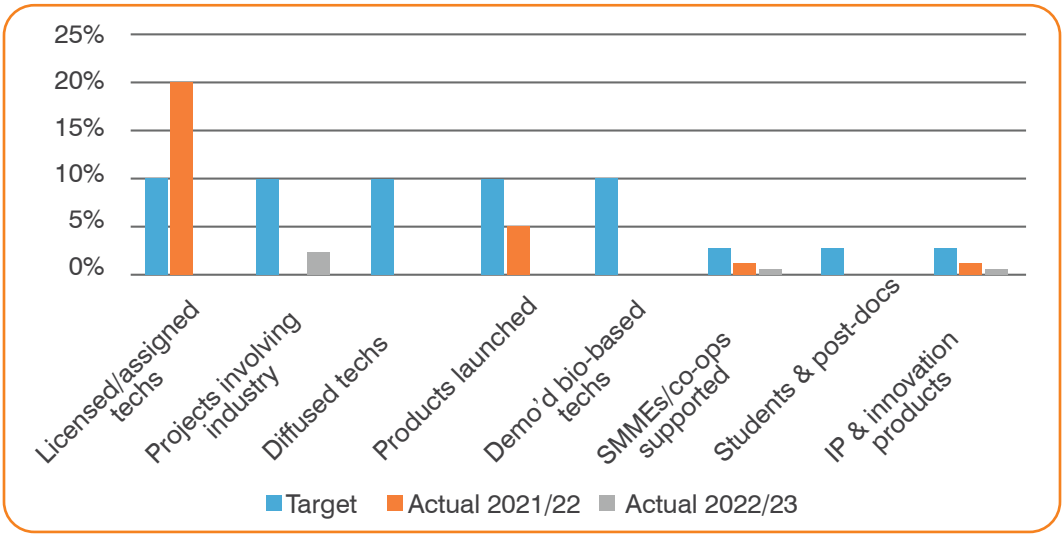


Figure 16: TIA's performance against output targets in 2021/22 and 2022/23 for persons with disabilities

With respect to women beneficiaries, TIA met seven of its eight sub-targets (88%) in 2022/23 compared to six out of eight (75%) in 2021/22. For the youths, TIA met six of its eight sub-targets (75%) in 2022/23 compared to three out of eight (38%) in 2021/22. This improved performance is attributed to improved data collection, given that TIA's women- and youth-focused innovation support programmes have yet to be launched, rather than any specific concerted effort by TIA to improve its performance. Nevertheless, the data provide an important "watermark" for comparison when such programmes are launched.

TIA did not meet any of its targets for support of beneficiaries who are persons with disabilities in 2022/23, compared with meeting one out of eight (13%) in 2021/22. This result underscores the importance of establishing a dedicated innovation support programme for persons with disabilities. Improvements are to be expected in 2023/24 and 2024/25, the last two years of the current five-year strategic cycle.

In future, TIA aims to drive a strong transformation agenda focusing on women, youths and persons with disabilities through launching dedicated innovation support programmes that focus on women, youths and persons with disabilities in 2023/24 to ensure inclusive innovation. In so doing, the Agency will seek to leverage off existing initiatives that focus on supporting these groupings in partnership with other organisations in the NSI.

Disbursements to publicly funded organisations

TIA's mandate is to de-risk promising IP emanating from publicly funded research. TIA's shareholder, the DSI, requires the Agency to direct the bulk of its investment expenditure (approximately 70%) to publicly funded recipients. In 2022/23 TIA's disbursements to publicly funded research organisations (universities and science councils) was 73.7% (R313.3 million) compared to 26.3% (R111.9 million) to non-public (private) beneficiaries. In 2021/22 the proportions were 74.5% and 25.5% respectively. While there will be some variation from year to year, over the past few years TIA has consistency ensured that approximately 75% of disbursements are directed to supporting the outputs of publicly funded research.

Support to underserved provinces

Given the increased focus on transformation in all forms and on inclusive development in innovation and economic and social development policy, TIA took the decision to allocate a portion of its uncommitted funds to recipients in underserved provinces when planning for 2022/23. While the quantum of TIA's commitments may have been modest to start with, this step demonstrates TIA's commitment to dealing with the scourges of poverty, inequality and unemployment through a specific developmental focus.

The Agency's target of R19.7 million to underserved provinces was exceeded by 121%, with R43,6 million recorded. Notable examples of such disbursements are provided below.

African Traditional Medicines: TIA awarded R11.8 million in additional support to the African Medicines Innovation and Technology Development Platform at the University of the Free State (UFS). TIA also awarded an additional grant totalling R6.9 million to the Centre for Human Metabolomics (formerly known as the National Metabolomics Platform) to acquire a new piece of equipment: the SCIEX Triple Quad 5500+ QTRAP. This is a high-throughput liquid chromatography system with

a triple quadrupole mass spectrometer. The equipment will be used for both diagnostic sample analysis and new method set-up.

Algal Biorefinery Support Programme: NMU received R2.2 million from TIA to support the establishment of an Algal Biorefinery Support Programme. Its aim is to provide a stable platform of resources and expertise to develop, package and transfer microalgae technologies to SMMEs to promote the production and commercialisation of algal bioproducts. Appreciable progress was made by NMU, including compiling technology information packages, developing product-formulation manuals, undertaking market reviews and preparing for regulatory requirements for the algal technologies.



Figure 17: Integrated raceway cultivation system (Scenedesmus sp. cultivation) developed at the NMU Algal Biorefinery



ICT Maturity Readiness Tool: TIA entered into a contractual agreement with NMU for Phase 2 of the ICT Maturity Readiness Tool for schools to the value of R3.5 million. The digital tool developed by software engineering students will be deployed to all 25,000 public schools in South Africa, enabling the schools and the Department of Basic Education to make informed decisions about ICT interventions for schools. In addition, the platform will be handed over as a decision support platform to the department, which will be able to extract reports on the readiness of schools for ICT.

TIA's **Technology Acquisition and Deployment Fund** provided R700,000 funding for the Kada Device in the Free State and R600,000 for the Moonshine Reflective Spray in the North West province. The Kada Device is attached to a smartphone and it enables visually impaired individuals to access apps on their smartphone. Moonshine is a paint that is sprayed on livestock to prevent vehicle accidents at night in poorly lit rural areas. Through developing the technology at the Mangosuthu University of Technology's Chemical Technology Station and a partnership with the Road Accident Fund, the reflective paint will also be distributed to livestock farmers.

Transformation of TIA's investment portfolio

In keeping with TIA's focus on transformation and inclusive development, the Agency has also taken the decision to allocate a portion of its uncommitted funds to transformed recipients. This demonstrates TIA's commitment to redressing poverty, inequality and unemployment through a specific developmental focus.

TIA's target for new initiatives in support of transformed recipients (recipients with a minimum black ownership of 30% or recipients who are at Broad-Based Black Economic Empowerment (B-BBEE) Level 4 or better) of R19.7 million was exceeded by 56%, with R30.8 million being recorded. Notable examples of such disbursements are provided below.

Selokong Sa Dimelana is a start-up company that received R2.7 million from TIA to develop and manufacture environmentally friendly products that include bio-paint derived from seeds of the castor oil plant, an invasive alien species. The castor oil plant is cultivated by a group of smallholder farmers in Limpopo. The company provides these farmers with seeds and extension services as part of a programme to promote castor oil cultivation in the province.

The bio-paint, which has antiradiation and antimicrobial properties, was successfully demonstrated using different colour paints on various surfaces. The project has also secured a R1.2 million loan facility from Standard Bank South Africa to support the upscaling of production capacity.

Ziziba is a 100% black-owned micro-enterprise that received R2.3 million to support the development of protein-rich bioproducts derived from waste biomass. This includes pulp-and-paper mill sludge, food waste and dairy waste for the production of a single-cell protein to be used as fish feed and fish meal.

Document Certifier is a black-owned micro-enterprise that received R1 million to develop an automatic document-certifying machine. The apparatus compares the original document with a photocopy of the same document to verify or trace through electrical magnifying sensors, data analysis and a comparison processor any variations between the original document and the certified document.

Smart Water and Waste Management Solution is a black-owned micro-enterprise that received R1 million to deploy a smart polymer manhole cover made from recycled plastic material and fitted with technology such as an ultra-sensor, a micro-controller and a Sigfox module in three municipalities.

14. DIVISIONAL PERFORMANCE

14.1 Commercialisation division

14.1.1 Overview

The purpose of the Commercialisation division is to support the process of technological development across key economic sectors by providing funding and other support. This will create commercialisation opportunities for entrepreneurs and contribute to economic growth in South Africa. Through this strategic thrust, TIA aims to intensify its efforts to

- increase the rate of translation of locally developed technologies;
- exploit IP from publicly funded institutions;
- ensure that these are commercialised in a manner that promotes economic growth and the competitiveness of industry; and
- respond to the imperatives of transformation and inclusive development.

TIA has focused on leveraging local and global partnerships to support the translation of knowledge from universities, science councils and the private sector into commercialised innovations that will have a positive impact on the lives of all South Africans. TIA has also sought to take advantage of the 4IR to stimulate the economy and respond to some of the social challenges faced by many South Africans.

The division has leveraged new strategic interventions that combine the strength of TIA's investment support and close collaborations with industry champions and enterprise development initiatives. Its purpose is to deliberately forge real progression with technology innovations in the respective industrial sectors in demonstrating market potential and impact and creating viable new technology enterprises.

14.1.2 Progress towards planned strategic initiatives

The 2022/23 APP committed the Commercialisation division to several strategic initiatives for the year. The division's progress with these strategic initiatives is indicated in Table 6.

Table 6: Progress with strategic initiatives planned by the Commercialisation division for 2022/23.

Strategic Goal	Strategic initiatives	Performance for the Year
Increased conversion of publicly funded R&D outputs into commercialised innovations	Implement the Innovation Fund.	TIA continued to support DSI in implementing the Innovation Fund with more strategic high-impact projects approved. In keeping with the intention of the Innovation Fund, a number of these funded projects are entering international markets.
	Formulate a TIA-wide Enterprise Development Strategy.	The strategy is in place and will be implemented as appropriate.
	Embark on a roadshow to science councils and universities to articulate the rationale for TIA's adopting a commercialisation-centric approach to funding.	The division participates in TIA-wide HEI engagements aimed at raising awareness of TIA offerings and empowering historically disadvantaged institutions.
	Institutionalise a full investment lifecycle approach to investments made.	Fully implemented at a divisional level. To be institutionalised as part of the implementation of the Commercialisation Strategy.
Integration of commercialisation efforts across TIA (Commercialisation, Bio-economy and Innovation Enabling and Support)	Develop and implement a Commercialisation Strategy.	The Commercialisation Strategy has been developed and will be approved in early 2023/24.
Improve and optimise TIA's investment practices	Review and revise TIA's Investment Framework Policy; include governance mechanisms for exit and disposals.	Investment benchmarking report completed and recommended to relevant Board structures. Piloting of initial deals underway.
TIA 4IR Strategy (AI, etc.)	Align TIA efforts with the prioritised strategic sectors of the RSA AI institute.	Efforts have been delayed by changes in the RSA AI/4IR Institute.
Science council engagements	Initiate and develop high-impact projects in collaboration with science councils.	A portfolio in two of pockets of excellence of the South African science system has been initiated, namely, radar and radiation sciences, with more progress being made in the former than in the latter.
B-BBEE exits and commercial harvests	Execute value-creation opportunities through levy collection or conversion execute redemptions.	A pilot deal has been executed successfully, with repayment arrangements being finalised.
	Identify and execute investment exits to B-BBEE players.	Approval of alternative investment instruments is pending following a B-BBEE pilot in the previous year.

14.1.3 Business unit overviews

The Commercialisation division consists of the Advanced Manufacturing, Energy, ICT and Natural Resources business units.

Advanced Manufacturing

The purpose of the business unit is to support TIA's vision by building a quality portfolio of projects in Advanced Manufacturing that contributes to transforming South Africa's manufacturing industry into a competitive, high-tech and high-value-creation industry. The business unit will fund and support hi-Tech industrialisation opportunities in the industrial sectors that encourage modernisation and the improvement of competitiveness through the development, diffusion and adoption of advanced manufacturing technologies. Through these, new technologies will be diffused to SMMEs and will be adopted not only by old and ailing industries, but also for new industries.

The focus areas are advanced electronics; production technologies; automation and robotics; advanced materials (lightweight, composite, nano, etc.); photonics; chemicals; additive manufacturing and the 4IR (Industry 4.0 and converging technologies).

A noteworthy project is the CSIR's Cardioflow project. It focuses on developing Cardioflow, a device that will be able to perform precision detection and trending of possible cardiovascular diseases by extracting, normalising and interpreting features of the characteristics of ultrasound signals. The project is gearing up for starting the second phase of the clinical trials. The CSIR secured additional funding in the amount of R700,000 from the organisation's own parliamentary grant funding.

NOVELQUIP UNIQUE SEEDLING-PLANTING SYSTEM TO CREATE LONG-TERM ECONOMIC IMPACT

Novelquip Forestry (Pty) Ltd is a specialist, high-end supplier and innovator of forestry equipment, with the emphasis on modernised seedling planters. The company has developed a technologically advanced seedling planter with patented design and functionality. The planter offers improved planting efficiency, which reduces manual labour and enables rapid and precise seedling placement.

With investments by TIA, Novelquip has developed a unique seedling-planting system to address this growing global demand and secured a global original equipment manufacturer as its commercialisation partner. A fully functional prototype has been validated and demonstrated to leading forestry companies from multiple markets and the first order has been received. The prototype received positive feedback, which has generated the anticipation of the planters entering the market.

Novelquip and TIA are committed to creating a long-term economic impact in South Africa by establishing a new, niched and job-rich industry, cementing TIA's role as an industry-builder. The shared goal of Novelquip and TIA is not only to create a profitable business, but also to contribute to the economic growth, development and prosperity of the community where the company operates.

To this end, five new black industrialist-owned businesses will be created and housed in a supplier park to be established where local community members will be upskilled for the supply and service of the components to Novelquip. The envisioned supplier park will comprise specialised zones designed to support the requirements of the equipment developed by Novelquip and its suppliers. These include hydraulic sub-system assembly and testing, electrical harness assembly and testing, a small-component fabrication shop, a business support service-provider and a canteen. The supplier park is expected to create 80 permanent jobs.

The park will include a mix of industrial and commercial properties, such as factories, warehouses, office buildings and support facilities, specifically to support Novelquip and be used for the development of forthcoming suppliers.

Increasing costs, labour scarcity and the ever-growing need for timber and wood by-products is forcing the international forestry sector to rapidly mechanise planting operations, creating a largely untapped R24 billion market for mechanised seedling planters. Novelquip's ergonomic innovative technologies will transform unsafe, harsh manual forestry work into dignified, decent, safe, higher-skilled and higher-paid jobs.



GAS-DETECTION CAMERA LICENSED TO INDUSTRY

Worldwide, environmental legislation is being promulgated and stricter controls are being implemented to prevent spillages and the emission of hazardous and greenhouse gases in various industries. To this end, efficient technologies are required that will ensure compliance. These include gas-detection instruments capable of pinpointing the exact location of gas leaks to enable quick containment and repair.

The CSIR GasCam project is focused on the development of a gas-sensing camera, one that is capable of detecting and locating hazardous gas leaks at industrial plants and sites. The technology is designed to detect and locate hazardous gas leaks in industries such as petrochemical, chemical and electrical. Gas-detection cameras currently in the market offer either passive or active detection solutions. Each of these is both costly and affected by the elements such as wind and humidity. The GasCam technology offers a combination of passive and active detection modes in one camera, providing users with a more robust and cost-effective solution.



Figure 18: CSIR's GasCam

The lack or loss of containment in the oil, gas and chemical process industries can have detrimental safety and environmental consequences. Leaks not detected on time can accumulate into dangerous gas clouds that can ignite and create explosions or inflict harm on workers as toxic agents. Besides their impact on safety, gas leaks from man-made and natural-gas sources are detrimental and exact a heavy toll on the environment.

One of the key gases of interest in the project is sulphur hexafluoride. Approximately 80% of the gas used globally is in electricity transmission and distribution. It is used extensively in high-voltage circuit-breakers and other switchgear employed in the power industry, and also in gas-insulated power distribution substations and gas-insulated transmission lines. Medium- and high-voltage electrical equipment contains sulphur hexafluoride to insulate the live electrical parts and to switch the flow of electrical current on and off. This equipment is also used to connect the generation and storage of renewable energy. Electrical equipment is designed to avoid the release of this gas into the atmosphere, but leaks can occur over its lifecycle. In addition, many other hazardous gases, referred to as volatile organic compounds, are of importance in other industrial and processing applications, where gas leakage needs to be monitored.

The GasCam has been licensed to UViRCO Technologies, a South African company that specialises in the manufacture of emission visualisation equipment. In addition, a collaboration agreement has been signed with Lochtron (Pty) Ltd to supply components for the GasCam. This is a demonstration of TIA funding and enabling a critical value chain among SMMEs in this industry.

Energy

The Energy business unit focuses on supporting energy-related technological innovations in areas such as renewables, energy storage, distributed generation, and hydrogen and fuel cells. Its focus areas are the local carbon economy, the hydrogen economy, e-mobility, JET and battery storage.

JET is about moving to a lower carbon, greener future while enabling the creation of new job opportunities for those displaced by the replacement of coal with these cleaner technologies. It is the principle of easing the burden decarbonisation poses to those who depend on high-carbon industries.

Given South Africa's vulnerability to climate change, our energy future calls for a less coal-intensive mix, with significant increases in cleaner technologies. By following a JET pathway, it will be possible simultaneously to spur economic growth, create sustainable jobs and put emissions into structural decline, in the process ensuring an electricity supply that does not compromise economic growth. JET is part of the Eskom's long-term strategy to transition the business towards financial sustainability, achieve "net-zero" carbon emissions by 2050, while managing Eskom's socio-economic impact and contribution to South Africa's JET.

South Africa is investing in hydrogen and fuel-cell technologies. Millions of rands have been invested through the government's HySA programme. In 2021, the DSI published the Hydrogen Society Roadmap, which is one of government's strategies and policy directions aimed at bringing together a variety of stakeholders and institutions (both public and private) around a common vision on how to use and deploy hydrogen and hydrogen-related technologies as part of our economic development and greening objectives.

The Hydrogen Society Roadmap will serve as a national co-ordinating framework to facilitate the integration of hydrogen-related technologies in various sectors of the South African economy and stimulate economic recovery in line with the Economic Reconstruction and Recovery Plan. In its pursuit of a hydrogen society, South Africa will leverage its significant natural renewable resources, mineral endowment and capabilities to stimulate local demand for renewable hydrogen and build a viable green-hydrogen export market.

ENERGY-EFFICIENT RECOVERY SYSTEM AIMED AT SAVING FUEL FOR VEHICLES

Ducere Holdings (Pty) Ltd specialises in the efficient use of energy through the development of energy recovery and deployment technologies in the automotive industry. The company was funded by TIA for the further development of their MISER transmission technology. The MISER Hydraulic Hybrid Transmission is an innovative energy-efficient recovery system aimed at saving fuel for vehicles, particularly heavy-duty vehicles.

The MISER Hydraulic Hybrid Transmission is a new, hydraulic, efficient and automated transmission that achieves fuel savings and reduces emissions by optimising engine performance and regenerative braking. The ability of the MISER transmission to be both a series and a parallel system gives it unique capabilities to optimise both the performance and the fuel consumption of a vehicle. Initial simulation results show up to 70% fuel saving in city and highway driving. The design and assembly of the technology involved running simulation models for the mechanical design and control system. The developed MISER was tested and demonstrated on a truck to obtain a track record.

Through TIA funding, the company is currently working on deploying the MISER technology on passenger vehicles. The company will conduct road testing and independent third-party verification tests before the technology is commercialised.

Funding technologies such as the MISER Hydraulic Hybrid Transmission is yet further evidence of TIA's commitment to supporting the state in achieving the goals expressed in the JET Plan. The achievement of cleaner and fuel-efficient vehicles would translate into reduced greenhouse gas emissions, therefore bringing South Africa closer to its JET goals.



Figure 19: MISER Hydraulic Hybrid Transmission monitoring panel being installed.

uYilo e-Mobility Technology Innovation Programme

The uYilo e-Mobility Technology Innovation Programme was initiated by TIA in March 2013 with the aim of enabling, facilitating, mobilising and pioneering the electric mobility (e-mobility) sector in South Africa. The programme is a multi-stakeholder collaboration that operates in alignment with national multi-departmental objectives extending from the 2030 National Development Plan through to various national policies – for example, energy, the environment and the automotive industries. As a national programme, uYilo has made significant contributions, from enterprise and skills development to wider market-enabling initiatives on policies, regulations and standards in reducing market barriers o technology uptake.



Figure 20: uYilo fast-charging station for electric vehicles

uYilo has established an accredited battery-testing laboratory, provided materials-testing and materials-characterisation services and created a live testing environment for electric vehicles within the smart grid ecosystem. It continues to operate the necessary infrastructure, train specialists and co-ordinate development activities between various project partners across both the public and private sectors.

The programme, operated through NMU, concluded a service level agreement with the Automotive Industry Development Centre in the Eastern Cape to implement human capital development and capacity projects for the automotive industry in the province.

uYilo also leveraged a total of more than R12 million: R2,725,000 was secured in co-funding by GoMetro South Africa to support the investment initiatives of uYilo's KickStart Fund. This finance is intended to fund the development of an operating model and identify the technical specifications for the sustainable implementation and management of Public Transport Interchange charging facilities in South Africa.

Another co-funded amount of R8 million was secured from the Automotive Industry Development Centre for uYilo to assist with technical skills training for the automotive industry, increase innovation and competitiveness in the industry in the Eastern Cape, offer product and materials-testing analysis for suppliers in the automotive industry and provide internationally recognised critical skills development and training.

Information and Communication Technologies

The ICT business unit supports the commercialisation of solutions that are centred on the 4IR, AI, mobile application development and fintech. Several companies which TIA has supported have secured follow-on funding from external funders, demonstrating that TIA played a crucial role in de-risking their pipeline technologies and therefore rendering them attractive to the commercial market.

Some noteworthy projects are described below:

Jobox is a student freelancing platform that connects businesses and high-quality students. It narrows the gap between employers and students in respect of core soft skills. In addition, it serves as a feedback tool for universities in respect of the readiness of their students for the employment market. The tool provides for the current need of corporates for experienced graduates with a view to employing them. The company has established partnerships with the University of KwaZulu-Natal (UKZN), UJ, the University of the Witwatersrand (Wits), among others, to enable their students to access job opportunities. Jobox secured a loan facility of R662,000 with IDF Futurefund (Pty) Ltd.

Locum Base is an independent online booking and management platform that provides real-time availability of verified locum medical professionals to practices, pharmacies, hospitals and clinics. Locum Base has increased the availability of nurses, doctors and pharmacists in healthcare facilities. The company has successfully raised follow-on funding of R1 million. Two partnerships have been signed, one with an insurance partner and the other with a private placement firm specialising in dentistry.

RIOT is a start-up supported by TIA; its mission is to provide broadband internet access in township areas. The company offers a platform technology that will enable households and small businesses to crowdsource network infrastructure and deploy network devices that serving their need for private internet access. FISS Systems South Africa (Pty) Ltd will assist RIOT Network (Pty) Ltd as its enterprise development beneficiary, to enable RIOT to grow and remain sustainable. RIOT raised R4.15 million towards establishing a network.



Figure 21: A RIOT Network installation

Natural Resources

The Natural Resources business unit's strategic focus areas are water resource management, waste management, circular economy, climate change, mining and minerals processing. The business unit focuses on ensuring water security by using advanced technologies that sustainably improve efficiencies in solving the water crisis, supporting the development of technologies that minimise the impact waste has on the environment, providing support to technologies in the circular economy and the net-zero initiatives, and sustainably improving process efficiencies in the extraction and exploitation of natural resources (mining). The unit also supports initiatives that reduce worker exposure to hazards.

The business unit's specific focus areas are digitisation in mining, beneficiation in mining, circular economy, water security, digitisation of water and wastewater treatment, and waste technologies.

DEMONSTRATION OF A BIOLOGICAL PROCESS FOR THE TREATMENT OF ACID MINE DRAINAGE

Mining is one of the key pillars of the South African economy; it is also a major contributor the resultant pollution and environmental effects that require sustained and effective management. Acid mine drainage (AMD) is arguably one of the most serious environmental concerns in South Africa.

AMD describes a natural process produced when the mining activities expose sulphur-bearing minerals to atmospheric oxygen, moisture and acidophilic iron-oxidising bacteria, resulting in sulphuric acid, dissolved iron and precipitation of ferric hydroxide. The sulphuric acid dissolves heavy metals from mined materials and forms an acidic solution. This solution infiltrates into the ground, making AMD the primary pollutant of surface and groundwater with significant effects on the environment.

AMD is a legacy of abandoned, derelict and defunct mines and is a continuing by-product of existing mining activities. In addition to its impact on the environment, AMD will also have an impact on all the parameters of sustainability, including ecological, social and economic concerns. The treatment of mine-impacted waters arising from abandoned or derelict mines presents a financial liability either of the state or the mine owner. The annual cost of this liability, based on the estimated costs of the treatment processes, amounts to between R876 million and R1.31 billion.

The release of such waters into the environment also has an impact on both the environment and society because it significantly affects the flora, fauna and human settlements in the area affected. The long-term effects of AMD water greatly reduce microbial biomass, richness and diversity. This impairs soil health plant growth and productivity with negative effects on food safety and security.

The aim of the project is to upscale and demonstrate an integrated biological sulphate-reduction process for the treatment of coal-mine decant AMD effluent and re-use of the treated effluent in the production of agricultural products.

PRODUCTION OF SUPER OXYGENATED WATER FOR HYDROPONICS AND AQUACULTURE

Water scarcity and pollution affect the livelihood of societies owing to the impact they have on hygiene and food security. There is a need for technologies that will aid not only the conservation of water but also its quality and re-use. An example is the super oxygenated water system, SupaO2. The project aims to produce oxygen, purify water and fix the oxygen into the water to produce super-oxygenated water for use in hydroponics and aquaculture.

Oxygen-enhanced water is known for it benefits: faster plant growth and healthy plants. This improves both plant yield and plant quality as hydroponics are becoming important sources of food. The plan aims to produce 50 l batch reactors for direct sale to small-scale farmers. The system aimed at the hydroponics has also been completed and three units are being assembled for dispatch at a research tunnel located at UKZN.

Beyond the hydroponics application, the system is versatile as it can also remove pathogens and be customised to sterilise water, which would be useful for schools and hospitals in areas with unsafe water sources. The system to sterilise water, branded SupaO2, is currently in use at a school in Hammanskraal, Pretoria.

14.1.4 Budget and expenditure

A comparison of the budget and actual expenditure of the Commercialisation division is shown in Table 7.

Table 7: Budget and expenditure of the Commercialisation division for 2021/22 and 2022/23

	2021/22			2022/23		
Sub-programme	Budget (R'000)	Actual Expenditure (R'000)	(Over)/under Expenditure (R'000)	Budget (R'000)	Actual Expenditure (R'000)	(Over)/under Expenditure (R'000)
Advanced Manufacturing	13,400	11,644	1,756	45,469	16,836	28,633
Energy	15,000	20,376	(5,376)	8,909	20,983	(12,074)
ICT	24,873	37,845	(12,972)	35,693	47,828	(12,135)
Natural Resources	19,000	16,140	2,860	12,099	11,974	125
Total	**72,273**	**86,005**	**(13,732)**	**102,170**	**97,531**	**4,639**

14.2 Bio-economy division

14.2.1 Overview

The purpose of the Bio-economy division is to support the translation of South Africa's knowledge resources into sustainable bio-based solutions that can be commercialised. As with other territories around the globe, bio-based products will alter the economics, policy and trade of agricultural products in South Africa. It will also advance the aspirations of TIA to demonstrate the effect of science on policy.

The bio-economy promises to change the way natural resources are used to create new bio-based chemicals, plastics, bio-materials, bio-energy solutions and food, through novel conversions and applications of a wealth of knowledge created in South Africa's HEIs.

The full potential of bio-based products will be realised when key challenges such as market demand and the establishment of standards of acceptance of bio-based products have been met. Priority recommendations will be required to enable the uptake of bio-based products by society; they will include the use of policy instruments such as legislation and procurement of goods and services by the state.

South Africa needs to follow other economies in the move towards a more circular bio-economy, from production and consumption to the waste economy, and to the commercialisation of the secondary raw materials and by-products of bio-processes. It is here that the innovations will lead to job creation and overall growth in the economy and also a reduction in carbon and environmental footprints. The role of AI and ML algorithms will continue to play an important role in advancing the circular bio-economy by providing solutions that optimise the use of resources, improving bio-processes and creating new value chains upon which new industries will be created.

The existing structure and function of TIA bio-economy interventions continues to foster collaborations in TIA's bio-economy clusters and technology platforms and programmes.

14.2.2 Progress towards planned strategic initiatives

The 2022/23 APP committed the Bio-economy division to several strategic initiatives for the year. The division's progress against these strategic initiatives is provided in Table 8.

Table 8: Progress against strategic initiatives planned by the Bio-economy division for 2022/23.

Strategic Goal	Strategic initiatives	Performance for the Year
Create sustainable growth and value in the bio-economy through partnerships	Deliver an Algal Biorefineries initiative.	TIA in partnership with the DSI allocated R3.2m to support two initiatives under the Algal Biorefinery theme being implemented at NMU and at AlgaeLabs (Pty) Ltd.
	Deliver high-value cultivars through existing programmes of the Agriculture Bio-Innovation Partnership Programme.	Under the Agriculture Bio-economy Innovation Partnership Programme (ABIPP) a project to establish upland rice development and production continued, promising high-value crops for commercialisation.
Support bio-based enterprises with appropriate value-creation strategies	Increase access to Technology Platforms and Clusters by bio-based enterprises.	The FBIC programme received R14.1 million in leveraged funding from strategic partners, to support implementation. Six SMMEs were recruited under the bio-entrepreneurship initiative to develop and demonstrate waste beneficiation biorefinery technologies.
Create new bio-based industries based on publicly funded R&D	Spin out technologies from existing Innovation Clusters.	The existing portfolio of Technology Innovation Clusters was considered for further funding through other TIA instruments and other funding partners.
	Implement the Innovation Fund.	The Bio-economy division has continued to manage existing projects under the Innovation Fund and prepare new opportunities for consideration in 2023/24.
Create an enabling environment for bio-innovation	Map the IKS value chain and conduct an assessment of the remaining gaps.	TIA has engaged with various partners, including incubation centres, to implement projects and build the capacity required to support IK-based bio-innovations.

14.2.3 Business unit overviews

The division consists of the Agriculture, Health, Industrial Biotechnology, IKS and Technology Platforms Programme (TPP) business units. The division also hosts several contracted programmes: SABDI, ABIPP and The Strategic Industrial Bio-innovation Programme (SIIP).



Agriculture

The Agriculture business unit seeks to build a portfolio of agricultural technologies with the potential for commercialisation and also to contribute towards competitive, sustainable growth and inclusive agriculture and agri-business value chains in South Africa. The broader objectives of the agriculture sub-programme in TIA are to support the development of technologies and innovations that promote food safety and security, rural and township development and economic transformation, and also to create more resilience to climate change across the agriculture value chain through well-coordinated partnerships and collaborations with key strategic stakeholders in the agriculture sector.
Some noteworthy projects are described below.

A project to evaluate canola cultivars in the Eastern Cape is managed by Ukhanyo Farmer Development, a 100% black-owned company comprising 35 young agricultural graduates. The organisation helps subsistence and small-scale farmers grow into commercial farmers. The project aims to evaluate the suitability of canola in the different localities of the Eastern Cape.

Trials are being conducted across three district municipalities in the province: Chris Hani, Joe Gqabi and Sarah Baartman. A total of 16 canola cultivars were planted in Bathurst, Ugie and Cofimvaba, with the trial crops having been successfully harvested. Results show that the crop could adapt in Bathurst and Ugie, while the performance of the crop in Comfimbaba site remains uncertain due to the dry conditions experienced in the winter months. The project has attracted co-funding of R351,400 from the Western Cape Department of Agriculture and R94,600 from the Oil and Protein Seed Development Trust.

The **Recombinant Vaccines for Bovine Ephemeral Fever Virus (BEFV)** and **Lumpy Skin Disease Virus (LSDV)** project was contracted for R9.7 million in 2017 and was completed in the period under review. The aim of the project was to produce a recombinant vaccine for Lumpy Skin and Bovine virus in cattle. Although six vaccines were produced by the study, only two showed acceptable efficacy: LSDV(dSOD)BEFV-Gb-M and LSDV(SODis)BEFV-Gb-M, which were tested on cattle. All the animals developed neutralising antibodies to both BEFV and LSDV after two vaccinations that were administered four weeks apart. The next steps for the project team would be to secure the next round of funding and licensing out opportunities to interested commercial players.

A notable achievement was reported by UP regarding the project **Development of Recombinant Tick Vaccine** supported by TIA in the amount of R14.7 million in early 2020. The objective was to identify and evaluate several tick antigens for cattle trials. Three promising antigens were identified: Bm86 (expressed in adult ticks), a tissue factor inhibitor (TC-X, expressed in all life stages, very high in male testis and female ovary) and a Kunitz protein that binds to Bm86 (KUBP, expression profile undetermined). The licensors (UP and CSIR) have licensed the IP relating to the know-how and copyright of all the above present and future output to Afrivet (Pty) Ltd as a distribution and commercial partner of the technology.

DEVELOPMENT OF POULTRY ENZYME-LINKED IMMUNOASSAY TO TEST FOR AVIAN INFLUENZA

The global poultry industry has seen numerous outbreaks of Avian influenza, also known as “Avian flu” or “bird flu”. Avian influenza usually infects wild birds but can also infect commercial or domestic poultry. Once this virus is detected on a farm, there is usually a need to cull birds to prevent further infections. This presents a significant risk to the country’s food security, especially given the dependence of many households on chicken as an affordable protein.

Enabled by funding from TIA, UP, in collaboration with the CSIR, has successfully developed and validated four enzyme-linked immunoassay (ELISA) tests to detect chicken or ostrich antibodies (an antibody is a protein produced by the body’s immune system when it detects harmful substances such as viruses). Preliminary results show that the ELISA test could detect H5, H6 and H7 influenza A virus sub-types.

The success of this product for treating Avian influenza will provide the poultry industry with a rapid test to detect Avian infections and allow farmers to take steps to prevent the spread of the virus on the farm. This resultant technology would have applications in lateral-flow assays, lateral-flow rapid tests and lateral-flow strip readers, ELISA tests, allergen-specific immunodiagnostic tests, immunoassay analysers and other immunodiagnostic products, therefore benefiting various customers – from those in the local and regional markets to players in the global export market. These customers include veterinary clinical laboratories, diagnostic laboratories, hospitals, research centres, and pharmaceutical and biotechnology industries.

The success of this project, upon licensing and scale-up by a commercial partner, will promote greater safety in the poultry industry and contribute to food security and economic competitiveness in the industry.

Agriculture Bio-economy Innovation Partnership Programme

ABIPP is a programme of the DSI managed by TIA. It is a mega-programme that funds, facilitates and manages multi-disciplinary and -institutional research programmes in the agricultural bio-innovation, product and process development and services sector. Furthermore, ABIPP encourages collaboration on national priorities and promotes the global competitiveness of the local agricultural sector by exploiting developed technologies.

ALOE FEROX-BASED COSMETICS HANDED OVER TO SMMES IN THE EASTERN CAPE

TIA partnered with the CSIR to hand over six newly developed Aloe ferox-based cosmetic products to three agribusinesses and community enterprises of Seymour in the Eastern Cape province under the ABIPP. The six cosmetic products – face wash, body lotion, hand cream, hand wash, hair food and hair spray – together with the developed technologies for the ingredients, were transferred to three local enterprises which had been trained in the development and formulation of the products.



Figure 22: Aloe forex-based cosmetic products on display

The objective of the project was to promote the agro-processing of underused crops such as Aloe ferox and the commercialisation of quality-tested cosmetic products based on Aloe ferox that meet regulatory requirements. In addition, the project was aimed at providing enterprises based in Seymour with enterprise development support to promote the products' commercialisation.

The Aloe ferox product and process development was managed by the CSIR and falls within the ambit of the post-harvest small-scale farmers technology diffusion project. As the implementing agent of the ABIPP, TIA funded the CSIR for the processing and the validation of the Aloe ferox material. The result is the development of quality-compliant products that can be produced at commercial scale for sale in formal markets.

The CSIR provided training to the local enterprises, which included agro-processing technologies, Aloe ferox processing and cosmetic formulation development. The trainees received hands-on experience in materials receiving, storage, washing, peeling, cutting and processing, and then drying gel into powder. The trainees gained experience in developing cosmetic products using the Aloe ferox gel powder they had processed.

The training provided will ensure that the enterprises are able to process the plant material that grows wild in the locality. The harvesting and tapping are done in partnership with the provincial environmental officials to ensure the sustainable harvesting of the aloe plant. A total of 22 beneficiaries, including women and youths, from Seymour were trained in Cape Aloe processing and product formulation. These were from the Nozulu Aloe Farming Co-operative, Ziyanda Enterprise and Karibu Construction & General Trading.

The success and growth of this initiative could spark significant economic growth and employment for the Seymour area. This is in line with the White Paper on Science, Technology and Innovation, which focuses on using science and innovation to accelerate inclusive economic growth, render the economy more competitive and improve people's daily lives.

Health

The Health business unit aims to enhance South Africa's global competitiveness in the health arena and to deliver socio-economic value through technological innovation in healthcare products and services while working towards the prevention, diagnosis and/or treatment of priority disease areas.

Some noteworthy projects are described below:

The (NTeMBI) functions as a high-level research, development and innovation initiative that provides a framework in which to consolidate expertise and to implement new strategic initiatives relating to R&D in nuclear technologies in medicine and the biosciences locally, regionally and internationally. The NTeMBI received funding from the International Atomic Energy Agency for the purchase of entomological equipment (R773,278) and additional funds for R&D (R1 million). The National Institute for Communicable Diseases-based Sterile Insect Technique project is supported by TIA and the DSI, and was co-funded to the value of R6.6 million by Sandia National Laboratories (the South African partner of the US Department of Energy) to run a project together with the Wits Health Consortium based on the irradiation of mosquitoes.

MeDDIC continued to take on board SMMEs that need assistance to enter the medical devices market. One project has already started selling its products to local surgeons and has attracted additional funding to expand its market. Another notable achievement from the cluster included the Unkink project, which seeks to develop a retaining device for medical tubing. Progress has been made towards producing useable samples via injection moulding for clinical testing and evaluation of the technology in the relevant environment.

OPTISHUNT INNOVATIVE AND COST-EFFECTIVE TREATMENT FOR GLAUCOMA

Glaucoma is a leading cause of irreversible vision loss worldwide. In South Africa, vision loss is one of the leading causes of disability and accounts for 32% of all disabilities. Glaucoma is an eye condition caused by a build-up of fluid pressure in the eye that results in irreversible damage to the optic nerve. Liqid Medical, a South African medical innovation company, has designed a novel ocular implant, the OptiShunt, that uses a simple concept to revolutionise the treatment of glaucoma.

The current treatments available for glaucoma pose a few challenges. Traditional glaucoma devices drain excess ocular fluid by creating a fluid-filled blister on the surface of the eye, known as a "bleb". Blebs are well known to be uncomfortable and associated with a high risk of complications and failure; they therefore require lifelong follow-up and management by patients and doctors. This makes traditional glaucoma surgery one of the least cost-effective ophthalmic interventions that also has the greatest impact on quality of life.

The OptiShunt ocular implant has been designed to limit unsightly bleb formation and the complications that arise from blebs. It creates a self-regulating system which provides highly effective pressure control while avoiding the complications and costs associated with traditional devices.

Vision loss exacerbates poverty as it often leads to loss of income and ultimately to low standards of living. Visually disabled people account for 97% of those unemployed, 90% of whom are from rural communities. South African women are 40% more likely to be visually impaired than men. This is common among people of African descent. The highly efficient and cost-effective OptiShunt enables access to quality healthcare for the most vulnerable, who have been excluded from traditional glaucoma treatment due to the high costs. Tests conducted to date show that the OptiShunt is 50% more effective than the current gold standard in the treatment of glaucoma.

The use of the OptiShunt halts the progression of blindness and affords patients an opportunity of a better life and the ability to contribute to the betterment of their families and communities. Furthermore, the OptiShunt will be manufactured locally and therefore provides an opportunity to create jobs, reduce imports and enable exports.

The next stage in the development of the technology is to conduct regulatory clinical trials. The company is already in the process of obtaining the necessary quality management systems, regulatory approvals and ultimately certification such as CE marking and approval by the World Health Organization. Liqid Medical successfully raised R29.6 million in follow-on funding from the SAB Foundation through an equity transaction. These funds will go towards facilitating Food and Drug Administration approval of the OptiShunt and further development of other ophthalmic devices currently in the Liqid Medical pipeline.

Funding the OptiShunt technology is testament to TIA's commitment to improving the quality of life of South Africans.

MARKET EXPANSION FOR LOCALLY DEVELOPED OSTEOGENIC BONE MATRIX

Altis Biologics' Osteogenic Bone Matrix (OBM) is an orthobiological regenerative product or biomaterial indicated for clinical specialties, including trauma, sports medicine and craniomaxillofacial uses. Altis OBM contains a proprietary bone-derived extracellular matrix protein (bone protein), a naturally occurring osteoinductive protein that has demonstrated the ability to stimulate, repair and regenerate bone. It is an injectable bone collagen material reconstituted with controlled amounts of Bone Morphogenetic Protein complex derived from pig (porcine) bone matrix. The protein is recognised for its biological activity of de novo bone induction (scaffold) when implanted into human beings and mammals.



Figure 23: Packaged and ready-for-market Altis Biologics' Osteogenic Bone Matrix product

TIA supported the company to develop novel porcine OBM trauma implant products for skeletal regeneration in human beings as an alternative to traditional procedures. Traditional bone-graft products usually involve harvesting bone from the patient's own hip or employ allograft donor bone supplied by bone tissue banks. Altis' Porcine OBM is injected into the skeletal site requiring the regeneration of new bone without the need to perform a second bone-graft operation.

The initial funding from TIA was for developing the Altis porcine OBM. The company developed an injectable delivery system based entirely on bone matrix. Current funding from TIA is to assist the company to attain CE certification, which will facilitate wider market penetration. Altis Biologics has successfully concluded a distribution agreement with a Brazilian distributor – ***Fort Med Distribuidora E Importadora De Productos Medicos Ltda*** (Fort Med). Fort Med is the exclusive authorised distributor of the OBM and has been granted a licence to market, sell and service the OBM in Brazil. Part of the agreement is for Fort Med to facilitate the approval and registration of Altis OBM in Brazil by the ***Angencia Nacional de Vigilancia***, the Brazilian equivalent of the South African Health Products Regulatory Authority (SAHPRA). Ford Med has also agreed to collaborate with Altis Biologics in future clinical trials as required.

South African BioDesign Initiative
The SABDI is a DSI-contracted bio-economy seed fund that supports collaborative and integrative research projects, focusing on the disciplines of functional genomics, structural biology, synthetic biology and systems biology. Skills development and technology transfer to historically disadvantaged students are key deliverables. In line with these objectives, projects in the areas of animal breeding, energy, health, ocean biotechnology and bioremediation are in different stages of development.

Researchers from the **Goat Lipase Biodiesel Project** have filed a patent and are conducting a market feasibility assessment based on the research findings. A highly attractive finding is that the lipases have now been shown to work well on waste palm oil with the production of good-quality biodiesel.

Spinout companies – **LM Point of Care** and **FamGen Counselling** – were created by two SABDI graduates from the Open Genome Project to roll out their research in the form of a point-of-care breast cancer diagnostic and genetic counselling services. The lead scientist co-edited a special precision medicine issue for the Frontiers Journal publication published in January 2023. Following profiling of the research in the November 2022 edition of Health News Daily, the project team has met with Discovery Health to discuss a pilot programme for the breast cancer diagnostic.

For the **Biofouling Project**, sea urchin toxicity testing has been optimised to ensure that the developed nanoparticles are not harmful to sensitive ocean creatures. Five isolates paired with nanoparticles displayed promising antimicrobial activity. The investigator has been awarded a National Research Foundation (NRF) grant for three years to conduct a similar study using indigenous coral.

The **Bioremediation of Mine Pitlakes Project** has made steady progress, having produced many noteworthy findings for the year, and it has been attracting considerable interest from mining houses interested in their research. Together, two students were awarded approximately R900,000 by the NRF in bursaries over three years.

The group that are **Using Macroalgae for Production of Nutraceuticals against Diabetes and Cancer** observed strong antidiabetic effects of the seaweed polysaccharides against diabetes. The polysaccharides also inhibited key enzymes responsible for uncontrolled cell proliferation and stimulated cell death when studied against liver and cervical cancer cell lines.

Industrial Biotechnology

The Industrial Biotechnology business unit focuses on supporting the development and commercialisation of technologies that promote a green economy and environmental sustainability. Key focus areas for intervention include strengthening the development

of biomanufacturing capacity and capabilities in the country, creating partnerships and linkages to enhance the diffusion of green technologies and supporting the establishment of SMMEs to create sustainable jobs.

Some noteworthy projects are described below:

Green Corridor NPC, a non-government organisation in KwaMashu, received funding from TIA to support a Bio-residue Value Chain Beneficiation initiative implemented by Green Corridor in support and in partnership with the eThekwini Municipality Economic Unit. This circular economy initiative focuses on processing residual biomass and invasive alien plant species into bio-based applications. The project has secured supportive funding from the eThekwini Municipality amounting to R17.5 million over three years to support economic development through the rehabilitation, improvement, management and activation of natural open space corresponding to eThekwini river corridors.

Khepri Innovations, an SMME supported by TIA, entered into an agreement with the CSIR for participation in the National Cleaner Production Centre South Africa for the purposes of conducting assessments within the centre's the Industrial Symbiosis Programme. This programme aims to assist participating companies to lower overall costs through reduced energy, water and materials usage, and waste management, by adopting the use of resource efficiency and cleaner production methodologies.

The aim of the **Sugar Milling Research Institute** project is to develop a technology for a continuous crystal seed-preparation system for seeding continuous vacuum pans in raw sugar factories, eliminating the initial energy-intensive step in pan boiling in the process. The project team secured R960,000 in co-funding from the Sugar Milling Research Institute as part of its budgetary support to cover operational costs of the extended project timeline.

FOREST BIO-ECONOMY INNOVATION CLUSTER PROVIDES ACCESS TO DNA FINGERPRINTING FOR SMALL-SCALE TIMBER GROWERS

Rapid climate change – including more extreme weather events and associated pest and disease outbreaks – is causing some of the main threats to the productivity of small-scale plantations. Developing and matching the correct genotypes to the diverse and variable sites where most small growers are situated is key to the sustainability of the small grower sector.

The **DNA Fingerprinting for Small-Growers** initiative, is an intervention of the Forest Molecular Genetics (FMG) Programme under the Forest Bio-economy Innovation Cluster (FBIC) supported by TIA in partnership with the DSI. The aim of this initiative is to contribute to the development and deployment of more resilient plantations for small-scale timber growers by extending the benefits of DNA-based molecular technologies to support their sustainability in the South African forestry sector.

The uptake of DNA marker technologies has been slow, due to the cost and a lack of awareness of the availability and benefits of the technology. The DNA Fingerprinting for Small-Growers initiative is overcoming this by lowering the cost of making the technology more accessible to small-scale growers through partnering with key stakeholders to reach out to nurseries and small growers. The initiative will enable small-scale growers who use the technology to ensure that the correct genotypes are being planted on their land and to determine the identity of any trees exhibiting disease or other stress symptoms.

DNA fingerprinting and screening of tree material in private nurseries is essential to ensuring genetic integrity during propagation and deployment. Errors can have large knock-on effects, including loss of genetic gain and, in worst-case scenarios, crop failure – as in the case of deploying frost-sensitive genotypes into frost-prone sites. Previously undetected error rates of up to 10% were typical during routine crossing and propagation steps. These can now be corrected with DNA fingerprinting and parentage analysis, especially for new pre-commercial selections being propagated for the market.



Figure 24: Sampling leaves for DNA fingerprinting

DNA-based technologies can, generally, be daunting to farmers who are not exposed to them regularly. For this reason, the initiative will partner with cooperatives such as NCT Forestry Co-operative Ltd and organisations such as Forestry South Africa which already have networks in place. This is to ensure that information about DNA fingerprinting is communicated in an inclusive manner, which will include explaining the process and the potential benefits in the small-grower setting.

The FMG Programme has received dedicated funding for this initiative through TIA and this will allow nurseries to benefit from a 50% subsidy. Small-scale growers will benefit from an 80% subsidy towards the cost of DNA fingerprinting. Initially, efforts will focus on small-scale growers and nurseries working closely with the NCT Forestry Co-operative and those already working within the Forestry South Africa network. From there it is envisaged that the initiative will grow organically.

In addition to already-developed eucalyptus and pine DNA fingerprinting tools, the FMG Programme has partnered with the NCT Forestry Co-operative and the Institute for Commercial Forestry Research to develop a DNA fingerprinting marker panel for Acacia (wattle) species that can be used in nurseries and by small growers. Similarly, FMG has partnered with Macadamias South Africa to develop DNA marker resources for the macadamia industry.

In addition, Macadamias South Africa is supporting a PhD project to sequence the genomes of key macadamia cultivars in South Africa and to implement the routine DNA fingerprinting of macadamia. This will become part of the service offering of the FMG Precision Breeding Platform.

The FBIC supports TIA's role as an industry builder and enabler by enhancing access to cutting-edge technologies by small-scale timber growers

Strategic Industrial Bio-innovation Programme
The SIIP was established by TIA and the DSI to fund and co-ordinate multidisciplinary programmes, enabling partnerships across institutions. The intention of the programme is to develop new technologies, products and processes and to support SMMEs, promote a green economy and create sustainable jobs.

The FBIC programme received a total of R14.1 million in leveraged funding from strategic partners, including the United States Department of Energy (R9.5 million), UP (R2.8 million) and R1,9 million from the forestry sector to support the implementation of the programme. The R9.5 million received from the United States Department of Energy Joint Genome Institute is aimed at supporting the large-scale sequencing of 2,000 eucalyptus tree genomes from South Africa. The database of sequenced genomes created will serve as a reference resource for developing fast-growing woody biomass crops for bio-based products and carbon drawdown through restoration and plantation forestry. In addition to the leveraged funding, 31 students registered at various tertiary institutions were recruited into the two sub-programmes the FBIC programme implemented at the CSIR and at UP.

As part of implementation of Programme 2 of the FBIC, the CSIR has recruited five SMMEs under the bio-entrepreneurship initiative with the aim of supporting the development of SMMEs and demonstrating waste beneficiation biorefinery technologies to bridge the gap between technology development and full entry into commercial upscaling. The five SMMEs are Oratech Minerals and Commodities, Selokong Sa Dimelana, Ukuqala Okusha, TMGG and Ziziba Holdings.

A total of R37.6 million has been committed to support the implementation of the Industrial Biocatalysis Hub (IBH) for a period of three years. The initiative is implemented by the CSIR and aims to provide a platform to support SMMEs in the biomanufacturing sector using biocatalysis technologies to develop and commercialise mature technologies with the aim of promoting the uptake of green technologies in the biomanufacturing sector.

The IBH has adopted a hub and spoke model for implementation where five universities have been selected to host IBH nodes: UWC, UFS, Wits, Rhodes University and the University of Fort Hare. In addition, three SMMEs have been recruited into the IBH incubation programme: Applied Protein Biotechnologies, Linuset and Puris Natural Aroma Chemicals.

One of the focus areas for the IBH initiative is human capacity development. To this end, 23 students are being supported by the various institutions participating in the IBH initiative.

Indigenous Knowledge Systems

The IKS business unit focuses on supporting technology development and the mainstream commercialisation of indigenous knowledge-based bio-innovations. Activities span four thematic areas: African traditional medicines, cosmeceuticals, health infusions and nutraceuticals.

The aim of the Afriplex Natural Product for Benign Prostatic Hyperplasia project is to validate and commercialise BP05, a natural plant compound derived from Elephant's Root (***Elephantorrhiza elephantina***) as a complementary alternative for the treatment of benign prostatic hyperplasia and male pattern baldness. The indigenous knowledge relating to the use of the Elephant's Root for this purpose is held by the Khoisan people in the Northern Cape province.

The IP relating to this project was successfully commercialised. A product, "Free 2 Gro", containing the hair-growth natural ingredient, was developed by Afriplex for Sof 'n Free (AMKA Pharmaceuticals) and was launched in the market. The product is a follicle-boosting

growth tonic that is scientifically proven to grow hair in six weeks and is suitable for all hair types.

TIA is supporting Smart Biotech's Aloe ferox-based SmartHerbals Colon Regulator project. The company has contracted OnQ Research, a clinical research organisation, to design, compile and submit a Phase 2B clinical trial protocol to SAHPRA which will be the basis of testing the efficacy of the SmartHerbals Colon Regulator to treat irritable bowel syndrome. Smart Biotech has tested the market with this IK-based product and the uptake has been impressive. Positive testimonials were submitted to the client by end-users of the product, confirming the efficacy of the product for a range of digestive health conditions. OnQ Research has made substantial progress towards the conclusion of the clinical trial protocol and its submission to SAHPRA.

Technology Platforms Programme

TIA provides funding to eight Technology Platforms across South Africa in support of facilitating access to key technical infrastructure and expertise that enables technological innovation in strategic technology areas. The value proposition of the TPP is to facilitate access to cutting-edge technological capabilities by investing in and supporting entities to enable them to acquire appropriate technologies and expertise that in turn lower the barriers for others to innovate. The programme forms part of the TIA investment toolbox that seeks to enable and stimulate innovation in the NSI. The unit identifies and co-develops opportunities and also funds and supports technology platforms to build the long-term technological capabilities required to grow the South African bio-economy.

Some noteworthy achievements are described below:

The CPGR, in collaboration with Harvard University, the Georgia Institute of Technology and the Dana-Faber Cancer Institute, has received a research grant of R814,000 from the National Institutes of Health to extend the **MADCaP** project. MADCaP is a pan-African genome-wide association study aimed at identifying the genetic risk factors that underpin the development of prostate cancer in men of African descent. This a significant project in the ongoing quest to bring precision medicine to African populations.

CPGR CENTRE FOR PROTEOMIC & GENOMIC RESEARCH

Another notable achievement was the renewal of R50.3 million to the **Distributed Omics Platforms** by the DSI to the CPGR to support the strengthening of genomics capabilities in South Africa. This demonstrates the ongoing confidence of TIA-funded technology platforms as lynchpins for catalysing the growth of the biotechnology sector in South Africa.

TIA concluded a funding agreement with the CSIR to **transfer and localise technology to manufacture recombinant human insulin and its long-acting analogue Detemir** from the International Centre for Genetic Engineering and Biotechnology. The technology localisation programme will be jointly undertaken by the CSIR and the TIA Bioprocessing Platform. In the long term, this project aims to support the local production and enhance the availability of modern, fast-acting and long-acting insulin analogues for the treatment of diabetes, particularly in public healthcare facilities.

The **Kwazulu-Natal Research and Innovation Sequencing Platform** (KRISP) entered into a cooperation agreement with the Gender Based Violence Foundation to support efforts to respond to the DNA-profiling backlog experienced by the SAPS. In this partnership, the technology platform will help to validate the suitability of highly automated and high-throughput DNA extraction systems used at KRISP, as well as its suitability for downstream DNA-profiling processes applied by the SAPS.

krisp

Through the National Equipment Fund Instrument at the NRF, the KRISP also received a grant award of R7.7 million to acquire a new next-generation sequencer system, an **Illumina NextSeq2000**. The NextSeq2000 Sequencing System leverages the latest advances in optics. The instrument design and reagent chemistry reduce the volume of the sequencing reaction time, increasing productivity as a result.

The **Cape Universities Body Imaging Centre** at UCT is TIA-funded technology platform housing two imaging capabilities: a 3T Siemens Skyra full-body MRI and a PET-CT scanner. The technology platform reported a satisfactory increase in the number of projects supported. Twenty-seven active projects were reported against a target of 20, and a total of 561 scans were conducted against a targeted operating capacity of 500 scans per quarter.

New laboratories for the African Medicines Innovation and Technology Development Platform were constructed at the UFS which are intended to operate under Good Laboratory Practice. This is another significant step in creating an enabling environment to support innovation and the commercialisation of South Africa's indigenous knowledge.

To ensure that TIA's Technology Platforms remain at the cutting edge TIA approved a capital-funding injection to replace obsolete instruments, increase operational capacity, build redundancy and create new technical capabilities. Funding was approved for CPGR (R2.2 million), the Cape Universities Body Imaging Centre (R2.7 million), the Holistic Drug Discovery and Development Centre (R1.6 million).

14.2.4 Budget and expenditure

A comparison of the budget and actual expenditure for the Bio-economy division is presented in Table 9.

Table 9: Budget and expenditure for the Bio-economy division for 2021/22 and 2022/23

	2021/22			2022/23		
Sub-programme	**Budget (R'000)**	**Actual Expenditure (R'000)**	**(Over)/under Expenditure (R'000)**	**Budget (R'000)**	**Actual Expenditure (R'000)**	**(Over)/under Expenditure (R'000)**
Health	22,464	14,656	7,808	9,984	17,656	(7,672)
Agriculture	28,327	25,807	2,520	27,743	22,795	4,948
Industrial Biotech	13,404	6,220	7,184	15,504	10,345	5,159
IKS	8,247	3,894	4,353	33 413	12 864	20,549
TPP	52,515	69,170	(16,655)	66,218	75,352	(9,134)
Technology Innovation Cluster Programme	16,337	17,114	(777)	15,789	13,463	2,326
Thought Leadership	12,000	3,634	8,366	5,500	10,973	(5,473)
Specific contracts (SIIP, ABIPP & SABDI)	35,000	81,057	(46,057)	65,000	79,089	(14,089)
Total	**188,294**	**221,552**	**(33,258)**	**239,151**	**242,537**	**(3,386)**



14.3 Innovation Enabling division

14.3.1 Overview

The Innovation Enabling division aims to stimulate a culture of innovation and provide enabling support through a range of interventions that make possible the development of innovative solutions that respond to societal challenges. Support is provided through innovation infrastructure and expertise, direct funding and skills development. A key characteristic of the division is the development of innovators alongside technology development. The division targets broader society, from universities and science councils to cooperatives and communities.

14.3.2 Progress towards planned strategic initiatives

The 2022/23 APP committed the Innovation Enabling division to several strategic initiatives for the year under review. The division's progress against these strategic initiatives is indicated in Table 10.

Table 10: Progress against strategic initiatives planned by the Innovation Enabling division for 2022/23.

Strategic Goal	Strategic initiatives	Performance for the Year
Increased productivity of the venture capital fund management and technology transfer system	Implement a revived Chuma IP commercialisation programme. Implement the TIA/SA SME Fund/ Southern African Venture Capital and Private Equity Association (SAVCA) Fund Manager Development Programme.	Ongoing. A reformulated internship programme is being tested together with implementation partners in the NSI. Successfully completed. Three of the graduates are TIA's venture capital fund manager partners in the Innovation Fund.
Contribute to a viable technology entrepreneurship ecosystem	Establish an accelerator programme (including technology-focused mentorship).	Completed. The TIA mentorship platform was launched to connect innovators with mentors that have extensive knowledge and experience to advise and guide tech-based business development. More than 100 beneficiaries are connected on the platform.
Support regional innovation ecosystems in underserved provinces	Develop a regional innovation strategy and plan, with an emphasis on underserved provinces.	TIA's IID has engaged with Sol Plaatjie University, Human Science Research Council and the Namaqua District Municipality to establish a new site for the Innovation Champions for Local Economic Development. A call was issued to establish two new Living Labs in Limpopo and Mpumalanga provinces.
Increased private-sector involvement and investment in R&D	Recruit additional private sector partners into the Industry Matching Fund and the Innovation Fund.	Ongoing. The SAB Foundation has matched TIA's funding in support of achieving transformation in TIA's Seed Fund portfolio through targeting historically disadvantaged HEIs. TIA has initiated discussions with Old Mutual about an innovation programme for technologies in the insurance sector.
Utilise government's public procurement spend as a lever for innovation	Establish a South African equivalent of the United States Small Business Innovation Research programme.	Ongoing. Piloting DSI's Technology Acquisition and Deployment Fund has facilitated the commercialisation of locally developed technologies, promoting their uptake by public-sector entities to improve operations, enhance service delivery and resolve pressing socio-economic challenges. TIA has partnered with the United Nations Development Programme, the City of Tshwane and The Innovation Hub to pilot four technologies in the City of Tshwane through the GIP.
Position TIA as an industry-builder in the NSI	Establish strategic innovation programmes through thematic innovation networks.	To be addressed as part of the TIA 2.0 model together with curatorship functions and capabilities along the entire innovation chain.

14.3.3 Functional area overviews

The division consists of the following functional areas.

Enabling, facilitation and de-risking funding and fund management

Seed Fund

The Seed Fund Programme assists innovators (university-based researchers and SMMEs) with risk-adjusted funding to translate their research outputs into fundable ideas for further development and commercialisation. There are 36 implementing partners in the programme with a portfolio totalling 231 active projects.

In the period under review, TIA took on board the NRF as Seed Fund Implementing Partner under the HEIs Seed Fund sub-programme. This is a co-funding partnership that will allow both institutions to extend support to five NRF National Research Infrastructure Platforms.

As part of scaling up the Seed Fund through effective funding partnerships, a total of 22 projects were approved for funding by TIA to the value of R9.3 million through partnerships with the NRF, TuksNovation and the SAMRC. Through this, TIA leveraged a total of R7.9 million in co-funding.

TIA concluded an agreement with Chemin in which Chemin committed co-funding of R6 million. The TIA–Chemin Seed Fund Programme is an IK-based programme aimed at advancing focused SMMEs and community-based cooperatives through business development support. Chemin is an incubation programme that supports the growth of very early-stage technology businesses.

Some noteworthy projects are described below:

University of South Africa researchers are developing a **solar-activated system for creating pressure to cause water circulation** in a novel stand-alone water purification system that can be used for surface and wastewater treatment. A demonstration pilot plant purification system was built and commissioned at iNanoWS facilities.

Reevell Enterprise Development is developing an **augmented reality welding programme** that will be used in training and education, aligned to the Quality Council for Trades and Occupations welding programme requirements. The programme has coded welder learning material loaded into the learning management system. It will be used for accreditation, workplace approval as well as monitoring across the technical education landscape; it will also help trainees to understand the technical challenges, the health and safety issues and the learner logistics of the welding programmes.

Innovation for Inclusive Development

The IID Programme focuses on the development and deployment of innovative technologies for social impact. The unit supports the following areas of work:

Grassroots Innovation Programme

In the year under review the GIP recruited 37 innovators to bring the total number of innovators in the programme to 147 since its inception in 2019. Four projects (Prev Leak, Abiri Rural Tourism, Mpumalanga Art Exposure Online Store and Credit Peak) raised a total additional funding of R2.4 million from external organisations. Ten projects were successfully transferred to and received follow-on funding from the Technology Acquisition and Development Fund to advance their technologies to market trial or pilot stage with the public sector.

As part of its JET Programme, Eskom purchased demonstration units of two agriculture innovations from the GIP – African Mushroom Dome by Sydwell Sihlangu and Kleinskuur Gravel Barrel Auto Syphon by Annemarie Bremner – to integrate the agriculture innovations into a photovoltaic solar-panel system installed in the Komati Power Station. TIA, in partnership with the United Nations Development Programme, City of Tshwane and The Innovation Hub, selected four grassroots innovation products to be piloted at the City of Tshwane. In addition, Prev Leak and ERS Tech are being piloted by the City of Johannesburg.

Living Labs and Science Centres for SET

The Living Labs Programme has established a total of 11 community-based labs in rural villages and townships throughout six provinces. Three are based in KwaZulu-Natal, one in the Western Cape, two in the Northern Cape, two in the Eastern Cape, two in North West and one in Free State. Three more new labs were taken on board during the financial year: Bhongweni CLC in KwaZulu-Natal, Rakgatla CLC in North West and Mecwi CLC in the Northern Cape.

In the year under review the programme has supported more than 200 aspiring innovations with access to innovation infrastructure and through a structured innovation support programme. The outcomes include the development of 28 prototypes, 17 market-ready products and the registration of 14 businesses. Investments totalling R24.5 million have been made to date, of which R16.7 million has been disbursed to the labs.

As the Living Labs concept is premised on the idea of a co-creation model, one of the Labs – the Macro-Informative Youth Agency situated in Free State province – received further funding of R200,000 for an experimentation project. Through this project, the Macro-Informative Youth Agency successfully co-developed a Spaza Shop Ecosystem Platform app with the involvement of multiple stakeholders. The platform was designed, developed and tested on 72 local spaza shop owners. Through this app, users can place orders, leverage bulk buying and negotiate discounts with suppliers and wholesalers. In

addition, the project was able to secure capacity-building support from the Small Enterprise Development Agency in the form of training in business registration and financial administration. The Macro-Informative Youth Agency has been successful in registering the initiative with the Companies and Intellectual Property Commission as a start-up firm.

Innovation Champions for Local Economic Development

The Innovation Champions for Local Economic Development (IC4LED) pilot programme is centred on the recruitment, employment and training of graduate students and then their placement in the municipalities and respective universities to infuse innovation into local entities. The programme is being implemented in Limpopo and Eastern Cape, where it is driven by the joint teams from the University of Venda and the Vhembe District Municipality, WSU and the OR Tambo District Municipality.

A highlight has been the employment and placement of 13 graduates in municipalities as Innovation Champions. The programme also successfully integrated the work of the Human Sciences Research Council on Local Innovation Advancement Tools for the Community of Practice into the IC4LED programme's activities. The University of Venda/Vhembe IC4LED Local Innovation Advancement Tools project has successfully completed 50 key informant interviews, whereas the WSU/OR Tambo project has completed 35, all of them carried out by Innovation Champions.

The IC4LED programme is to be extended to two new pilot sites in the Northern Cape and KwaZulu-Natal provinces, where it will be implemented by the Sol Plaatje University and the Namakwa District Municipality and the University of Zululand and the King Cetshwayo District Municipality respectively.

SMME support programme: science, engineering and technology support infrastructure

The TSP enables academia and industry to take part in technology transfer and development by facilitating interaction and reducing barriers to market access through subsidised services. A network of 16 active Technology Stations across the country contributes to improving the competitiveness of industry through the application of SET interventions and by facilitating interactions between industry and academia.

The TSP provides SET and enterprise development support to technology innovators in targeted industries and communities. It does so through providing access to state-of-the-art equipment, infrastructure and expertise in specialised fields that would not otherwise be available or where they would not be able to afford to commercialise their innovations themselves.

Support services provided by Technology Stations range from prototyping to pre-commercialisation. They include testing and analytical services, rapid prototyping and manufacturing, consultation, technology audit and feasibility studies, process or product improvements, applied development, engineering and design, R&D, and technology demonstration and training. The initiative supports mainly SMMEs, individual innovators and researchers.

Technology Stations provide products and process improvements, from technology development to supporting the competitiveness of enterprises to be productive, and to creating jobs, gaining access to markets and exporting products that are tested to comply with national and international standards. The support provided enables SMMEs to secure new contracts and/or retain existing jobs.

Regarding human capital development and training, two interventions contribute to the improved capacity of students: work-integrated learning and support to graduate interns in priority sectors. This is done alongside creating a better enabling environment for the exploitation of R&D outputs of universities in partnership with other government departments and entities.

Interns and postgraduates are placed either with the Technology Station or with an industry partner to work on an industry project. Interns and postgraduates at Technology Stations have subsidised access to state-of-the-art equipment and platforms, which enables them to participate in projects on the latest standard of technology, which then gives them a competitive edge in the industry.

Support was provided to 2,938 SMMEs (including nine non-government organisations and 34 cooperatives) across various sectors: agro-processing; chemicals and cosmetics; manufacturing and metal fabrication; and green industries, plastics, composites and textiles. Of these, 1,555 (58%) are youth-owned enterprises or youth entrepreneurs, 1,252 are women-owned enterprises or women entrepreneurs and 11 (0.3%) were enterprises owned by persons with disabilities or entrepreneurs who are persons with disabilities.

Highlights for the period under review include the following:

- 857 competitive improvements were provided, where 60 enterprise solutions were taken up in the market, which either resulted in retaining and/or the creation of new jobs. This compares favourably with an average of 836 competitive improvements and 45 enterprise solutions taken up in the market in the 2016/17–2021/22 period.
- 137 high-level postgraduates were supported, with 38 students afforded an opportunity to work on industry projects in the manufacturing and agro-processing sectors.
- Regarding knowledge-based innovation products, 22 invention disclosures were made, 43 prototypes

developed, 23 technology assistance packages delivered and nine technology demonstrators developed in pilot productions for pre-commercial products, processes or services.
- R43.9 million was leveraged by Technology Stations.
- 22,332 hours were spent delivering short learning programmes and tailored training for skills transfer to companies. This includes individuals from 82 accredited training courses and providing work-based learning for SET university graduates and the high-end skilled labour force to industry. Such efforts contribute to curriculum improvements and student involvement in industry-related projects.
- 27,837 hours were spent on applied research and technology development with host universities to enable the use of new knowledge.

Innovation skills and enterprise development

The business unit aims to stimulate a culture of innovative thinking in the NSI, therefore increasing the rate of translation of innovative ideas into novel technologies, products and services. It provides focused and targeted training interventions to strengthen the entrepreneurial capacity of researchers and innovators in the commercialisation of their research outputs.

GCIP-SA 2022

The Global Cleantech Innovation Programme in South Africa (GCIP-SA) is part of a global initiative by the United Nations Industrial Development Organization (UNIDO). The aim of GCIP is to promote clean technology innovation and support entrepreneurs in growing their SMMEs and start-ups into viable, investment-ready businesses. UNIDO's Global Environment Facility designated TIA as the national implementer and country host for GCIP-SA in 2018.

From 130 applicants, a total of 30 enterprises were accepted into the National Academy Programme, which supports early-stage SMMEs in developing cleantech solutions. This is achieved through comprehensive end-to-end business acceleration services, including pre-accelerator, national and global accelerators, and advanced accelerator and post-accelerator support.

EWaste Africa, a small electronic-waste business based in KwaZulu-Natal, scooped the coveted GCIP-SA award in March 2023. iSolar, Rubber Nano Products and Hello Gugu were the first, second and third runners-up.



Figure 25: GCIP-SA 2023 finalists

Partnerships and strategic engagement

In repositioning TIA in the NSI and increasing its brand visibility and equity in the market, the Agency is committed to engaging with stakeholders through implementing a diverse range of strategic engagement platforms. TIA's Engagement Plan is segmented into three categories: TIA-owned events, partnered events and sponsored events. During the reporting period, TIA implemented several initiatives within this framework that focused on the start-up ecosystem and sector-specific and product launches from its successful investments.

Start-up ecosystem

TIA participated in several start-up ecosystem events through sponsorship and partnering with the likes of the Innovation Summit, Africa Arena and the SAVCA Annual Conference. Through these platforms, TIA participated in plenaries and panel discussions on topical issues about innovation and had the opportunity to showcase its investees, enabling them to participate in bootcamps and pitches. Three specific engagements and resulting partnerships are featured below.

TIA and the SAB Foundation entered into a partnership to promote social entrepreneurship development in South Africa. The partnership will see TIA and SAB Foundation co-investing in a Social Innovation Fund, the Social Innovation and Disability Empowerment Awards and a University Seed Fund.

The SAB Foundation, in partnership with TIA, hosted its 12th annual Social Innovation and 7th annual Disability Empowerment Awards in which R18 million in grant funding and business development support was awarded to 29 deserving social innovators in October 2022. The theme for this year's awards was "Renewal, Revival and Resilience, honouring the tenacity and sheer will of South African entrepreneurs". Three projects previously supported by TIA (Fire Killa Extinguishers, Mind Blown Game, AddressDox) were among the finalists. Through this partnership, TIA is committed to expanding innovation-related activities in underserved regions and to promoting social entrepreneurship development in South Africa aligned to our mandate.



Figure 26: SAB Foundation Social Innovation and Disability Empowerment award winners

TIA has entered into a collaboration agreement with the **Small Enterprise Finance Agency**. The agreement will allow the parties to work together to jointly facilitate funding for SMMEs, co-fund selected strategic initiatives, provide mentorship support and offer SET support in the form of technology transfer.

TIA partnered with **AfricArena**, one of the start-up ecosystem-building partners that has emerged as an important player in the South African ecosystem which connects start-ups to investors and provides a wide range of follow-on support beyond TIA's funding. AfricArena runs annual start-up events in the five regional blocks of the continent, including Kenya, Tunisia, Nigeria, Egypt and Morocco. During the reporting period, TIA co-hosted the AfricArena Johannesburg Summit in March 2023 that saw 25 start-ups from six countries participating and receiving various forms of support during the event. The event consisted of collaborative sessions and discussion activities about investment and entrepreneurship in Africa, with a focus on its pitch format consisting of the winners of its regional rounds who compete in a series of finals.

The summit was preceded by two events: a one-day bootcamp programme called "AfricArise Founders' Bootcamp" took place at the Tshimologong Precinct in Johannesburg in March 2023 and a Learning Expedition with 40 attendees. The event attracted 280 participants as in-person attendees and 3,096 online participants.



Figure 27: The 2023 AfricArena event under way

Sector-specific

Sector-specific events are important platforms for gathering intelligence on industry trends and identifying key partners. Through TIA's various business units, the Agency participated in a range of thematic conferences, seminars, dialogues and colloquia of relevance to their respective focus areas. These included the Agri-5 Conference, the EnergyX Conference, the Mining Indaba, the Manufacturing Indaba, GovTech and the AI Expo. TIA used these platforms to promote awareness of its mandate and offerings, showcasing its portfolio of investments, and pitching itself as an important contributor to advancing the innovation agenda in the fact of sector-specific challenges.

TIA-hosted events

As part of building its own brand presence in the market, the Agency has been working towards establishing its own stand-alone high-level and high-impact event hosted in its own name. While this remains part of a future plan, a few initiatives have been implemented to this end.

Firstly, TIA partnered with AfricaBIO and the DSI to sponsor and host the 2022 BIO Africa Convention in Durban under the theme "Africa Resilient: Life sciences innovation for achieving health and food security". The convention showcased Africa's biotechnology innovation in the health, agricultural and industrial sectors. The event It was anchored by an insightful programme by industry experts and thought leaders sharing experiences, wealth of knowledge and discussing critical issues facing the biotechnology industry today.

This annual event facilitates the exchange of groundbreaking ideas and opportunities in the biotechnology industry. TIA played a meaningful role not only as a headline sponsor, but also as a thought leader in the NSI through contributing to the design and content of the event, through a strong physical presence in the exhibitions and through participating and leading panel discussions and presentations in the conference plenaries. TIA also ensured that selected investees were afforded the opportunity to attend and exhibit their products and services for the purposes of awareness and business development. This platform provided significant opportunities for TIA to expose successful technologies from South Africa and establish leads for partnerships into the future and overall connectedness to the global innovation ecosystem.

Going forward TIA intends enhancing the Agency's brand equity at the event and boost the profile of the event such that BIO Africa achieves its intended objectives and achieves its potential as a key event on the global biotechnology stage. As part of its strategy to increase the event's value proposition a critical improvement required is to increase the participation of the private sector generally and investors in particular.



Figure 28: Panelists at the BIO Africa Convention

The second is the GCIP-SA Awards function. This annual event is held to celebrate and honour some of the most promising innovators in the cleantech sector on the back of a programme run by TIA on behalf of UNIDO. The partnership with UNIDO has made it possible for TIA to position its brand as a leader in the cleantech innovation space.

The third Initiative is the Indigenous Knowledge and Bio-Trade Indaba that TIA hosted in collaboration with UFS in Bloemfontein. Exploring various aspects of IKS, the Indaba provided a platform for various stakeholders to share knowledge about current developments in IK research and product development, biodiversity, conservation, innovation and the commercialisation of IK-based products. The Indaba was championed by the university's African Medicines Innovation and Technology Development Platform, which was established in 2020 through TIA funding as one of the new Technology Platforms focusing on IKS.

These events give insight into the types of event and initiative that TIA should be pursuing in line with the recommendations of the Ministerial Review concerning elevating TIA's stature in the NSI. It is through this approach that TIA will elevate its brand equity in the market, to be recognised as the main organisation responsible for driving innovation in the country.

HEI engagement

TIA's HEI Engagement Programme seeks to increase TIA's visibility in universities, create awareness of the Agency's programmes and offerings, strengthen existing relationships between TIA and Offices of Technology Transfer and promote TIA's funding instruments beyond the Seed Fund. By pursuing these objectives, TIA is able to promote the uptake of other instruments, such as the Technology Development Fund, the Pre-Commercialisation Support Fund and the Innovation Fund. A particular emphasis in implementing this programme is placed on historically disadvantaged HEIs which require special attention if TIA is to achieve its transformation and inclusivity objectives. During the reporting period, TIA engaged with Sefako Makgatho Health Sciences University, the University of Limpopo and WSU.



Figure 29: The TIA CEO, Mr Patrick Krappie and the Sefako Makgatho Health Sciences University Vice-Chancellor, Prof. Peter Mbati

Product launches

Product launches are an important key performance indicator in TIA's APP, where TIA achieved 43 launches against a target of 28 for the year. For a selected few of these, TIA hosted special events to showcase their achievements to relevant stakeholders in the NSI. These include Sawubona Mycelium, the cotton bailer machine and PEN Play's Let's Really! Play Maths.

Industry Matching Fund programme

The Industry Matching Fund is a pilot commercialisation acceleration instrument or initiative for partnering with industry, particularly venture capital, the angel investor community and institutional investors. The Industry Matching Fund has several Partnership Funds operating, including the University Technology Fund (UTF), Biotech Fund, Natural Indigenous Products Fund, Angel Network Fund and Venture Fund.

To diversify its portfolio outside of the Western Cape, the UTF has assessed projects from universities in other provinces and has provided pre-seed funding to six projects. The UTF has also approved its divestment of 100% of its shares in Cape Bio Pharms valued at a minimum of R30 million, which equates to approximately twice the initial investment.

International engagements

Through its International Partnerships programme, TIA pursues five specific objectives:

- promoting bilateral collaborative R&D and innovation;
- market access and international networking;
- leveraging international investments into the NSI;
- capacity-building and knowledge transfer; and
- positioning the TIA brand globally as a thought leader and a go-to organisation for innovation in South Africa.

During the year under review, TIA took advantage of key strategic international platforms to position its brand, seek partnership opportunities and promote the internationalisation of its investees. Key among these include participation in the US Bio Convention (San Diego), Bio-Habana (Havana), a USA Study Tour, VivaTech (Paris), COP 28 (Sharm El-Sheikh), the Kenya Innovation Summit (Nairobi) and the Climate Investment Summit (London). Key engagements are featured below.

TIA signed a partnership agreement with Innovate UK, the Agency's counterpart in the United Kingdom, to collaborate and deliver on the **Knowledge Transfer Network Global Alliance**. This initiative is funded by the Foreign, Commonwealth and Development Office and the Department for Business, Energy and Industrial Strategy in the United Kingdom.

The programme aims to work in partnership with government and private-sector stakeholders in developing more sustainable and effective innovation networks to help accelerate the application of innovative solutions to socio-economic needs in Kenya, South Africa and Nigeria. Through this the objective is to promote long-term inclusive economic growth and job creation in these countries.

TIA is represented on the Advisory Board of **Place Based Innovations** in South Africa, Kenya and Nigeria. The Agency is also implementing a jointly funded programme between TIA and Innovate UK concerning water technologies in the order of R10 million. Phase 2 of the Scale-out For Impact Programme, which is jointly funded by TIA and Innovate UK in the amount of R10 million, is also being implemented. This project also produces podcasts and tools for IP and promotes commercialisation and business model validation.

TIA partnered and signed a sponsorship agreement for the **World Climate Summit** – The Investment COP, a high-level companion event which took place in parallel to the United Nations COP27 (27th Conference of the Parties) in Sharm el-Sheikh, Egypt, in November 2022. The World Climate Summit is a networking and matchmaking event that facilitates a swift transition to a net-zero emissions economy across energy, industry, transport, cities and natural resource management, providing bottom-up solutions through public and private collaboration.
TIA's participation was informed by the president's unveiling of the government's JET Investment Plan, which requires USD99 billion (R1.5 trillion) over the next five years. For this reason, the event was aligned with the Presidency's COP27 priorities that focused on accelerating climate finance and showcasing best practices and innovative climate solutions.

TIA participated in the summit by positioning itself as a formidable force in the innovation discourse regarding the JET. The World Climate Summit was a crucial opportunity for TIA to engage with the international community to showcase its portfolio of technological innovations that require follow-on funding and leverage international investment for the purpose of developing green and renewable energy technologies locally. Further efforts would entail the development of a strategic high-impact innovation programme that would mobilise local stakeholders in the research community, business, and innovators to develop high-impact innovative technologies to advance South Africa's transition to renewable and green energies, in this way contributing to the JET.

The Board chairperson led the TIA delegation by participating as a speaker; the chosen topic was "Africa on the Front Line – Towards a Resilient Future: Outlook on Africa's 2030 Commitments and Resilient Future Pathways". The Acting CEO participated in an interview with the World Climate Foundation, positioning TIA as a partner in technological innovations that seek to respond to the challenges that come with climate change and require mitigation and adaptation.

These efforts represent TIA's early activities in the post-COVID lockdown period to re-engage with international partners beyond online interactions. Through these efforts, a number of investees were exposed to international partners and they are currently pursuing follow-up business development activities. A case in point is the Sawubona Mycelium, which, during their participation at the Kenya Innovation Summit, entered into an agreement to partner with a local Kenyan producer and distributor to act as their local distributor in the country.



Figure 30: Ms Matsi Modise, the TIA Board chairperson, speaking at the World Climate Summit

SCALE-OUT FOR IMPACT HIGHLIGHT – SA REBUILDERS (PTY) LTD

SA Rebuilders and Bluepile are the local partners in an international project that seeks to manufacture low-cost, high-quality filament for 3D printers from recycled soft drink bottles and bio-waste bagasse. The project is a collaboration between SA Rebuilders, led by Dr Maryam Jordan, Bluepile from South Africa and Tech for Trade led by William Hoyle in the United Kingdom.

SA Rebuilders has successfully developed a streamlined approach to tackle the soft-drink bottle waste crisis. The company, through its project SA Waste and Biomass Valorisation (Waste-to-Value), has set up a pilot recycling plant in Mayville township and successfully developed three prototypes of low-cost, high-quality filaments for 3D printers from recycled soft-drink bottle waste plastics, recycled construction brick and resin from plastic waste. SA Rebuilders has also created a training centre to provide skills development to youths in its work-integrated learning programme based at the Mangosuthu University of Technology.

SA Rebuilders is a semi-finalist of the Gauteng Accelerator Programme Green 2022 Competition for our "Build a home" project. The company raised R1.8 million from the Support Programme for Industrial Innovation in addition to R700,000 funding from TIA. The company now plans on raising funding for prototype testing against standards, patent registration and protection, and constructing a pilot manufacturing plant.

14.3.4 Budget and expenditure

A comparison of the budget and actual expenditure for the Innovation Enabling division is shown in Table 11.

Table 11: Budget and expenditure for the Innovation Enabling division for 2021/22 and 2022/23

	2021/22			2022/23		
Sub-programme	**Budget (R'000)**	**Actual Expenditure (R'000)**	**(Over)/under Expenditure (R'000)**	**Budget (R'000)**	**Actual Expenditure (R'000)**	**(Over)/under Expenditure (R'000)**
Youth Technology Innovation Programme	1,599	1,599	–	115	128	(13)
IS&ED	1,581	3,166	(1,585)	1,600	3,605	(2,005)
TSP	91,019	107,263	(16,244)	72,685	144,724	(72,039)
IID	29,000	12,985	16,015	22,519	43,349	(20,830)
GCIP-SA	3,380	1,023	2,357	14,083	4,466	9,617
Seed Fund	12,000	25,263	(13,263)	14,032	26,953	(12,921)
Africa Programme	–	–	–	11,849	3,811	8,038
Strategic engagements and partnerships	–	–	–	450	5,014	(4 564)
Total	**138,579**	**151,299**	**(12,720)**	**137,333**	**232,050**	**(94,717)**

15. SPECIAL FOCUS: IMPLEMENTATION OF THE INNOVATION FUND

DSI established the Innovation Fund that will enhance South Africa's capacity to commercialise technological innovations. The objectives of the fund are to serve as an opportunity to de-risk investments through technology development and demonstration and as a catalyst for co-investment and follow-on investment from industry and private-sector sources (commercial funding). TIA is one of the implementing partners alongside the SA SME Fund, the Public Investment Corporation, the IDC and others. This public–private funding instrument aims to facilitate and accelerate project commercialisation.

TIA received an allocation of R80 million for a portfolio of 20 projects approved by the DSI under Phase 1 of the Innovation Fund. Under Phase 2, R102.2 million has been received and R100 million under Phase 3. All Phase 1 funds have been committed, including the use of R3.1 million in interest on Phase 1 funds received.

For the period under review, a total of R34.5 million has been disbursed against project milestones (R18.9 million against Phase 1 and R15.5 million against Phase 2). To date (from the commencement of the fund until 31 March 2023), a total of R91.6 million has been disbursed against project milestones (R76.1 million against Phase 1 and R15.5 million against Phase 2). A total of R41.4 million has been disbursed to Bio-economy-related projects as at 31 March 2023 and R37.9 million to Commercialisation-related projects.

During March 2023, TIA successfully contracted with the DSI for a further R100 million as part of Innovation Fund Phase 3. This followed a proposal for further funding submitted in September 2022 on the back of a significant investable pipeline. A number of opportunities are at advanced stages of due diligence for evaluation and funding under Phase 3. This takes in the advancement of transformation in the venture capital space, including the identification of the Black Business Council as a strategic implementing partner.

Two radar-based projects developed under consortia have been approved to a total of R130 million: the **Passive Radar Technology** and the **Inundu** projects. Inundu is an air-to-air training and evaluation airborne platform that allows older-generation fighter aircraft to exhibit new-generation (fourth and fifth) aircraft capabilities in the electromagnetic spectrum. These advanced capabilities allow airforces to improve their training realism at a lower cost. The Passive Radar Technology project entails the deployment of a novel airspace surveillance solution in which aircraft detection does not require an active transmitter but rather relies on "transmitters-of-opportunity" to plot the positions of aircraft.

Project highlights under the Innovation Fund are provided below:

Stone Three

Stone Three solves real-time measurement problems with industrial AI-augmented machine vision and remote AI-augmented process monitoring and diagnostics, which improves the efficiency of minerals processing. This is achieved through its Smart Sensor Process Advisory Dashboard. With Innovation Fund support, Stone Three has grown internationally, having garnered projects in Chile, Australia, South Africa and Europe.



Figure 31: A control room at Stone Three

Stone Three's Smart Sensor Process Advisory Dashboard has made remarkable progress and has successfully implemented, both locally and internationally, several trials such as but not limited to belt rip detection; trial on a froth sensor; train ML model to detect foreign objects present on the client's (Newmont Australia) conveyor belt; belt health trial; cubicity-measurement function; pulp trial on the three float cells and particle-size analyser data campaign. The project has drawn to a close at TIA as all the milestones have been met.

Stone three increased its levy payment to TIA from R717,198 to R1.4 million over the past year. The company continues to pay its Innovation Fund loan repayment instalments of R338,453 per quarter as at September 2022.

Msizi Pharmaceuticals

Msizi Pharmaceuticals (Pty) Ltd ("Msizi Pharma") received funding Phase 1 from the Innovation Fund of R12.5 million to locally manufacture fluorocytosine/emtricitabine/lamivudine using flow chemistry". The aim of the project is to enable Msizi Pharma to localise the manufacture of Flucytosine, an antifungal used in the treatment of cryptococcal meningitis and an intermediate in the synthesis of two antiretroviral drugs (ARVs), lamivudine and emtricitabine via a novel continuous flow process. Therefore, Msizi Pharma intended to acquire a technology package for the production of Fluorocytosine (5FC) via a continuous flow process that was developed by the University of Durham.

Through a subcontracting model with Microinnova, Msizi Pharma completed the basic engineering and feasibility studies and the team was able to demonstrate a continuous production process of Flurocytosine at a very high purity level via continuous flow chemistry. At this purity, Flurocytosine can be used only for API synthesis and other applications and cannot be used in the development of the ARV, Emtricitabine. Therefore, the next step for the team is to optimise the synthesis process so that the purity of the product is at an acceptable level for ARV application prior to running the process at a commercial scale. In this regard, Msizi Pharma has submitted a request for additional funding to optimise its manufacturing process further in order to produce Flurocytosine at acceptable pharmaceutical grades that are suitable for health applications.

Natural Indigenous Products Programme Fund

The Natural Indigenous Products Programme (NIPP) Fund has been established jointly by TIA and the IDC for the purposes of supporting IK-based and natural products-based bio-innovations. Six projects previously supported directly through the DSI were taken on board the pilot phase of the NIPP Fund. These are the Setsong Tea Crafters, the University of Limpopo, Machaba Herbs, UP, Mor Nutri and Phephisa Natural Resources Institute projects:

- Setsong Tea Crafters is a community-based enterprise that specialises in developing and commercialising indigenous teas and related health infusions.
- The University of Limpopo project focuses on the production of marula fruit wine.
- The Machaba Herbs project entails manufacturing and commercialising immune-boosting African traditional medicines.
- The Phephisa Natural Resources Institute continues to commercialise its product range comprising cosmeceuticals and African traditional medicines.

University Technology Fund

The UTF was established to bridge the gap between the research and commercialisation stages, specifically to facilitate the commercialisation of technology originating from South African universities. As part of TIA's efforts to expand the reach and impact of the Innovation Fund, the Agency partnered with the UTF to bolster its capacity to support the commercialisation of publicly funded IP.

The UTF made new Series Seed Investment totalling R5 million in the period under review in MariHealth Solutions, a UCT spinout company developing prebiotics and a health monitoring system for the abalone industry. The investment also comes with R2 million co-investment by UCT.

Seed Fund Programme

TIA approved 20 new projects under the Seed Fund Programme to the value of R9.6 million. Eleven of these projects originated from the NRF as a new Seed Fund implementing partner in support of five National Research Infrastructure Platforms.



PART C Governance

TIA was established by, and derives its mandate from, the TIA Act 26 of 2008, as amended (the TIA Act). TIA is a Schedule 3A public entity under the provisions of the PFMA (Act 1 of 1999). The objective of the Agency in terms of the TIA Act is to support the state 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.

16. PORTFOLIO COMMITTEE

TIA is accountable to parliament through the Parliamentary Portfolio Committee on Higher Education, Science and Innovation. The Portfolio Committee exercises oversight over TIA with an emphasis on service delivery and enhancing economic growth.

During the year under review, TIA appeared before the Portfolio Committee twice: on 22 April 2022 to present its APP for 2022/23 and on 21 October 2022 to present its Annual Report for 2021/22. The APP presentation included insights into TIA's strategic positioning and impact on the NSI and its planning priorities for the subsequent three years. The Annual Report presentation looked back at the first two years of implementation of the Strategic Plan 2020–2025 and included highlights of TIA's 2021/22 financial performance with reference to matters such as Commercialised Innovations, delivering on the Bio-economy Strategy, SMME support and partnerships.

17. EXECUTIVE AUTHORITY

Oversight by the Executive Authority rests on the prescripts of the PFMA. The Executive Authority has the power to appoint and dismiss the board of a public entity. The Executive Authority must ensure that Board members having an appropriate mix of skills are appointed to guide the public entity.

The Executive Authority is accountable to parliament for achieving the goals and objectives of TIA. The Executive Authority takes an interest in risk management to the extent necessary to derive comfort that properly established and functioning systems of risk management are in place to protect TIA against significant risks. As risk management is an important tool with which to support the achievement of this goal, it is important that the Executive Authority provides leadership to governance and risk management.

TIA's Executive Authority is the Honourable Minister of Higher Education, Science and Innovation, Dr Bonginkosi Emmanuel Nzimande.

The following statutory reports were submitted to the Executive Authority:

- 2022/23 Quarter 1 Performance Report (20 July 2022)
- 2022/23 Quarter 2 Performance Report (20 October 2022)
- 2022/23 Quarter 3 Performance Report (20 January 2023)
- 2022/23 Quarter 4 Performance Report (20 April 2023)
- 2022/23 Annual Report (29 July 2022)
- 2023/24 APP (16 January 2023)
- 2021/22 TIA Key Performance Highlights (30 May 2022)
- 2020-2025 TIA Mid-term Performance Report (14 November 2022)
- Response letter to TIA Ministerial Review Report (13 March 2023)

18. ACCOUNTING AUTHORITY

TIA's Accounting Authority is the TIA Board. The Minister of Higher Education, Science and Innovation, Dr Bonginkosi Emmanuel Nzimande, appointed the Board with effect from 1 November 2021 in terms of section 8(4) of the TIA Act.

In terms of section 5 of the TIA Act, the Board is responsible for managing and controlling the Agency. Board members are appointed by the Minister on the grounds of their knowledge and experience in technological innovation, technology management, IP and its commercialisation, and business skills which, when considered collectively, should enable them to attain the objects of the Agency.
The Board considers the practice of good corporate governance to be a fundamental component contributing to the success of TIA's business. In the pursuit of and in its commitment to the highest standards of governance, the Board provides strategic oversight and effective direction by adhering to the relevant codes of best practice and principles of fairness, integrity, responsibility, accountability and transparency.

18.1 Board Charter

A Board Charter is in place which sets out the roles and responsibilities of the Board in relation to the Agency and governs the conduct of the Board. The Board Charter is central to determining the way in which the Board interacts with management, the shareholder and other stakeholders. In addition, Board members' responsibilities and limitations are primarily set out in the TIA Act, the PFMA, the King reports on corporate governance and the common law of South Africa.

The Board is responsible for:

- acting as the focal point for, and the custodian of, corporate governance by managing its relationship with management, the shareholder and other stakeholders of the Agency along sound corporate governance principles;
- providing effective leadership on an ethical foundation;
- appreciating that stakeholders' perceptions affect the Agency's reputation;
- adopting strategic plans;
- appointing a suitably skilled and qualified person as the CEO of the Agency, which appointment must be made after following a transparent and competitive selection process;
- retaining full and effective control over the Agency, and monitoring management in implementing Board plans and strategies;
- monitoring operational performance and management;
- ensuring that the Agency complies with all relevant laws, regulations and codes of business practice;
- ensuring that the Agency communicates with its internal and external stakeholders openly and promptly, and with substance prevailing over form;
- developing a Code of Conduct that anticipates and deals with conflicts of interest, particularly relating to Board members and management;
- ensuring that 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;
- defining and monitoring the information needs of the Board;
- identifying and monitoring the non-financial aspects relevant to the business of the Agency; and
- through its sub-committees, prioritising and managing risks which seek to impede the business of TIA.

18.2 Composition of the board

Table 12 provides a detailed list of the TIA Board members.

Table 12: TIA Board members and their particulars

Full Name and Designation	Effective Dates of Appointment and Resignation	Qualifications	Area of Expertise	Board Directorships	Other Committees or Task Teams
Ms Matshidiso Modise (Chairperson)	1 November 2021 to date	B Com (Marketing and Advanced Management) Financial Insights for non-financial directors AltX Director Induction Programme (IODSA)	Venture Capital (early-stage investment experience) Technology entrepreneurship Strategy Business development Governance green skills and sustainability	Furaha Afrika Holdings (Pty) Ltd Furaha Solutions (Pty) Ltd Furaha Green Solutions (Pty) Ltd Finclusion (Pte) Ltd SiMODiSA Start-Up Kuehne + Nagel SA SAB Foundation (Trustee) Metropolitan Momentum Holdings ESD Trust (Trustee) City Power (Board member)	Agri-Vie Private Equity Fund (Advisor) SA Venture Capital & Private Equity Association Google Africa Launchpad Programme (Business Mentor) Endeavor SA Trust (Mentor) World Economic Forum – global shaper Young Presidents Organisation – Member Wits University Deputy Vice-Chancellor's External Advisory Committee on Innovation (Advisor)
Ms Anati Canca (member)	1 November 2021 to date	BSc (Microbiology) BSc (Hons) (Human Genetics) MSc (Technology Development) Coaching for Development	IP management Strategy formulation and execution of innovation strategies for revenue generation Commercialisation Leadership and executive coaching	Malangana Innovation Advisory (Pty) Ltd Mazangani Solutions (NPC) Ruliv (NPO)	Associate: Nurturing Growth Trading (Pty) Ltd Wits University – School of Governance Research Assistant
Dr Revel Iyer (member)	1 November 2021 to date	BSc BSc (Hons) MSc PhD (Botany) LLB LLM (IP) MBA	Technology transfer IP management Technology innovation Technology commercialisation Biotechnology strategy	Aonyx Holdings Aequorea Aonyx Foods Promerops	DSI IP and Technical
Mr Patrick Krappie (Acting CEO and ex officio Board member)	13 June 2020 to date	BCom (Hons) Economics	Economic policy, International diplomacy & negotiation Collaborative leadership Stakeholder management Partnership building Strategy & execution	None	Member: Innovation Challenge Pilot Project Steering Committee Co-Chair: IID Steering Committee Member: Afrique du Sud Steering Committee

Table 12: TIA Board members and their particulars (continued)

Full Name and Designation	Effective Dates of Appointment and Resignation	Qualifications	Area of Expertise	Board Directorships	Other Committees or Task Teams
Ms Lindiwe Matlali (member)	1 November 2021 to date	B Com (Economics and Statistics) Foundation Programme for Private Equity (GIBS) Graduate Certificate Innovation and Entrepreneurship Graduate Certificate Social Entrepreneurship Master's in Innovation	Techno-entrepreneurship Social entrepreneurship	Africa Teen Geeks National Financial Aid Scheme Apodytes (Pty) Ltd	Presidency (Commissioner 4IR) Member: World Economic Forum Global Future Council on the Future of Cybersecurity (2023–2024 term)
Mr Butana Mboniswa (member)	8 August 2019 to date	MSc Biochemistry BSc (Hons) Biochemistry LLB Certificate Financial Modelling and Analysis	Executive leadership Investment management technology management Technology development Business development Global systems of innovation SME incubation	Inqaba Biotechnical Industries (Pty) Ltd The Innovation Hub Management Company (Pty) Ltd Sereko Technology & Innovation Advisors	Member: Gauteng Growth and Development Agency Infrastructure, Group Trade and Investment Committee
Ms Joy Sebenzile Matsebula (member)	1 May 2017 to date	MSc Biometrics BSc Natural Sciences, Environmental Sciences & Biometrics	Business development Social justice & human rights Disability mainstreaming Governance Leadership Statistics & scientific research	Dempower Divuseni Trading and Investments ICT SMME Chamber Johannesburg International Airport Kuzuko Lodge Lanseria Airport 1993 Lanseria Airport Investments Lanseria Holdings Lanseria International Airport Lindandanda Consulting Investments & Trading Motswako Office Solutions Ngwedi Investment Managers Petatex Taquanta Securities Taquanta Asset Managers Taquanta Investment Holdings	Centre for Alternative & Augmentative Communication Disability Economic Empowerment Trust South African Development Trust for Disabled People Presidential Working Group on Disability The Sebenzile Matsebula Foundation
Mr Thabiso Gerald Ramasike (member)	1 May 2017 to date	BCom BANKSETA International Executive Development Senior Executive Leadership Development Programme Certified Associate (CAIB (SA))	Business Investing Strategy Governance Public speaking Executive coaching Community leadership Philanthropy	Tuleka Group (Pty) Ltd Kwena Fund Managers (Pty) Ltd Kwena Franchise Fund (Pty) Ltd Eic Wealth Investors (Pty) Ltd Ramasike Investment Club (Pty) Ltd Thabiso Ramasike Investments (Pty) Ltd Villa De Rama (Pty) Ltd Thatir Group (Pty) Ltd Willrod Holdings (Pty) Ltd Tshepe Foundries International (Pty) Ltd MES Mould Empower Serve NPC African Unity Life Ltd Leadership Circle (Pty) Ltd Ramasike Foundation NPC Ramasike Family Trust Khula Trust Maxwell Mahole Morapeli Trust Mosotho Trust	Member: Audit and Risk Committees of South African Revenue Service and African Unity Insurance Ltd Member: Audit and Risk Committee of MES Chairperson: Social, Ethics, Transformation & Sustainability Committee of African Unity Insurance Ltd

The Board convened for a total of seven meetings during the period under review. The dates of the meetings and Board member attendance are provided in Table 13.

Table 13: Board dates of meetings and attendance record

Member	No. of Meetings Attended	1 May '22	29 Jul '22	9 Sept '22	10 Nov '22	30 Nov '22	12 Jan '23	7 Mar '23
Ms M Modise	7	●	●	●	●	●	●	●
Ms A Canca	7	●	●	●	●	●	●	●
Dr R Iyer	6	●	●	●	●	●	○	●
Ms L Matlali	6	●	●	●	○	●	●	●
Ms S Matsebula	7	●	●	●	●	●	●	●
Mr B Mboniswa	7	●	●	●	●	●	●	●
Mr T Ramasike	7	●	●	●	●	●	●	●
Mr P Krappie	7	●	●	●	●	●	●	●

Legend
● In attendance
○ Not in attendance

The Board has recognised the relevance and significance of TIA's role in the NSI and has prioritised commercialisation, the implementation of the Bio-economy Strategy and support to SMMEs and cooperatives for the successful implementation of TIA's mandate.

18.3 Committees

TIA's Audit and Risk Committee (ARC), Investment and Finance Committee (IFC), Human Resources and Remuneration Committee (HR&REMCO), and Board Technical Committee (BTC) have been tasked with specific responsibilities in order to attend to the matters of the Board effectively.

18.3.1 Audit and Risk Committee

The ARC is constituted in terms of section 77 of the PFMA, 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 and control processes, and the preparation of accurate financial reporting and statements in compliance with all the applicable legal requirements and accounting and auditing standards. The ethical function of a Social and Ethics Committee as envisaged in the Companies Act 71 of 2008 is incorporated in the Terms of Reference of the ARC.

During the reporting period, the committee monitored the effectiveness of TIA's internal controls, governance and compliance with its risk management framework, and received reports on ongoing litigation matters. The combined assurance plan was implemented to ensure that the Agency adopts a co-ordinated approach to all assurance activities. While several material risks emerged, no internal or external audit findings have come to the attention of the committee to indicate that any material breakdown of internal controls occurred during the year under review.

The Committee convened for a total of 10 times during the period under review, as shown in Table 14.

Table 14: ARC dates of meetings and attendance record

Member	No. of Meetings Attended	19 Apr '22	20 May '22	27 May '22	19 Jul '22	18 Aug '22	18 Oct '22	19 Oct '22	8 Nov '22	19 Jan '23	7 Feb '23
Mr T Ramasike	10	●	●	●	●	●	●	●	●	●	●
Ms L Matlali	6	●	○	○	○	●	●	●	●	●	●
Mr B Mboniswa	10	●	●	●	●	●	●	●	●	●	●

Legend
● In attendance
○ Not in attendance

18.3.2 Investment and Finance Committee

The IFC provides oversight and advice to the Board on issues central to the Board's core mandate. The committee makes funding decisions in pursuit of TIA's mandate and strategic objectives within the specific thresholds determined in and guided by the Investment Framework Policy, as prescribed by section 5(3) of the TIA Act.

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

During the reporting period, the committee approved an amount of R39.9 million for the development of a radar-based flight-simulation system from Technology Readiness Level 6 to Level 9. The committee also approved funding in an amount of R15 million each to two black-owned venture capital funds which aim to advance and support entrepreneurs with high growth scalable businesses with a technology and innovative focus.

Furthermore, the committee approved R12 million for a project involved in fixed-wireless broadband network infrastructure and an amount of R36.8 million for the development of a solution aimed at relieving the burden on existing air traffic management systems.

The committee convened for a total of seven times during the period under review, as shown in Table 15.

Table 15: IFC dates of meetings and attendance record

Member	No. of Meetings Attended	3 May '22	13 May '22	12 Aug '22	23 Nov '22	3 Feb '23	17 Feb '23	23 Feb '23
Mr B Mboniswa	7	●	●	●	●	●	●	●
Ms L Matlali	6	●	●	●	●	●	●	●
Ms M Modise	6	●	●	●	●	●	●	●
Dr R Iyer	7	●	●	●	●	●	●	●

Legend
- In attendance
- Not in attendance

18.3.3 Human Resources and Remuneration Committee

The HR&REMCO derives its authority from the Board and was established in order to oversee and provide advice to the Board on issues central to TIA's HR capability, design and strategy as well as remuneration and succession planning.

The committee is responsible for ensuring that TIA develops a framework, policies, guidelines and an environment that allows the Agency to employ, reward and retain dedicated, motivated, efficient and loyal employees so as to achieve TIA's long-term strategic goals. The social functions of a Social and Ethics Committee as envisaged in the Companies Act 71 of 2008 are incorporated into the Terms of Reference of the HR&REMCO, dealing with matters such as the environment, health and safety, consumer relationships, labour and employment.

During the period under review, the committee approved the three-year Employment Equity Plan, implemented various training initiatives for employees and approved revisions to policies, including the Acting Policy and the Remote Working Policy.

The committee convened for a total of four times in the period under review, as shown in Table 16.

Table 16: HR&REMCO dates of meetings and attendance record

Member	No. of Meetings Attended	17 May '22	10 Aug '22	17 Nov '22	14 Feb '23
Ms S Matsebula	4	●	●	●	●
Ms A Canca	3	●	●	●	●
Mr T Ramasike	4	●	●	●	●

Legend
- In attendance
- Not in attendance

18.3.4 Board Technical Committee

The purpose of the BTC is primarily to provide high-level strategic and strategy-related technical advice to the Board and management of TIA. The committee is a convening platform for key opinion leaders in the NSI and globally, to help TIA to think about its strategic positioning, function and the way it contributes to the global and international discourse. The committee may also consider matters of a technical nature which relate to other aspects of TIA's mandate and advises the Board on the strategic priorities which should be adopted in the context of the NSI, the overall objectives of the South African government and the objectives of TIA as set out in the TIA Act.

The committee also considers matters which may be referred to it by the Board or presented to it by the management of TIA. As a strategic advisory body, the committee does not have the powers to approve transactions. Where relevant, the committee must operate within the specific thresholds determined by the Delegation of Authority Framework as approved by the Board.

The role of the committee was restated and refined during the period under review, and the committee considered and deliberated on the recommendations of the Ministerial Review Report in detail.

The committee convened for a total of three times in the period under review, as shown in Table 17.

Table 17: Board Technical Committee dates of meetings and attendance record

Member	No. of Meetings Attended	1 Sep '22	31 Jan '23	1 Mar '23
Ms Anati Canca (Chairperson)	3	●	●	●
Ms Sebenzile Matsebula	3	●	●	●
Dr Revel Iyer	3	●	●	●
Mr Patrick Krappie	2	●	●	●

Legend
● In attendance
● Not in attendance

18.4 Remuneration of Board members

Board members receive fees for the services they render to the Board and the executive authority in accordance with the relevant tariffs as determined by National Treasury. These fees 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 airfares 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. For the use of their personal vehicles in conducting TIA's business, members are reimbursed per kilometre as permitted by TIA's travel policy. The breakdown of each member's remuneration is presented in note 27 (members' emoluments) of the AFS, presented in Part E.

19. RISK MANAGEMENT

19.1 Governance

The Board has overall responsibility for risk management, ensuring that it is embedded in all the processes and activities of TIA. Effective risk management is essential to TIA's strategic planning and operational success. As we navigate a business environment that is becoming increasingly complex and dynamic, it is crucial that we identify, evaluate and mitigate the risks that could have an impact on the achievement of our strategic objectives. TIA remains committed to a robust enterprise-wide risk-management system by proactively identifying and managing risks; we strive to safeguard TIA's interests, enhance stakeholder confidence and ensure sustainable growth in the long term. This ensures that TIA takes a holistic view of the risks inherent in its strategy, operations and business and that the management of risks is embedded in the planning, business and decision-making processes in accordance with the approved Enterprise Risk Management Policy and Strategy and the Risk Appetite and Tolerance Framework.

TIA's Executive Management acknowledges the dynamic nature of risks and the value of regular review. Furthermore, Executive Management is accountable for designing, implementing and monitoring the process of risk management, and for integrating it into the Agency's day-to-day activities.

As part of enhancing support for the risk management function, TIA established an internal Risk Management Steering Committee that is a key role-player in maturing the risk function in the combined assurance approach. The committee provides robust oversight and direction for risk-related matters and ensures that the identified risks are adequately identified and mitigated. The ARC provides an oversight role regarding the effectiveness of

TIA's risk-management process, which is integrated into and central to its strategic planning process.

TIA maintains a steadfast commitment to continuous improvement in risk management as effective risk management is a continuous process that requires ongoing monitoring and adaptation.

19.2 Risk categories

TIA manages risks at three levels: strategic, operational and projects:

- Strategic risks are those that are most consequential to TIA's ability to execute its strategy and achieve its constitutional mandate. These risk exposures can ultimately affect TIA's shareholder value and long-term sustainability.
- Operational risk refers to those inherent to TIA's operations and processes. They are introduced by internal factors (such as HR, legal and compliance, fraud) and external factors (such as suppliers, politics and the economic climate).
- Project risk refers to those risks that could hinder the progress, result or outcome of a specific project funded by TIA. They would result in deviations from expected returns on a project or affect the planned outcomes of specific value-creating initiatives.

19.3 Strategic risks

Strategic risks that could affect business operations are approved by the Board and monitored throughout the year, and adjustments are made as issues emerge and the business environment changes. The TIA Board and the Executive Committee continuously review the principal risks to ensure an appropriate understanding of the overall operating environment. In total, seven strategic risks and 15 root causes were identified and are listed in Table 18.

Table 18: Strategic risks and associated root causes

Strategic risk	Root cause
Inability to deliver on the strategy	COVID-19 pandemic restrictions and impact of emerging variants Possible lack of continuity of the Board Strategic imperatives do not embrace inclusiveness Funding/product instruments do not deal with systemic challenges in NSI Ministerial Review not finalised
Possible misalignment between TIA and the DSI	TIA strategy not aligned to the Decadal Plan Key deliverables/measurements from a shareholder perspective not fully defined
Negative stakeholder sentiment	Poor stakeholder management as a result of poor communication Inadequate service to stakeholders due to long turnaround times
Possible budget cuts	Poor/prolonged economic conditions and fiscal pressures
Inadequate performance of investment portfolio	Inadequate post-investment monitoring Unethical conduct by investees
Lack of optimal organisational capability	Loss of critical skills required in the organisation/inability to attract talent Inadequate/insufficient processes and systems
Cyber security threats	Virus infection and illegal network access

Figure 32 reflects the inherent risk and residual risk rating per risk after taking existing controls into account.

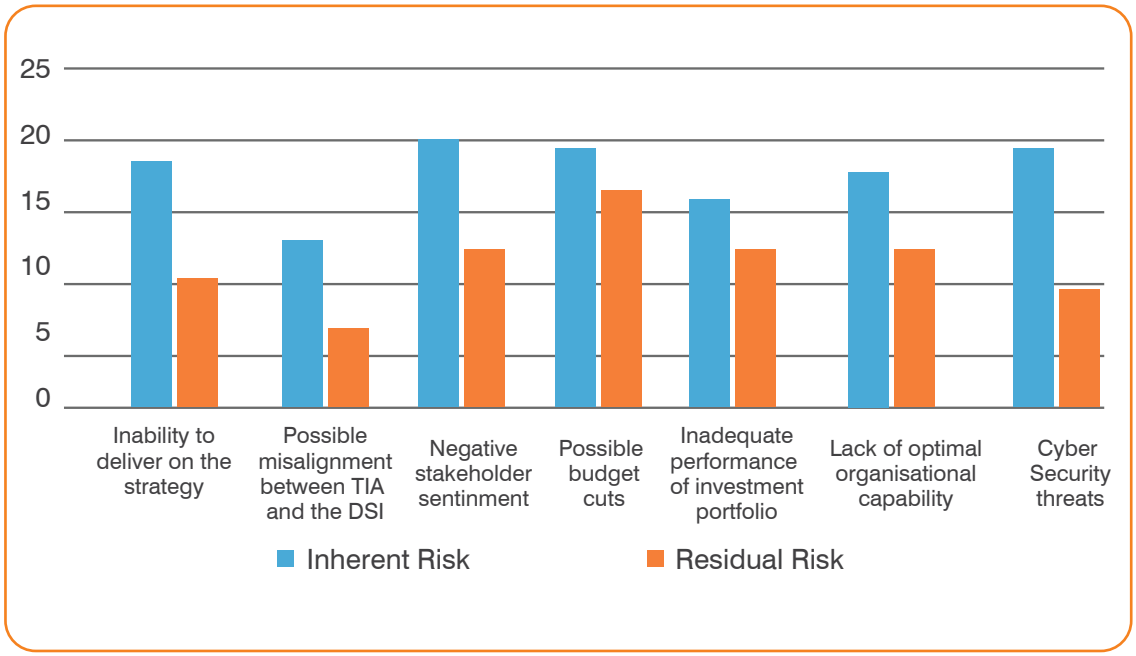


Figure 32: TIA's strategic risks

19.4 Risk management

At a strategic level, the risk management functions performed by the Board, executives and management include:

- defining risk;
- determining risk appetite;
- formulating strategies and policies for managing risk; and
- developing adequate strategies and policies for managing risk and developing adequate systems and controls to ensure that overall risk remains within an acceptable level.

At an operational level, risk management is performed by the Risk Management function at an enterprise-wide level. Enterprise risk management activities are performed by the relevant business units and are entrenched through adherence to the operational procedures and guidelines set by management. Operational risk management strategies and policies are used in conjunction with delegated powers of authority which detail the authority levels for various transactions as well as other approved organisational policies.

Project risk assessments are performed to identify key risks that could affect the progress, result or outcome of a specific project and any actions that are designed to mitigate adequately the risks identified and then put in place. The implementation and effectiveness of planned actions are monitored throughout the duration of a project.

20. INTERNAL CONTROL UNIT

While the Agency does not have a separate Internal Control unit, TIA's management has established and maintained an effective system of internal controls. The objectives of the system of internal control are to ensure that:

- risks are properly managed;
- assets are safeguarded;
- financial and operational information is reliable;
- operations are effective and efficient; and
- laws, regulations and contracts are complied with.

Internal Audit assesses whether the internal controls upon which management relies to mitigate the risks to acceptable levels are appropriate and functioning as intended; and it develops recommendations for the enhancement of or improvements in TA's overarching control environment.

21. INTERNAL AUDIT

21.1 Purpose and objectives

It is a requirement of the PFMA that an Internal Audit function must exist for all public entities. The primary objective of the Internal Audit function is to provide management, the ARC and the Board with an independent and objective level of assurance. By partnering and collaborating with management, Internal Audit's assurance is designed to add value and improve TIA's operations, its internal control environment, and its risk management and

governance processes. In addition, Internal Audit helps TIA to accomplish its objectives by bringing a risk-based, systematic and disciplined approach to evaluating and improving the effectiveness of risk management, internal control and governance processes.

The Internal Audit function remains in-house and the unit has maintained its independence by reporting functionally to the ARC and administratively to the CEO. The unit has established processes and procedures in place that are supported by a sound internal audit methodology. The purpose, authority and responsibility of Internal Audit are encapsulated in the Internal Audit Charter, which is approved periodically by the ARC.

21.2 Key internal audit activities

The primary scope of the Internal Audit function is to provide TIA with an independent capability to perform assurance audits that are consistent with the relevant legislation, respond to TIA's priorities and are aligned to TIA's objectives. The function provides value-added assurance, supports positive change within TIA and also supports stewardship and accountability in the spending of public funds. Internal Audit focuses on the following key activities (among other activities):

- Risk areas are adequately identified and dealt with.
- Breakdowns in key internal controls are identified and reported on and in response to these instances appropriate refinements can be recommended and agreed on with management for implementation.
- Instances of non-compliance with TIA's corporate governance, policies and procedures, applicable regulations and statutory requirements are identified and implementation plans are put in place to redress and resolve these matters.

21.3 Summary of work done in 2022/23

In accordance with the National Treasury requirements, an Annual Internal Audit Plan was prepared for 2022/23, which was approved by TIA's ARC, as required. The plan was developed to enhance organisational value by providing risk-based and objective assurance, advice and insight through professional practices to cope with emerging challenges.

During the period under review, an annual allocation of resources to audit activities was established on the basis of a systematic risk-based assessment, taking into account various financial, operational and strategic internal and external risks, policies and processes and the requirements of the PFMA, Treasury Regulations, etc. In line with the approved Annual Internal Audit Plan, audits were conducted across various TIA functional areas. In addition, a certain amount of capacity was used for ad hoc projects, special investigations, whistle-blowing matters and requests from management, ARC and the Board.

From an overarching perspective, during the period under review, Internal Audit completed all the planned audit activities, which include internal assurance audits, project and programme audits, advisory assignments and ad hoc requests. In this regard, no evidence was presented to suggest that there were material breakdowns in, or threats to, the internal control environment and the most significant risks at TIA were found to be at acceptable levels. A year-on-year comparison in Internal Audit showed an improvement in the control environment, with TIA developing and implementing more stringent controls and with a significant decrease in the number of critical and major audit matters. All the recommendations provided by Internal Audit have been appreciated and adopted by TIA management, where applicable.

21.4 Compliance with laws and regulations

TIA has implemented sufficient adequate processes, procedures, policies and frameworks to ensure that the Agency complies with legislative or regulatory matters that affect TIA. The Internal Audit planning process identifies audit areas in a manner that ensures compliance with legislative requirements and supports a value-added audit process. Instances of non-compliance with applicable regulations and statutory requirements are identified and guidance is provided for implementation plans to redress and resolve these matters.

22. FRAUD AND CORRUPTION

The provisions of section 38(1)(a)(i) of the PFMA stipulate that the Accounting Authority is responsible for ensuring that an organisation has in place and maintains an effective, efficient and transparent system of financial, risk management and internal controls. For this purpose, TIA has implemented a Fraud and Corruption Prevention Policy.

Fraud means the unlawful and intentional making of a misrepresentation which causes actual prejudice or which is potentially prejudicial to another, and it includes offences in respect of corrupt activities as defined in the Prevention and Combating of Corrupt Activities Act 12 of 2004 and cybercrime as defined in the Electronic Communications and Transactions Act 25 of 2002.

Corruption is any conduct or behaviour where a person accepts, agrees to or offers any gratification for themself or for another person where the purpose is to act dishonestly or illegally. Such behaviour also includes the misuse of material or information, the abuse of a position of authority or a breach of trust or a violation of duty.

Procedure for disclosure

In terms of the amended Act, an employer is required to implement internal procedures for receiving and dealing with information about improprieties, and they must do so as follows:

- Any disclosure must first be raised with the employee's line manager, either verbally or in writing.
- Should the employee feel uncomfortable or if the line manager is party to the disclosed facts, the disclosure may then be raised with:
  - the Executive: Corporate Services;
  - any other executive or manager;

- the Company Secretary;
- the CEO; or
- the Head: Internal Audit.

- Should the above channels have been exhausted internally and the employee is of the opinion that the disclosure could not be trusted in the hands of the above employees for whatever reason, they may approach the Chairman of ARC or make use of TIA's independent service provider for whistle-blowing, whose hotline number is communicated to all staff.
- Should an employee be uncomfortable approaching TIA staff or the Independent Service Provider, they can call the National Anti-Corruption hotline.

Once a disclosure has been made, management must be obliged to:

- acknowledge receipt of the disclosure in writing;
- within a period of 21 days after receiving the protected disclosure, decide whether to investigate the matter or refer the disclosure to another person or body, if the disclosure could be investigated or dealt with more appropriately by that other person or body; and
- inform the employee making a disclosure as to what steps have been taken once the disclosure has been made.

TIA must ensure that any employee who makes a disclosure will not be penalised or suffer any occupational detriment for doing so. Employees making a disclosure are not required to disclose their names.

23. MINIMISING CONFLICT OF INTERESTS

Annually, and on an ad hoc basis, through active solicitation, members are required to disclose potential conflicts of interest. During the period under review, disclosures received from members were closely scrutinised by the Company Secretary and the ARC chairperson. No conflicts or potential conflicts of interests were noted. Where required, members were excused from matters which had given rise to conflicts of interests. Members are required to disclose any potential conflicts at every meeting.

24. CODE OF CONDUCT

To support good governance, TIA adopted a Code of Conduct as part of its policies and procedures. The code is adhered to in TIA's dealings with all stakeholders and organisations, internally, externally, nationally and globally. In addition, the Board incorporated a Code of Conduct into its Board Charter to deal with instances where Board members may have conflicts of interest. The Code of Conduct makes it clear that Board members may not have any dealings involving personal financial interests with TIA.
As indicated above, the Board operates and conducts itself through four standing sub-committees (ARC, IFC, HR&REMCO and BTC). The Board's devolution of responsibilities, therefore, falls on these four sub-committees, which meet independently and report regularly to the full board through their respective chairpersons.

25. HEALTH, SAFETY AND ENVIRONMENTAL ISSUES

TIA is committed to prioritising the health and safety of its employees and visitors by maintaining a safe and secure working environment. The organisation adheres to occupational health and safety requirements by ensuring that all offices are compliant. Applicable control measures are implemented by the Occupational Health and Safety Committee to protect and prevent employees and visitors from occupational injuries or diseases; these measures are monitored by TIA's Internal Audit and Risk Management functions for effectiveness. Hazard identification and risk assessments are conducted at all TIA offices to ensure that potential environmental hazards, threats and risks are identified and controls are implemented. Such assessments also cover wellness aspects pertaining to communicable diseases, including COVID-19 preventive measures.

The Occupational Health and Safety Policy and Standard Operating Procedures are reviewed regularly for their effectiveness. Fire-detection systems and emergency equipment in the offices are serviced and maintained regularly. An employee health and safety awareness programme was implemented continuously.

26. BROAD-BASED BLACK ECONOMIC EMPOWERMENT

TIA continues with its commitment to supporting the country's transformational agenda and the policy objectives of B-BBEE. This is entrenched through contributions in various areas, including skills, enterprise and supplier development, and also preferential procurement. During the current year, the Agency's procurement strategy has focused on both black women-owned and black youth-owned businesses.

Procurement from black women-owned businesses amounted to 35%, exceeding the previous year's actual of 27% by 8%. Despite focused procurement initiatives, procurement from black youth-owned businesses amounted to only 5% which was 2% lower than last year's actual of 7%. This was attributed to the continuation of existing contracts and the specialised nature of procurement in some cases in which suppliers with youth ownership are limited. The Agency continues to follow focused procurement processes in order to promote and improve procurement from previously disadvantaged individuals.
TIA not only focuses on its own B-BBEE contribution, but

also ensures that the principles of B-BBEE are entrenched in the businesses of its funded projects through continuous monitoring of project transformational plans. Targeted investment strategies that are enhanced further will be implemented in 2023/24 to facilitate transformation and inclusiveness in the NSI.

27. COMPANY SECRETARY

The Company Secretary provides the Board with professional and independent guidance on corporate governance matters and its legal duties. In addition to co-ordinating the functioning of the Board and its committees, the Company Secretary acts as a central source of information and advice to the Board on matters of ethics, adherence to good corporate governance principles, and compliance with procedures and the applicable statutes and regulations.

In accordance with Principle 10 of the King IV Report on Corporate Governance for South Africa, 2016 (King IV™ 2016), the Company Secretary reports functionally to the Board and administratively to the CEO, as the member of the executive management designated for this purpose. The Company Secretary is not a Board member and has unfettered access to the Board, but maintains an arm's-length relationship with the Board and its members. The appointment of the Company Secretary, Mr Kobus Louw, including his employment contract and remuneration, was approved by the Board.

The Company Secretary has certified that, to the best of his knowledge and belief, TIA has lodged all such returns as are required in terms of the Companies Act 71 of 2008 and that such returns are true, correct and up to date. In addition, he has certified that TIA has lodged with the Minister of Higher Education, Science and Innovation the financial statements in respect of the preceding financial year.

28. CORPORATE SOCIAL RESPONSIBILITY

Homelessness is an issue that most people witness but few pay attention to. TIA employees in Pretoria had observed many homeless people around the Agency's Menlyn head office. Accordingly, TIA's Social Responsibility Committee requested that TIA employees and those of its stakeholders contribute to making home-cooked meals for homeless people by contributing cash or perishables and fresh vegetables. Members of TIA's Social Responsibility Committee made and distributed approximately 100 meals per week to homeless people during the period June to August 2022 based on funding contributed by TIA staff and outside organisations.





Figure 33: Home-cooked meals being distributed to homeless individuals in and around Menlyn, Pretoria

29. AUDIT AND RISK COMMITTEE REPORT

The ARC ("the committee") is appointed in terms of 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 regularly reviewed charter and has executed specific duties delegated to it by the Board. Among other things, the charter empowers the committee with the following responsibilities:

- Examine and review the AFS and the report on the financial results.
- Appoint and evaluate the qualification, appropriateness, eligibility and independence of the external auditor and recommend the audit fees for Board approval.
- Approve the internal audit plan and Internal Audit Charter.
- 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.

29.1 Audit and Risk Committee responsibility

The committee reports that it has complied with its responsibilities arising from section 51 (1)(a)(ii) of the PFMA and Treasury Regulation 27.1. The committee also reports that it has adopted appropriate formal terms of reference as its ARC Charter, has regulated its affairs in compliance with this charter and has discharged all its responsibilities as contained in the charter.

29.2 Effectiveness of internal controls

Internal Audit is responsible for the evaluation of the effectiveness of TIA's internal controls, including recommending improvements. Therefore, Internal Audit must determine whether the internal controls designed and applied by management are adequate and function as intended.

Our review of the findings of the internal audit work, which was based on the risk assessments conducted, revealed certain weaknesses. These were then raised with TIA's management and corrective measures and controls were devised and implemented.

Internal Audit work provided the following assurance to TIA management and the Board for the year under review:
- Assets are adequately and appropriately safeguarded.
- Funds disbursed by TIA are managed economically, effectively and efficiently.
- Applicable laws, regulations and directives and contracts are complied with by the public entity.
- Resources are acquired economically, used efficiently and protected adequately.
- Significant financial, managerial and operating information is accurate and reliable.
- Internal controls and systems (including IT systems are efficient and effective.
- Financial and operating information is effective.

Internal Audit provided recommendations for the improvement of the efficiency and effectiveness of TIA's operations. Whereas several areas requiring improvement were identified, there is reasonable assurance that the most significant risks at TIA are at acceptable levels. It is the overall view of Internal Audit that the control environment remains effective as no critical or repeat findings were reported during the reporting period. However, improvements are required in certain areas to improve the efficiency, effectiveness and adequacy of its governance, risk management, financial management and internal controls.

29.3 In-year management and monthly/ quarterly reporting

In 2022/23, TIA reported quarterly to its executive authority as per the 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. After considering the reports during the year, the committee guided management in reviewing targets and assessing the adequacy of the quarterly performance reports against the targets.

The public entity has reported quarterly to National Treasury, as is required by the PFMA.

29.4 Evaluation of financial statements

The committee reviewed the AFS and agreed that the statements presented fairly, in all material respects, the consolidated financial position and performance of TIA. The committee concluded that it was satisfied that the statements complied with GRAP.

29.5 External auditor

The external auditors, Rakoma & Associates Inc., remain on record, with oversight by the office of the Auditor-General of South Africa. The committee is satisfied that the external auditors have complied with sections 90(2)(b) and 94(8) of the Companies Act (2008), as amended, and confirm that there are no conflicts of interest as determined by the criteria prescribed by the Independent Regulatory Board for Auditors. The committee, 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 2023. In considering the external audit plan, the committee is satisfied that it was comprehensive and adequately interrogated the risk areas identified. The external auditors remain independent and no non-audit services were provided nor required. In further consideration of their services and engagement with the external auditors, the committee was satisfied that:

- the quality and effectiveness of their services were appropriate;
- in-committee sessions excluding management were held when required; and
- 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.

No reportable irregularities were identified by the external auditors.

29.6 Auditor's report

The committee has reviewed TIA's implementation plan for the audit issues raised in the previous year and are satisfied that the matters have been adequately resolved. The committee concurs with and accepts the conclusions of the Auditor-General on the AFS and is of the opinion that the audited AFS should be accepted and read together with the report of the Auditor-General.

29.7 Going concern

The management of TIA provided the assurance to the committee 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.

29.8 Fraud prevention

The committee assists the Board in discharging its duties regarding the identification, responsiveness, and mitigation strategies in relation to fraud prevention. In this regard, the committee has ensured that fraud-prevention policies and procedures are in place, along with an anonymous ethics line to manage matters relating to fraud and corruption; and the committee regularly evaluates the effectiveness of these processes.

29.9 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 according to their 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 regarding the following:

- embedding risk management in the organisational processes; and
- embedding risk management in projects.

Management regularly reviews risk-related internal control processes and will continue to do so through the Risk Management Committee. Actions are delegated to staff together with guidance on how to embed risk management in the execution of their daily tasks.

TIA's enterprise-wide risk management activities and initiatives were consistently aligned to best international practices (ISO 31000 – 2018 International Standards, COSO: Enterprise Risk Management – Integrating with Strategy and Performance (September 2017), the King IV Report on Corporate Governance, the Public Sector Risk Management Framework and the Institute of Risk Management South Africa risk principles). Accordingly, the committee can report that the risk-management processes for the period under review were adequate.

29.10 Information technology governance

The committee 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 TIA's disaster recovery plans when necessary. No material weaknesses were found in TIA's IT environment during the period under review.

29.11 Governance on quality

The committee was pleased to learn of management's having secured the re-certification of TIA's ISO 9001: 2015 standard following a surveillance audit for the year under review. This standard is used to demonstrate TIA's ability to consistently provide services that meet clients' and regulatory requirements.



Mr Thabiso Ramasike
Audit and Risk Committee Chairperson


PART
D
Human Resource
Management

30. INTRODUCTION

TIA's HR Management business unit aims to ensure that TIA functions at optimal levels to enhance capacity in critical areas of the business. To complement the effective functioning of the organisation the unit adopted a talent-management strategy, enhancing each element of the HR value chain (see Figure 34).



Figure 34: TIA's HR management value chain

The year under review has been one of substantial change, especially in the workplace, where organisations of all shapes and sizes had to navigate the post-pandemic normal. From embracing the work-from-home phenomenon to improving the way organisations attract and nurture diverse talents, both large and small adjustments during this year have created lasting shifts in the way TIA supports its employees in preparation for the future.

Hybrid office arrangements, loadshedding troubles, a struggling economy, the need for rapid organisational response to change, new ways of thinking, stimulation and taking care of mental health issues are some of the key issues the organisation navigated through during the year under review. Business changes, their impact and team capabilities to become agile, modify and move forward were fundamental to operational excellence.

The turnover rate for the period under review is 7.9%, which has decreased compared to that in the previous financial year. Employee engagement sessions lie at the core of the business unit's service offerings to ensure that the TIA values are embedded and employees have a sense of belonging.

A holistic change management programme and engagement was imperative to minimise employees' uncertainties; it was largely collaborative to ensure employee involvement throughout the processes for retention. The HR Management business unit was cognisant of these changes and devised continuous business solutions and options in its operations that are responsive to the need to demonstrate the utility of the TIA Employee Value Proposition depicted in Figure 35.

TIA strives to continuously enhance the Employee Value Proposition and remain the employer of choice for the right skills amid high levels of job market competition. The following are some of the initiatives implemented by TIA to remain competitive:

- Respond to employees' concerns raised in the annual engagement surveys. Recommendations from the survey are implemented as an annual project plan to improve on employees' areas of concern.
- Benchmark remuneration and rewards against the market to ensure market-related remuneration packages for employees.
- Promote hybrid working arrangements complemented by the appropriate secured tools to support the flexibility of working from home.
- Create opportunities for upskilling through secondments, promotions and training and development initiatives.
- Implement Employee Wellness Programmes that are responsive and provide proactive solutions based on the employee profile.



Figure 35: TIA's Employee Value Proposition

31. HUMAN RESOURCES OVERSIGHT STATISTICS

31.1 Personnel cost by division

The approved TIA organogram was maintained as aligned to the approved business strategy until financial year 2025. Structural realignment was imperative for organisational flexibility and stakeholder demands to be met.

The organogram comprises three core divisions: Bio-economy, Commercialisation and Innovation Enabling. The support functions under the Office of the CEO, Finance and Corporate Services are reported on under Administration.

In view of the TIA National Treasury Expenditure Review conducted during this period, various cost-containment measures were implemented to reduce operational costs. The eight vacant positions that were declared redundant were aimed at reducing the employment cost while maintaining acceptable performance levels in the organisation. The scarcity of skills for filling mission-critical positions made it necessary to offer competitive remuneration packages that would attract suitably qualified candidates.

The overall HR budget from the MTEF allocation for 2022/23 amounted to R120 million, including a ringfenced allocation for programmes. No annual salary increases were provided for in the MTEF allocation for 2022/23. However, a total of R19.8 million was realised by the end of the financial year from the total HR budget and the Board approved its use for annual salary increases in line with the Department of Public Service and Administration annual salary increase guidelines for the period. The decision was taken by the Board to cushion the TIA employees against inflationary and economic impacts by also enhancing the TIA Employee Value Proposition.

The annual staff salary increases were approved after the budget readjustment. Staff received a 4.2% CPI annual increase plus a 2.8% ad hoc increase, totalling a 7% increase overall.

Table 19: Personnel costs by division for 2022/23

Division	Total Expenditure for the Entity (R'000)	Personnel Expenditure (R'000)	Personnel Expenditure as a % of Total Expenditure	Number of Employees	Average Personnel Cost per Employee (R'000)
Administration*	96,071	55,353	57.62	71	780
Bio-Economy	275,596	22,711	8.24	25	708
Innovation Enabling	252,750	16,693	6.60	23	726
Commercialisation	118,123	19,137	16.20	19	1,007
Other**	–	2,018	–	N/A	N/A
TOTAL	**742,540**	**115,912**	**15.61**	**138**	**752**

** Administration incorporates Corporate Services, the CEO's Office and the CFO's Office.*
*** Other costs include Board remuneration, interns, workman's compensation and other provisions.*
The table includes only positions funded through the MTEF allocation.



31.2 Personnel cost by salary band

The vacancies in the core divisions were prioritised as per the recruitment drive for capacitation with skills and competencies where technical skills gaps were identified as affecting business continuity. According to the salary benchmark conducted by an independent contractor, a need arose for a thorough comparison with market-related packages in order for TIA to attract the right level of skills for retention. This initiative implied that the organisation had to be willing to pay improved remuneration packages in order to fill vacancies.

The increase in personnel cost is attributed to new appointees being offered market-related remuneration packages as indicated above.

Table 20: Personnel cost by salary band for 2022/23

Level	Personnel Expenditure (R'000)	% of Personnel Expenditure To Total Personnel Cost	Number of Employees	Average Personnel Cost per Employee (R'000)
Top management	11,241	9.70	5	2,248
Senior management	27,406	23.64	19	1,442
Professional qualified	55,429	47.82	65	853
Skilled	18,280	15.77	41	446
Semi-skilled	829	0.72	3	276
Unskilled	708	0.61	5	142
Other*	2,018	1.74	N/A	N/A
TOTAL	**115,912**	**100.00**	**138**	**840**

** Other costs include Board remuneration, interns, workman's compensation and other provisions.*
The table includes only positions funded through the MTEF allocation.

31.3 Performance rewards

The organisation recognises the economic difficulties and cost-of-living crisis under which staff must operate and views organisational performance as an indication of staff dedication, despite a challenging working environment, with staff motivation being essential as these important assets deliver on the TIA's mandate.

An amount of R7 million was approved by National Treasury as a rollover for the bonus payments in 2021/22. It must be noted, as indicated above, that no salary increases nor bonus provisions were made in our MTEF allocation due to budget constraints by National Treasury.

Aligned to the Remuneration and Rewards Policy, performance-based incentives are paid to those employees who meet certain performance criteria. The incentive is determined by the performance of the employee and translates into a percentage of the employee's total cost to company. A total of 135 employees were paid performance bonuses for 2021/22 in March 2023. Table 21 below indicates the percentages paid to different levels of employee.

Table 21: Performance rewards for 2022/23

Level	Performance Rewards (R'000)	Personnel Expenditure (R'000)	% of Performance Rewards to Total Personnel Cost
Top management	1,057	11,241	9.40
Senior management	2,322	27,406	8.47
Professional qualified	3,944	55,429	7.12
Skilled	1,226	18,280	6.71
Semi-skilled	53	829	6.39
Unskilled	72	708	10,17
Other*	N/A	2,018	N/A
TOTAL	**8,675**	**115,912**	**7.48**

** Other costs include Board remuneration, interns, workmen's compensation and other provisions.*
The table includes only positions funded through the MTEF allocation. It also excludes funds in relation to performance bonuses paid to ringfenced staff and contract staff employed for specific programmes.

31.4 Training costs

The TIA Talent Management Strategy requires that employees possess the requisite skills and competencies to deliver the organisational objectives. Where training gaps were identified in this period, personal development plans were used by employees to indicate and acquire necessary training to achieve the mandate. The Annual Training Plan was compiled collated from the training needs identified by employees. The training interventions ensured a correlation with employee roles and responsibilities to guide their career paths and retention in the organisation.

The training requirements outlined in the Annual Training Plan were streamlined and prioritised to those key skills and competencies required to deliver the operational targets. TIA being a knowledge-based organisation, it is envisaged that training needs will be increased in the coming years. Training costs for the year are shown in Table 22.

Table 22: Training costs for 2022/23

Programme	Personnel Expenditure (R'000)	Training Expenditure (R'000)	Training Expenditure as a % of Personnel Cost	Number of Employees Trained	Average Training Cost per Employee (R'000)
Administration*	50,580,550	294,596	0.6%	44	6,695
Bio-Economy	20,752,627	112,313	0.5%	12	9,359
Innovation Enabling	17,487,350	55,721	0.3%	8	6,965
Commercialisation	15,253,765	155,907	1.0%	12	12,992
Other**	1,484 661	–	0,0%	–	–
TOTAL	**105,558,954**	**618,536**	**0.6%**	**76*** **	**8,139**

** Administration incorporates Corporate Services, the CEO's Office and the CFO's Office.*
*** Other costs include Board remuneration, interns, workman's compensation and other provisions.*
**** Training for positions funded through Investments (ringfenced) are also included.*

31.5 Employment and vacancies

The approved structure has a headcount of 193, with 145 filled positions, 39 vacant positions and eight positions declared redundant for the period based on the realignment exercise embarked upon. The recruitment drive for 2022/23 was focused on capacitating the mission-critical technical areas, which resulted in the realignment of all cross-cutting functions for the optimal use of resources.

The job market volatility and changes in remuneration levels were the main challenges the organisation faced in recruiting and retaining skills and competencies. However, the organisation will attempt to use various recruitment and retention strategies in the future to curb the loss of skills.

The summary of total employees and vacancies per division is shown in Table 23. The vacancy rate was at 20% by end March 2023.

Table 23: Employment and vacancies by division for 2022/23

Programme	2021/22 Number of Employees	2022/23 Approved Posts	2022/23 Number of Employees	2022/23 Vacancies	% of Vacancies
Administration*	67	84	66	17	20
Bio-Economy	33	50	38	9	18
Innovation Enabling	27	35	23	7	20
Commercialisation	18	24	18	6	25
Other	–	–	–		–
TOTAL	**145**	**193**	**145**	**39**	**20**

** Administration incorporates Corporate Services, the CEO's Office and the CFO's Office.*
The table excludes interns, but includes ringfenced positions.

Three positions at the top management level were vacant as at 31 March 2023. The position of CEO is on hold pending the outcome of the Ministerial Review Report decision by the Minister. Recruitment for the position of Executive: Corporate Services and General Manager: Strategic Stakeholder Relations has commenced.

To support the operational effectiveness, all 39 vacant positions are at different phases of recruitment and updates will be recorded in the new financial year.

Table 24: Employment and vacancies by salary band for 2022/23

Programme	2021/22 Number of Employees	2022/23 Approved Posts	2022/23 Number of Employees	2022/23 Vacancies	% of Vacancies
Top management	5	7	4	3	43
Senior management	20	32	18	14	44
Professional qualified	66	89	69	15	18
Skilled	46	57	45	7	13
Semi-skilled	3	3	4	0	0
Unskilled	5	5	5	0	0
TOTAL	**145**	**193**	**145**	**39**	**21**

The table excludes interns, but includes ringfenced positions.

31.6 Employment changes

Forces in the external environment created the job market turbulence that led employees to change both their personal and their professional circumstances to balance their livelihoods. The TIA Ministerial Review Report received during the third quarter of the year also affected the natural attrition from the organisation negatively due to uncertainties experienced by staff. The staff turnover for 2022/23 was 7.9%, which is lower than that of the previous financial year, at 10.1%.

Focus was placed on mission-critical vacancies and the organisation embarked on a recruitment drive to acquire these skills to maintain the operational efficiency required to meet the strategic targets. Owing to market changes pertaining to competitive remuneration packages, it became challenging to recruit and retain the key talent required.

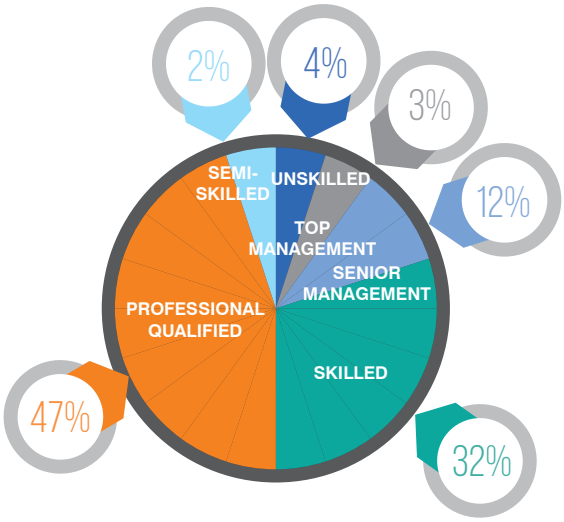


Figure 36: Terminations per occupational level

Table 25: Employment changes by salary band for 2022/23

Level	Employment as at 1 April 2022	Appointments	Terminations	Employment as at 31 March 2023
Top management	5	0	1	4
Senior management	20	0	2	18
Professional qualified	66	7	6	68
Skilled	46	4	3	47
Semi-skilled	3	1	0	3
Unskilled	5	0	0	5
TOTAL	**145**	**12**	**12**	**145**

The table excludes interns, changes in opening and closing balances due to internal promotions and movements.

31.7 Reasons for staff leaving

The economic impacts and the competitive remuneration benefits offered by other companies were the main reasons TIA lost staff. In the wake of the TIA Ministerial Review Report, the uncertainties which existed in the period under review about the organisation's future also had a bearing on the resignations received. A total of 12 staff members resigned during the year under review. Table 26 gives the reasons for employees leaving TIA.

Table 26: Reasons for staff leaving in 2022/23

Reason	Number	% of Total Number of Staff Leaving
Death	0	0
Resignation	12	100
Dismissal	0	0
Retirement	0	0
Ill health	0	0
Expiry of contract	0	0
Other	0	0
Total	**12**	**0**

The table excludes interns.

Table 27: Reasons for staff resignations in 2022/23

Reason	Number	% of Total Number of Staff Leaving
More attractive salary offer	5	42
Own business	1	8
Career growth opportunity	1	8
Reason not disclosed	3	25
Conflict in workplace	2	17
Total	**12**	**100**

Note: The table excludes interns.

31.8 Labour relations: Misconduct and disciplinary action

The organisation considers disciplinary action necessary for consequence management to ensure that employees behave in an appropriate manner to deliver on their performance expectations. A total of 21 verbal warning letters were issued together with one written warning in the period under review.

Table 28: Misconduct and disciplinary action in 2022/23

Nature of disciplinary action	Number
Verbal warning	21
Written warning	1
Final written warning	0
Dismissal	0

31.9 Equity target, employment equity status and transformation

TIA is committed to transformation, and the recruitment of women, youths and persons with disabilities is supported by the annual Employment Equity Plan as submitted to the Department of Labour.

TIA's employment equity profile as at 31 March 2023 is shown in Figure 37, depicting the number of employees (according to demographic category) currently employed by TIA compared to the target as planned in the Employment Equity Plan.

Approximately 43% of TIA employees are African females throughout the different employment levels, but they are less represented in the Senior and Top Management levels. Recruitment efforts will be aligned to the Employment Equity Plan to increase the top management representation of women candidates.

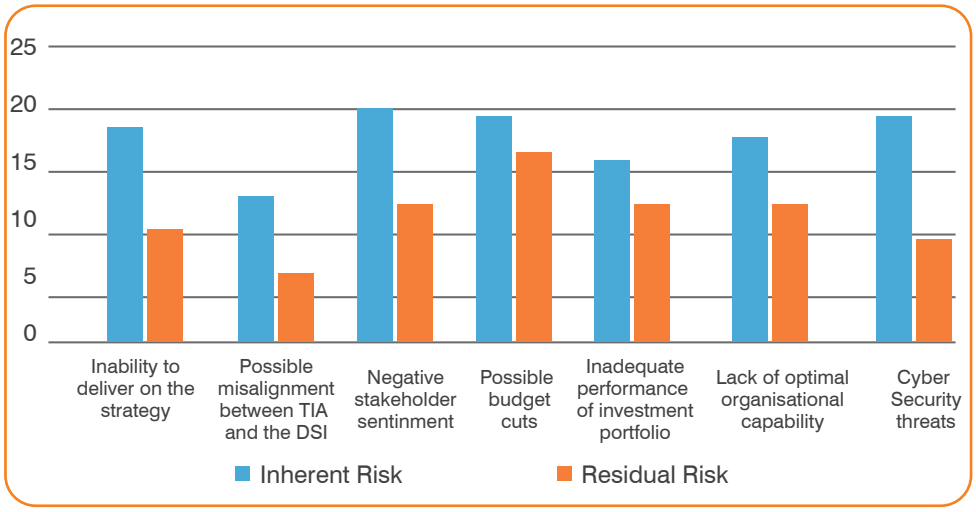


Figure 37: TIA's employment equity profile (measured against the economically active population) as at 31 March 2023

The employment equity demographics and occupational levels in each of these categories are shown in Tables 29, 30 and, 31, and in Figures 38 - 40.

Table 29: Female employees at TIA for 2022/23 as at 31 March 2023

Level	AFRICAN		COLOURED		INDIAN		WHITE	
	Current	Target	Current	Target	Current	Target	Current	Target
Top management	0	1	0	0	0	0	0	1
Senior management	1	6	0	1	1	1	1	1
Professional qualified	26	30	3	6	9	0	4	4
Skilled	29	29	5	5	3	2	0	0
Semi-skilled	1	5	1	0	0	0	0	0
Unskilled	5	4	0	1	0	1	0	0
TOTAL	**62**	**75**	**9**	**13**	**13**	**4**	**5**	**6**

The table excludes interns.

Table 30: Male employees at TIA for 2022/23 as at 31 March 2023

Level	AFRICAN		COLOURED		INDIAN		WHITE	
	Current	Target	Current	Target	Current	Target	Current	Target
Top management	2	3	0	0	1	1	0	0
Senior management	9	8	1	0	2	2	3	3
Professional qualified	18	35	2	7	2	2	5	5
Skilled	8	16	0	1	0	0	0	0
Semi-skilled	2	0	0	0	0	0	0	0
Unskilled	0	2	0	0	0	0	0	0
TOTAL	**40**	**64**	**3**	**8**	**5**	**5**	**8**	**8**

The table excludes interns.

The Employment Equity Plan also emphasises the need to recruit persons with disabilities across all job levels. The organisation has set a target of 2% (equivalent to three people) of the head count for the recruitment of persons with disabilities for the year 2022/23.

As shown in Table 31, the organisation has made progress to date by reporting a total of five persons with disabilities on its staff. The was achieved by implementing the TIA Reasonable Accommodation policy since 2021.

Table 31: Persons with disabilities employed at TIA for 2022/23 as at 31 March 2023

Level	FEMALE		MALE	
	Current	Target	Current	Target
Top management	0	0	1	0
Senior management	0	1	1	0
Professional qualified	2	1	0	1
Skilled	1	0	0	0
Semi-skilled	0	0	0	0
Unskilled	0	0	0	0
TOTAL	**3**	**2**	**2**	**1**

Note: The table excludes interns.

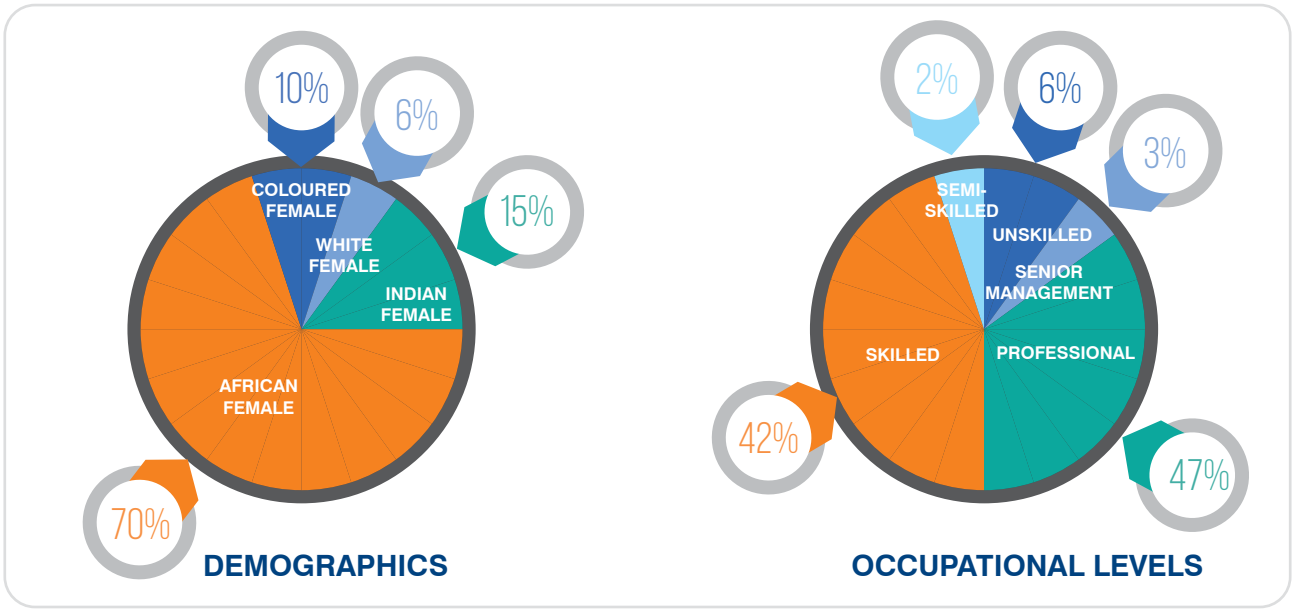


Figure 38: Employment equity demographics and occupational levels of the 61% women employment segment for 2022/23

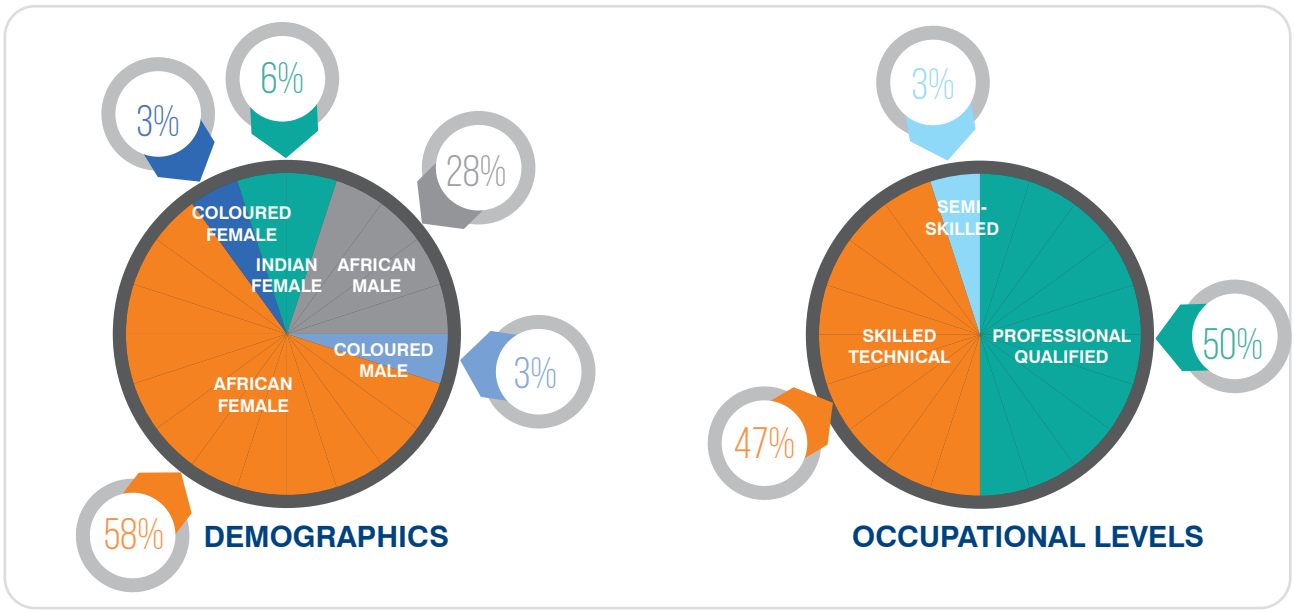


Figure 39: Employment equity demographics and occupational levels of the 22% youth employment segment for 2022/23

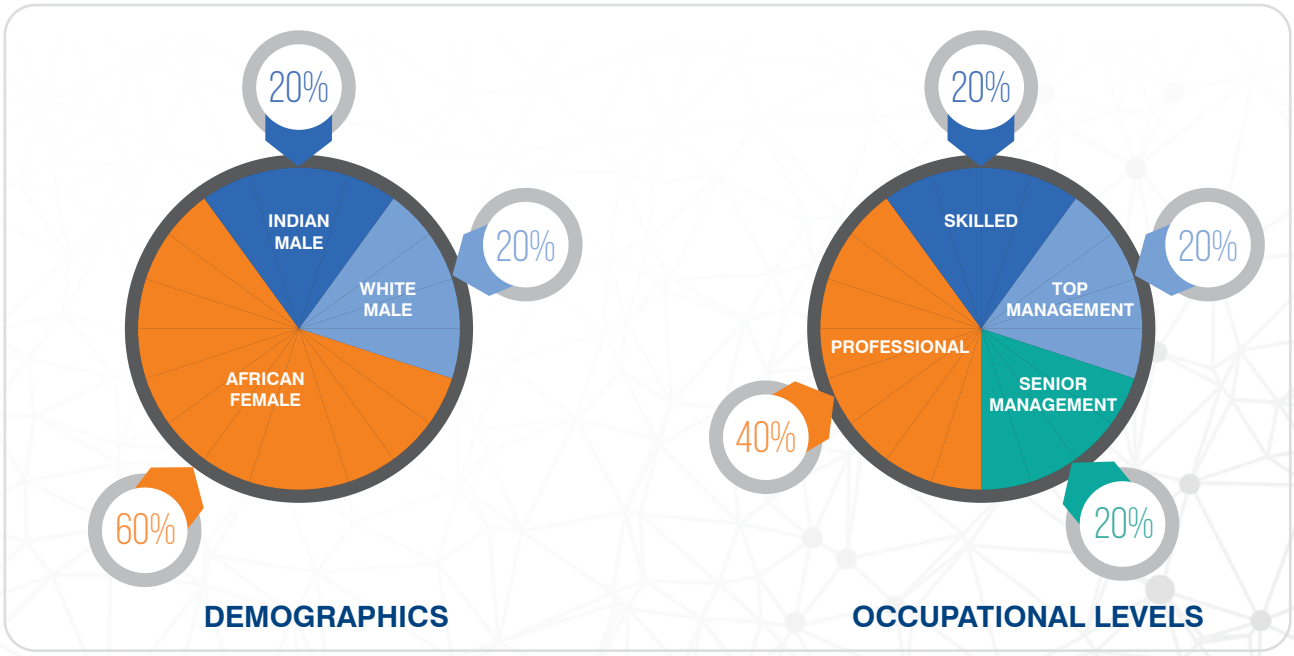


Figure 40: Employment equity demographics and occupational levels of the 3.4% people with disabilities for 2022/23



PART E Financial Information

32. BOARD'S RESPONSIBILITIES AND APPROVAL

The Board is required by the PFMA (Act 1 of 1999), to maintain adequate accounting records and is responsible for the content and integrity of the consolidated AFS and related financial information included in this report. It is the responsibility of the Board to ensure that the consolidated annual financial statements fairly present the state of affairs of the Agency 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 are engaged to express an independent opinion on the consolidated AFS and were given unrestricted access to all financial records and related data.

The consolidated AFS have been prepared in accordance with Standards of GRAP including any interpretations, guidelines and directives issued by the Accounting Standards Board.

The consolidated AFS are based upon appropriate accounting policies consistently applied and supported by reasonable and prudent judgements and estimates.

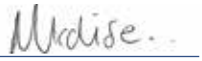
The Board acknowledge that they are ultimately responsible for the system of internal financial control established by the economic entity and place considerable importance on maintaining a strong control environment. To enable the Board to meet these responsibilities, the Board sets standards for internal 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 ethical standards in ensuring the economic entity's business is conducted in a manner that in all reasonable circumstances is above reproach. The focus of risk management in the economic entity is on identifying, assessing, managing and monitoring all known forms of risk across the economic entity. 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.

The Board is of the opinion, based on the information and explanations given by management, that the system of internal control provides reasonable assurance that the financial records may be relied on for the preparation of the consolidated AFS. However, any system of internal financial control can provide only reasonable, and not absolute, assurance against material misstatement.

The Board has reviewed the economic entity's cash flow forecast for the year to 31 March 2024 and, in light of this review and the current financial position, they are satisfied that the economic entity has access to adequate resources to continue in operational existence for the foreseeable future.

The external auditors are responsible for auditing and reporting on the economic entity's consolidated annual financial statements. The consolidated annual financial statements have been examined by the economic entity's external auditors and their report is presented on pages 92 to 96.

The consolidated AFS set out on pages 97 to 133, which have been prepared on the going concern basis, were approved by the board on 28 July 2023 and were signed on its behalf by:



Ms Matsi Modise
Board Chairperson



Mr Patrick Krappie
Acting Chief Executive Officer

33. INDEPENDENT AUDITOR'S REPORT TO PARLIAMENT ON TECHNOLOGY INNOVATION AGENCY

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 Group) set out on pages 97 to 133 which comprise the consolidated and separate statement of financial position as at 31 March 2023, the consolidated and separate statement of financial performance, statement of changes in net asset, cash flow statement and statement of comparison of budget and actual amounts for the year then ended, as well as 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 financial position of the Technology Innovation Agency and its subsidiaries as at 31 March 2023, and their financial performance and cash flows for the year then ended in accordance with South African Standards of Generally Recognised Accounting Practices (GRAP) and the requirements of the Public Finance Management Act 1 of 1999 (PFMA).

BASIS FOR 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 our report.

4. We are independent of the group in accordance with Independent Regulatory Board for Auditors' Code of Professional Conduct for Auditors (IRBA Code) and other independence requirements applicable to performing audits of financial statements in South Africa. We have fulfilled our other ethical responsibilities in accordance with the IRBA Code and in accordance with other ethical requirements applicable to performing audits in South Africa. The IRBA Code is consistent with the corresponding sections of the International Ethics Standards Board for Accountants' International code of ethics for professional accountants (including International Independence Standards).

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 33 to the financial statements, the corresponding figures for 31 March 2022 were restated as a result of an error in the financial statements of the public entity at, and for the year ended, 31 March 2023.

OTHER MATTERS

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

UNAUDITED IRREGULAR EXPENDITURE AND FRUITLESS AND WASTEFUL EXPENDITURE (UIFW EXPENDITURE)

9. On 23 December 2022 National Treasury issued Instruction Note No. 4: PFMA Compliance and Reporting Framework of 2022-23 in terms of section 76(1)(b), (e) and (f), 2(e) and (4)(a) and (c) of the PFMA, which came into effect on 3 January 2023. The PFMA Compliance and Reporting Framework also addresses the disclosure of unauthorised expenditure, irregular expenditure and fruitless and wasteful expenditure. Among the effects of this framework is that irregular and fruitless and wasteful expenditure incurred in previous financial years and not addressed is no longer disclosed in the disclosure notes of the annual financial statements, only the current year and prior year figures are disclosed in note 29 to the financial statements. The movements in respect of irregular expenditure and fruitless and wasteful expenditure are no longer disclosed in the notes to the annual financial statements of the Technology Innovation Agency. The disclosure of these movements (e.g. condoned, recoverable, removed, written off, under assessment, under determination and under investigation) are now required to be included as part of other information in the annual report of the auditees.

10. We do not express an opinion on the disclosure of irregular expenditure and fruitless and wasteful expenditure in the annual report.

RESPONSIBILITIES OF THE ACCOUNTING AUTHORITY FOR THE CONSOLIDATED AND SEPARATE FINANCIAL STATEMENTS

11. 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.

12. In preparing the consolidated and separate financial statements, the accounting authority is responsible for assessing the group'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 accounting authority either intends to liquidate the group or to cease operations, or has no realistic alternative but to do so.

RESPONSIBILITIES OF THE AUDITOR FOR THE AUDIT OF THE CONSOLIDATED AND SEPARATE FINANCIAL STATEMENTS

13. 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.

14. 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

15. In accordance with the Public Audit Act 25 of 2004 (PAA) and the general notice issued in terms thereof, we have a responsibility to report on the usefulness and reliability of the reported performance against predetermined objectives for selected programmes presented in the annual performance report. The accounting authority is responsible for the preparation of the annual performance report.

16. We selected the following programmes presented in the annual performance report for the year ended 31 March 2023 for auditing. We selected programmes that measure the public entity's performance on its primary mandated functions and that are of significant national, community or public interest.

Programme	Page numbers	Purpose
Bio Economy	30, 36 - 37	To creating new bio-based products and processes and will promote the creation of new enterprises and new markets that lead to job creation
Commercialisation	29, 32 - 36	To increase the rate of translation of locally developed technologies; exploit intellectual property from publicly funded institutions; ensure that these are commercialised in a manner that promotes economic growth and the competitiveness of industry; and respond to the imperatives of transformation and inclusive developments

17. We evaluated the reported performance information for the selected programmes against the criteria developed from the performance management and reporting framework, as defined in the general notice. When an annual performance report is prepared using these criteria, it provides useful and reliable information and insights to users on the public entity's planning and delivery on its mandate and objectives.

18. We performed procedures to test whether:
    - the indicators used for planning and reporting on performance can be linked directly to the public entity's mandate and the achievement of its planned objectives.
    - the indicators are well defined and verifiable to ensure that they are easy to understand and apply consistently and that I can confirm the methods and processes to be used for measuring achievements.
    - the targets can be linked directly to the achievement of the indicators and are specific, time bound and measurable to ensure that it is easy to understand what should be delivered and by when, the required level of performance as well as how performance will be evaluated.
    - the indicators and targets reported on in the annual performance report are the same as what was committed to in the approved initial or revised planning documents.
    - the reported performance information is presented in the annual performance report in the prescribed manner.
    - there are adequate supporting evidence for the achievements reported and for the reasons provided for any over- or underachievement of targets.

19. We performed the procedures for the purpose of reporting material findings only; and not to express an assurance opinion.

20. We did not identify any material findings on the reported performance information for the selected programmes.

REPORT ON COMPLIANCE WITH LEGISLATION

21. In accordance with the PAA and the general notice issued in terms thereof, we must audit and report on compliance with applicable legislation relating to financial matters, financial management and other related matters. The accounting authority is responsible for the public entity's compliance with legislation.

22. We performed procedures to test compliance with selected requirements in key legislation in accordance with the AGSA findings engagement methodology. This engagement is not an assurance engagement. Accordingly, we do not express an assurance opinion or conclusion.

23. Through an established AGSA process, we selected requirements in key legislation for compliance testing that are relevant to the financial and performance management of the public entity, clear to allow consistent measurement and evaluation, while also sufficiently detailed and readily available to report in an understandable manner. The selected legislative requirements are included in the annexure to this auditor's report.

24. The material findings on compliance with the selected legislative requirements, presented per compliance theme, are as follows:

ANNUAL FINANCIAL STATEMENTS, PERFORMANCE AND ANNUAL REPORT

25. The financial statements submitted for auditing were not supported by full and proper records, as required by sections 55(1) (a) and (b) of the PFMA. Material misstatements of non-current assets, current assets, expenditure, and disclosure items identified by the auditors in the submitted financial statements were corrected and the supporting records were provided subsequently, resulting in the financial statements receiving an unqualified audit opinion.

EXPENDITURE MANAGEMENT

26. Effective and appropriate steps were not taken to prevent irregular expenditure amounting to R4 500 000 as disclosed in note 30 to the annual financial statements, as required by section 51(1)(b)(ii) of the PFMA. The majority of the irregular expenditure was caused by the incurrence of expenditure for another company by the public entity without any agreement in place and without the appropriate approval of the expenditure.

OTHER INFORMATION IN THE ANNUAL REPORT

27. The accounting authority is responsible for the other information. The other information comprises the information included in the annual report, which includes the directors' report, the audit committee's report and the company secretary's certificate as required by the Companies Act 71 of 2008, Part A: General Information, Part B: Performance Information, Part C: Governance and Part D: Human Resource Management. The other information does not include the consolidated and separate financial statements, the auditor's report and the selected programmes presented in the annual performance report that have been specifically reported on in this auditor's report.

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

29. 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. We have nothing to report in this regard.

INTERNAL CONTROL DEFICIENCIES

30. We considered internal control relevant to our audit of the consolidated and separate financial statements, annual performance report and compliance with applicable legislation; however, our objective was not to express any form of assurance on it.

31. The matters reported below are limited to the significant internal control deficiencies that resulted in the material finding on compliance with legislation included in this report.

32. Management did not implement adequate internal controls to ensure compliance with laws and regulations as material misstatements were identified in the financial statements submitted for audit.

33. Management did not adequately monitor compliance with laws and regulations to prevent instances of non-compliance. This is evidenced by the irregular expenditure incurred by the entity during the period under review.

OTHER REPORTS

34. We draw attention to the following engagements conducted by various. 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.

AUDIT-RELATED SERVICES AND SPECIAL AUDITS

35. At the request of the public entity, we will perform procedures to review the National Treasury Consolidation Pack to ensure conversion adjustments are captured correctly for the consolidation purposes by National Treasury.

AUDITOR TENURE

36. 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 for 5 years.

Rakoma and Associates Inc.

Rakoma and Associates Incorporated
Per: Patience Moyo CA (SA)
Engagement Partner
Registered Auditor

31 July 2023

Willow Wood Office Park Block D
Corner 3rd Ave & Cedar Rd
Johannesburg
2021

ANNEXURE TO THE AUDITOR'S REPORT

The annexure includes the following:
- the auditor's responsibility for the audit
- the selected legislative requirements for compliance testing.

AUDITOR'S RESPONSIBILITY FOR THE AUDIT

PROFESSIONAL JUDGEMENT AND PROFESSIONAL SCEPTICISM

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 selected requirements in key legislation.

FINANCIAL STATEMENTS

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.

- conclude on the appropriateness of the 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 relating to events or conditions that may cast significant doubt on the ability of the public entity and its subsidiaries 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 consolidated and separate financial statements about the material uncertainty or, if such disclosures are inadequate, to modify our opinion on the consolidated and separate financial statements. Our conclusions are based on the information available to us at the date of this auditor's report. However, future events or conditions may cause a public entity to cease operating as a going concern.

- evaluate the overall presentation, structure and content of the consolidated and separate financial statements, including the disclosures, and determine whether the consolidated and separate 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

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.

We also provide the accounting authority with a statement that we have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to have a bearing on our independence and, where applicable, actions taken to eliminate threats or safeguards applied.

COMPLIANCE WITH LEGISLATION – SELECTED LEGISLATIVE REQUIREMENTS.

The selected legislative requirements are as follows:

Legislation	Sections or regulations
Standards of Generally Recognised Accounting Practice (Standards of GRAP)	
Public Finance Management Act No.1 of 1999 (PFMA)	Section 51(1)(a)(iv); 51(1)(b)(i); 51(1)(b)(ii); 51(1)(e)(iii) Section 53(4) Section 54(2)(c'); 54(2)(d) Section 55(1)(a); 55(1)(b); 55(1)(c)(i) Section 56(1); 56(2) Section 57(b); Section 66(4)
Treasury Regulations (TR), 2005 issued in terms of the PFMA	TR 28.2.2 TR 30.1.3(g) TR 30.1.1 NT annual report guide for schedule 3A and 3C public Entities
The Framework for the managing of programme performance information (FMPPI),	FMPPI chapter 3.2 FMPPI chapter 3.3
The Revised Framework for strategic plans and annual performance plans (R-FSAPP),	NT Instruction No. 10 of 2020-21 Section 4.4.3 and 4.4.4 of Revised FSAPP
Circulars and guidance issued by the National Treasury, Department of Public Service andAdministration (DPSA)	

34. ANNUAL FINANCIAL STATEMENTS

General Information

Country of incorporation and domicile	South Africa
Nature of business and principal activities	To support and enable technology innovation across all sectors of the economy in order to achieve socio-economic benefits for South Africa.
Directors	Ms MB Modise (Chairperson from 01 November 2021) Mr BA Mboniswa (Interim chairperson from 13 June 2020 until 31 October 2021, re-appointed as a Board member with effect from 01 November 2021) Mr TG Ramasike (re-appointed as a Board member with effect from 01 November 2021) Ms JSP Matsebula (re-appointed as a Board member with effect from 01 November 2021) Ms AJ Canca (appointed as a Board member with effect from 01 November 2021) Dr R Iyer (appointed as a Board member with effect from 01 November 2021) Ms EL Matlali (appointed as a Board member with effect from 01 November 2021) Mr PL Krappie (ex-officio Board member)
Business address	83 Lois Avenue Menlyn Pretoria 0181 Postal address PO Box 172 Pretoria 0063
Bankers	Standard Bank Ltd
Auditors	Rakoma Associates Incorporated (Appointed in terms of the Public Audit Act as approved by the Auditor General of South Africa)
Secretary	Mr K Louw
Preparer	The consolidated annual financial statements were internally compiled by: Mr I Abdoola Chief Financial Officer

STATEMENT OF FINANCIAL POSITION
as at 31 March 2023

		(R thousands)			
		Economic entity		Controlling entity	
	Note(s)	March 2023	March 2022 Restated*	March 2023	March 2022 Restated*
Assets					
Current Assets					
Loans and receivables	7	1,709	10,975	1,709	10,975
Trade and other receivables	9	4,234	4,519	4,234	4,519
Prepayments	10	3,246	3,331	3,246	3,331
Cash and cash equivalents	11	433,852	436,230	433,852	436,230
		443,041	**455,055**	**443,041**	**455,055**
Non-Current Assets					
Property, plant and equipment	3	4,800	5,116	4,800	5,116
Intangible assets	4	7,161	738	7,161	738
Investments in controlled entities	5	–	–	–	–
Investments in associates	6	222	234	–	–
Loans and receivables	7	48,647	23,925	48,647	23,925
Other financial assets	8	3,000	3,000	3,000	3,000
		63,830	**33,013**	**63,608**	**32,779**
Total Assets		**506,871**	**488,068**	**506,649**	**487,834**
Liabilities					
Current Liabilitieas					
Finance lease obligation	12	–	63	–	63
Operating lease liability		17	248	17	248
Trade and other payables	14	61,673	49,185	61,671	49,182
Committed conditional grants	13	291,265	279,168	291,265	279,168
		352,955	**328,664**	**352,953**	**328,661**
Non-Current Liabilities					
Committed conditional grants	13	28,675	56,672	28,675	56,672
Total Liabilities		**381,630**	**385,336**	**381,628**	**385,333**
Net Assets		**125,241**	**102,732**	**125,021**	**102,501**

STATEMENT OF FINANCIAL PERFORMANCE
for the year ended 31 March 2023

		(R thousands)			
		Economic entity		Controlling entity	
	Note(s)	March 2023	March 2022 Restated*	March 2023	March 2022 Restated*
Revenue					
Revenue	15	727,226	619,340	727,226	619,340
Other income	16	32,932	7,292	32,932	7,292
Interest revenue	17	15,098	8,227	15,098	8,227
Gain on disposal of investments		–	175	–	175
Total Revenue		**775,256**	**635,034**	**775,256**	**635,034**
Expenditure					
Employee related costs	18	(115,912)	(107,945)	(115,912)	(107,945)
Project funding expenditure	19	(578,642)	(458,855)	(578,642)	(458,856)
Depreciation and amortisation		(1,863)	(3,563)	(1,863)	(3,563)
Lease rentals on operating lease		(8,074)	(10,690)	(8,074)	(10,690)
Impairment	20	(3,363)	(3,424)	(3,363)	(3,424)
Deficit from equity accounted investments	6	(12)	(62)	–	–
Other operating expenses	21	(44,881)	(27,902)	(44,881)	(27,901)
Total Expenditure		**(752,747)**	**(612,441)**	**(752,735)**	**(612,379)**
Surplus for the Year		**22,509**	**22,593**	**22,521**	**22,655**

STATEMENT OF CHANGES IN NET ASSETS
for the year ended 31 March 2023

	(R thousands)		
	Accumulated surplus	Non-controlling interest	Total net assets
Economic Entity			
Balance at 01 April 2021	**80,139**	**–**	**80,139**
Changes in net assets:			
Surplus for the year (restated)	22,593	–	22,593
Total changes	22,593	–	22,593
Restated* Balance at 01 April 2022 (Restarted)	**102,732**	**–**	**102,732**
Changes in net assets:			
Surplus for the year	22,509	–	22,509
Total changes	22,509	–	22,509
Balance at 31 March 2023	**125,241**	**–**	**125,241**
Controlling Entity			
Balance at 01 April 2021	**79,846**	**–**	**79,846**
Changes in net assets:			
Surplus for the year (restated)	22,655	–	22,655
Total changes	22,655	–	22,655
Restated* Balance at 01 April 2022	**102,501**	**–**	**102,501**
Changes in net assets:			
Surplus for the year	22,521	–	22,521
Total changes	22,521	–	22,521
Balance at 31 March 2023	**125,022**	**–**	**125,022**

* See Note 33

CASH FLOW STATEMENT
for the year ended 31 March 2023

		(R thousands)			
		Economic entity		Controlling entity	
	Note(s)	March 2023	March 2022 Restated*	March 2023	March 2022 Restated*
Cash Flows from Operating Activities					
Receipts					
Grants		727,226	619,340	727,226	619,340
Interest income		14,959	8,035	14,959	8,035
Other receipts		6,895	2,608	6,895	2,608
		749,080	629,983	749,080	629,983
Payments					
Employee related costs		(114,859)	(107,731)	(114,859)	(107,731)
Project funding expenditure		(575,988)	(449,802)	(575,988)	(449,802)
Other payments		(43,633)	(65,551)	(43,633)	(65,551)
		(734,480)	(623,084)	(734,480)	(623,084)
Net Cash Flows from Operating Activities	23	**14,600**	**6,899**	**14,600**	**6,899**
Cash Flows from Investing Activities					
Purchase of property, plant and equipment	3	(1,965)	(1,355)	(1,965)	(1,355)
Purchase of intangible assets	4	(6,753)	–	(6,753)	–
Repayment of loans from economic entities		13,140	5,312	13,140	5,312
Proceeds from sales of assets		–	65	–	65
Payment to minorities following deregistration of the investment		–	(299)	–	(299)
Loans advanced		(5,500)	–	(5,500)	–
Net Cash Flows from Investing Activities		**(1,078)**	**3,723**	**(1,078)**	**3,723**
Cash Flows from Financing Activities					
Conditional grants received		243,979	351,908	243,979	351,908
Conditional grants paid		(266,294)	(168,270)	(266,294)	(168,270)
Net Cash Flows from Financing Activities		**(15,900)**	**183,638**	**(15,900)**	**183,638**
Net Increase/(Decrease) in Cash And Cash Equivalents		**(2,378)**	**194,260**	**(2,378)**	**194,260**
Cash and cash equivalents at the beginning of the year		436,230	241,970	436,230	241,970
Cash and Cash Equivalents at the End Of The Year	11	**433,852**	**436,230**	**433,852**	**436,230**

STATEMENT OF COMPARISON OF BUDGET AND ACTUAL AMOUNTS for the year ended 31 March 2023

Controlling entity	Approved budget	Adjustments	Final Budget	Actual amounts on comparable basis	Difference between final budget and actual	Reference
	(R thousands)					
Statement of Financial Performance						
Revenue						
DSI allocation	458,370	–	**458,370**	458,370	**–**	
Specific contracted income	176,433	–	**176,433**	268,856	**92,423**	Note 32 – A
Other income	4,500	–	**4,500**	32,932	**28,432**	Note 32 – B
Interest received	10,385	–	**10,385**	15,098	**4,713**	Note 32 – C
Total revenue from exchange transactions	**649,688**	**–**	**649,688**	**775,256**	**125,568**	
Expenditure						
Employee related costs	(119,722)	–	**(119,722)**	(115,912)	**3,810**	Note 32 – D
Project funding expenditure	(478,657)	–	**(478,657)**	(578,642)	**(99,985)**	Note 32 – E
Depreciation and amortisation	(7,581)	–	**(7,581)**	(1,863)	**5,718**	Note 32 – F
Other operating expenditure	(43,728)	–	**(43,728)**	(56,330)	**(12,602)**	Note 32 – G
Total expenditure	**(649,688)**	**–**	**(649,688)**	**(752,747)**	**(103,059)**	
Surplus before taxation	–	–	**–**	**22,509**	**22,509**	
Actual Amount on Comparable Basis as Presented in the Budget and Actual Comparative Statement	**–**	**–**	**–**	**22,509**	**22,509**	

ACCOUNTING POLICIES
as at 31 March 2023

1. PRESENTATION OF CONSOLIDATED ANNUAL FINANCIAL STATEMENTS

The consolidated AFSs have been prepared in accordance with the Standards of Generally Recognised Accounting Practice (GRAP), issued by the Accounting Standards Board in accordance with Section 91(1) of the Public Finance Management Act (Act 1 of 1999).

These consolidated AFSs 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 off to the nearest thousand.

These accounting policies are consistent with the previous period.

1.1 CONSOLIDATION

BASIS OF CONSOLIDATION

Consolidated AFSs are the consolidated AFSs of the economic entity presented as those of a single entity.

The consolidated AFSs incorporate the consolidated AFSs of the controlling entity and all controlled entities which are controlled by the controlling entity.

Consolidated AFSs 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 AFSs 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 consolidated AFSs at the acquisition date.

The consolidated AFSs of the controlling entity and its controlled entities used in the preparation of the consolidated AFSs 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 consolidated AFSs as of the same date as the consolidated AFSs of the controlling entity unless it is impracticable to do so. When the consolidated AFSs of a controlled entity used in the preparation of consolidated AFSs 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 consolidated AFSs. 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.

Adjustments are made when necessary to the consolidated AFSs 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 is 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.

LOSS OF CONTROL

When a controlling entity loses control of a controlled entity, it:

- derecognises the assets and liabilities of the controlled entity at their carrying amounts at the date when control is lost;
- derecognises the carrying amount of any non-controlling interests in the former controlled entity at the date when control is lost (including any components in the statement of financial performance attributable to them);
- recognises:
  - the fair value of the consideration received (if any), from the transaction, event or circumstances that resulted in the loss of control; and
  - if the transaction that resulted in the loss of control involves a distribution of residual interests of the controlled entity to owners in their capacity as owners, that distribution;
- recognises any investment retained in the former controlled entity at its fair value at the date when control is lost;
- reclassifies to surplus or deficit, or transfers directly to accumulated surplus or deficit, if required in accordance with other accounting policies, the amounts identified; and
- recognises any resulting difference as a gain or loss in surplus or deficit (in accordance with the accounting policy on Transfer of functions between entities not under common control or in accordance with the accounting policy on Transfer of functions between entities under common control) attributable to the controlling entity.

ACCOUNTING POLICIES
as at 31 March 2023 (continued)

1.1 CONSOLIDATION (CONTINUED)

On the loss of control of a controlled entity, any investment retained in the former controlled entity and any amounts owed by or to the former controlled entity are accounted for in accordance with other accounting policies from the date when control is lost.

The fair value of any investment retained in the former controlled entity at the date when control is lost is regarded as the fair value on initial recognition of financial assets in accordance with the Standard of GRAP on Financial instruments or when appropriate, the cost on initial recognition of an investment in an associate or jointly controlled entity.

INVESTMENT IN ASSOCIATES

An associate is an entity, 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 associate 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 economic entity's share of the surplus or deficit of the investee is recognised in surplus or deficit.

The most recent available consolidated AFS 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, consolidated AFS as of the same date as the consolidated AFS of the economic entity unless it is impractical to do so.

When the consolidated AFS 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 consolidated AFS. 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 consolidated AFS 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.

The controlling entity discontinues the use of the equity method from the date that it ceases to have significant influence over an associate and account 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 consolidated AFS, management is required to make estimates and assumptions that affect the amounts represented in the consolidated AFS 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 consolidated AFS. Significant judgements include:

TRADE RECEIVABLES AND LOANS AND RECEIVABLES

The economic 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 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, financial position of the entity, repayment terms and the commercial viability of the business.

The impairment for loans and receivables is calculated on a client by client basis and is based on client specific economic, operational and financial conditions that are present at the reporting date which correlate with defaults on the amounts owing by the client.

COMMITTED CONDITIONAL GRANTS

The economic entity assesses the split of amounts payable in the next twelve months at each reporting date. In determining the amount payable, consideration is taken of the expected disbursements for each programme. Sush assessment requires judgement to be applied. Where such estimation cannot be reliably determined, such amounts are disclosed as non-current.

ACCOUNTING POLICIES
as at 31 March 2023 (continued)

1.2 SIGNIFICANT JUDGEMENTS AND SOURCES OF ESTIMATION UNCERTAINTY (CONTINUED)

IMPAIRMENT TESTING

The recoverable amounts of individual assets have 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 entity reviews and tests 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 which are inherently uncertain and could materially change over time.

ALLOWANCE FOR DOUBTFUL DEBTS

On 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 debtors carrying amount and the present value of estimated future cash flows discounted at the effective interest rate, computed at initial recognition.

1.3 PROPERTY, PLANT AND EQUIPMENT

Property, plant 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, plant 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.

The cost of an item of property, plant 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 date of acquisition.

Where an item of property, plant 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, it's deemed cost is the carrying amount of the asset(s) given up.

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

Costs include costs incurred initially to acquire or construct an item of property, plant 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, plant and equipment, the carrying amount of the replaced part is derecognised.

Recognition of costs in the carrying amount of an item of property, plant 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.

Items such as spare parts, standby equipment and servicing equipment are recognised when they meet the definition of property, plant and equipment.

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

Property, plant and equipment is carried at cost less accumulated depreciation and any impairment losses. The depreciable amount of an asset is allocated on a systematic basis over its useful life.

Each part of an item of property, plant 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 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.

The depreciation charge for each period is recognised in surplus or deficit.

Items of property, plant and equipment are derecognised 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 derecognition of an item of property, plant and equipment is included in surplus or deficit when the item is derecognised. The gain or loss arising from the derecognition of an item of property, plant and equipment is determined as the difference between the net disposal proceeds, if any, and the carrying amount of the item.

ACCOUNTING POLICIES
as at 31 March 2023 (continued)

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.

Intangible assets that are still work in progress at year end (ie. not availiable for use) are not amortised in line with GRAP 31. Amortisation will commence once the asset is completed and available for use.

Amortisation is provided to write down the intangible assets, on a straight-line basis, to their residual values as follows:

Item	Depreciation method	Average useful life
Computer software	Straight-line	2 – 3 years
Website	Straight-line	5 years

1.5 INVESTMENTS IN CONTROLLED ENTITIES

ECONOMIC ENTITY CONSOLIDATED AFS

Investments in controlled entities are consoldiated in the economic entity's consolidated AFS. Refer to the accounting policy on Consolidations (Note 1.1).

CONTROLLING ENTITY AFS

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

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

When the entity loses control over a controlled entity it derecognises the assets and liabilities of the controlled entity, and any related non-controlling interest and other components of equity. Any resulting gain or loss is recognised in the statement of financial performance.

1.6 INVESTMENTS IN ASSOCIATES

ECONOMIC ENTITY CONSOLIDATED AFS

An investment in an associate is accounted for using the equity method. Under the equity method, the investment is initially recognised at cost and the carrying amount is increased or decreased to recognise the economic entity's share of the surpluses or deficit of the investee after acquisition date. The use of the equity method is discontinued from the date the economic entity ceases to have significant influence over an associate.

Any impairment losses are deducted from the carrying amount of the investment in associate.

Surpluses and deficit resulting from transactions with associates are recognised only to the extent of unrelated investors' interests in the associate.

The most recent available consolidated AFS of the associate are used by the investor in applying the equity method. When the end of the reporting period of the investor is different from that of the associate, the associate prepares, for the use of the investor, consolidated AFS as of the same date as the consolidated AFS of the investor unless it is impracticable to do so.

The recognition of the economic entity's share of losses is discontinued once the economic entity's share of losses of an associate equals or exceeds its interest in the associate.

ACCOUNTING POLICIES
as at 31 March 2023 (continued)

1.6 INVESTMENTS IN ASSOCIATES (CONTINUED)

CONTROLLING ENTITY CONSOLIDATED ANNUAL FINANCIAL STATEMENTS

An investment in an associate is carried at cost less accumulated impairement. The entity applies the same accounting for each category of investment.

1.7 FINANCIAL INSTRUMENTS

A financial instrument is any contract that gives rise to a financial asset of one entity and a financial liability or a residual interest of another entity.

The amortised cost of a financial asset or financial liability is the amount at which the financial asset or financial liability is measured at initial recognition minus principal repayments, plus or minus the cumulative amortisation using the effective interest method of any difference between that initial amount and the maturity amount, and minus any reduction (directly or through the use of an allowance account) for impairment or uncollectibility.

Credit risk is the risk that one party to a financial instrument will cause a financial loss for the other party by failing to discharge an obligation.

Currency risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in foreign exchange rates.

Derecognition is the removal of a previously recognised financial asset or financial liability from an entity's statement of financial position.

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.

A financial asset is:
- cash;
- a residual interest of another entity; or
- a contractual right to:
  - receive cash or another financial asset from another entity; or
  - exchange financial assets or financial liabilities with another entity under conditions that are potentially favourable to the entity.

A financial liability is any liability that is a contractual obligation to:
- deliver cash or another financial asset to another entity; or
- exchange financial assets or financial liabilities under conditions that are potentially unfavourable to the entity.

Interest rate risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market interest rates.

Liquidity risk is the risk encountered by an entity in the event of difficulty in meeting obligations associated with financial liabilities that are settled by delivering cash or another financial asset.

Loans payable are financial liabilities, other than short-term payables on normal credit terms.

A financial asset is past due when a counterparty has failed to make a payment when contractually due.

Transaction costs are incremental costs that are directly attributable to the acquisition, issue or disposal of a financial asset or financial liability. An incremental cost is one that would not have been incurred if the entity had not acquired, issued or disposed of the financial instrument.

Financial instruments at amortised cost are non-derivative financial assets or non-derivative financial liabilities that have fixed or determinable payments, excluding those instruments that:
- the entity designates at fair value at initial recognition; or
- are held for trading.

Financial instruments at cost are investments in residual interests that do not have a quoted market price in an active market, and whose fair value cannot be reliably measured.

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 asset measured at cost
Investment in associates	Financial asset measured at cost
Other financial assets	Financial asset measured at cost
Cash and cash equivalents	Financial asset measured at amortised cost
Loans and receivables	Financial asset measured 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

ACCOUNTING POLICIES
as at 31 March 2023 (continued)

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 buildings 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 corresponding liability to the lessor is included in the statement of financial position as a finance lease obligation.

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 of the remaining balance of the liability.

Any contingent rents are expensed in the period in which they are incurred.

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 as an operating lease asset or liability.

1.9 EMPLOYEE BENEFITS

SHORT-TERM EMPLOYEE BENEFITS

The cost of short-term employee benefits (those payable within 12 months after the service is rendered, such as paid vacation leave and sick leave, bonuses, and non-monetary benefits such as medical care), are recognised in the period in which the service is rendered and are not discounted.

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 expected cost of surplus sharing and bonus payments is recognised as an expense when there is a legal or constructive obligation to make such payments as a result of past performance.

DEFINED CONTRIBUTION PLANS

Payments to defined contribution retirement benefit plans are charged as an expense as they fall due.

Payments made to industry-managed (or state plans) retirement benefit schemes are dealt with as defined contribution plans where the entity's obligation under the schemes is equivalent to those arising in a defined contribution retirement benefit plan.

1.10 CONTINGENCIES

Contingent assets and contingent liabilities are not recognised. Contingencies are disclosed in note 25.

1.11 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.

An exchange transaction is one in which one entity receives assets or services, or has liabilities extinguished, and directly gives approximately equal value (primarily in the form of goods, services or use of assets) to the other party 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.

MEASUREMENT

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

INTEREST AND ROYALTIES

Revenue arising from the use by others of entity assets yielding interest, royalties and dividends or similar distributions 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 using the effective interest rate method for financial instruments. Interest levied on transactions arising from exchange or non-exchange transactions is classified based on the nature of the underlying transaction.

Interest will not accrue on loans and receivables where there is an indication that payment will be deferred in the short term. Royalties are recognised as they are earned in accordance with the substance of the relevant agreements.

ACCOUNTING POLICIES
as at 31 March 2023 (continued)

1.12 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.

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.

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 the taxable event occurs or a condition is satisfied, the amount of the reduction in the liability is recognised as revenue.

1.13 ACCOUNTING BY PRINCIPALS AND AGENTS

IDENTIFICATION

An agent is an entity that has been directed by another entity (a principal), through a binding arrangement, to undertake transactions with third parties on behalf of the principal and for the benefit of the principal.

A principal is an entity that directs another entity (an agent), through a binding arrangement, to undertake transactions with third parties on its behalf and for its own benefit.

A principal-agent arrangement results from a binding arrangement in which one entity (an agent), undertakes transactions with third parties on behalf, and for the benefit of, another entity (the principal).

IDENTIFYING WHETHER AN ENTITY IS A PRINCIPAL OR AN AGENT

When the entity is party to a principal-agent arrangement, it assesses whether it is the principal or the agent in accounting for revenue, expenses, assets and/or liabilities that result from transactions with third parties undertaken in terms of the arrangement.

The assessment of whether an entity is a principal or an agent requires the entity to assess whether the transactions it undertakes with third parties are for the benefit of another entity or for its own benefit.

BINDING ARRANGEMENT

The economic entity assesses whether it is an agent or a principal by assessing the rights and obligations of the various parties established in the binding arrangement.

Where the terms of a binding arrangement are modified, the parties to the arrangement re-assess whether they act as a principal or an agent.

ASSESSING WHICH ENTITY BENEFITS FROM THE TRANSACTIONS WITH THIRD PARTIES

When the economic entity in a principal-agent arrangement concludes that it undertakes transactions with third parties for the benefit of another entity, then it is the agent. If the economic entity concludes that it is not the agent, then it is the principal in the transactions.

The economic entity is an agent when, in relation to transactions with third parties, all three of the following criteria are present:

- It does not have the power to determine the significant terms and conditions of the transaction.
- It does not have the ability to use all, or substantially all, of the resources that result from the transaction for its own benefit.
- It is not exposed to variability in the results of the transaction.

ACCOUNTING POLICIES
as at 31 March 2023 (continued)

1.13 ACCOUNTING BY PRINCIPALS AND AGENTS (CONTINUED)

Where the economic entity has been granted specific powers in terms of legislation to direct the terms and conditions of particular transactions, it is not required to consider the criteria of whether it does not have the power to determine the significant terms and conditions of the transaction, to conclude that is an agent. The economic entity applies judgement in determining whether such powers exist and whether they are relevant in assessing whether the economic entity is an agent.

RECOGNITION

The economic entity, as an agent, recognises only that portion of the revenue and expenses it receives or incurs in executing the transactions on behalf of the principal in accordance with the requirements of the relevant Standards of GRAP.

The economic entity recognises assets and liabilities arising from principal-agent arrangements in accordance with the requirements of the relevant Standards of GRAP.

1.14 COMPARATIVE FIGURES

Where necessary, comparative figures have been reclassified to conform to changes in presentation in the current year.

1.15 FRUITLESS AND WASTEFUL EXPENDITURE

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

All expenditure relating to fruitless and wasteful expenditure is recognised as an expense in the statement of financial performance in the year that the expenditure was incurred. The expenditure is classified in accordance with the nature of the expense, and where recovered, it is subsequently accounted for as revenue in the statement of financial performance.

1.16 IRREGULAR EXPENDITURE

Irregular expenditure as defined in section 1 of the PFMA is expenditure other than unauthorised expenditure, incurred in contravention of or that is not in accordance with a requirement of any applicable legislation, including -

(a) this Act; or
(b) the State Tender Board Act, 1968 (Act No. 86 of 1968), or any regulations made in terms of the Act; or
(c) any provincial legislation providing for procurement procedures in that provincial government.

National Treasury practice note no. 2 of 2019/20 which was issued in terms of sections 76(2)e and section 76(4) of the PFMA requires the following (effective from 17 May 2019):

- Irregular expenditure is recorded at the transaction amount as and when it is incurred.
- Irregular expenditure that was incurred and identified during the current financial year and was condoned before year end and/or before finalisation of the financial statements must also be recorded appropriately in the irregular expenditure register and the note to the financial statements.
- Irregular expenditure that was incurred and identified during the current financial year and for which condonement is being awaited at year end must be recorded in the irregular expenditure register and the note to the financial statements.
- Irregular expenditure is removed from the irregular expenditure register after consideration and application of paragragh 58(a) – (e) of the Irregular Expenditure Framework. Amounts removed are required to be disclosed within the notes to the financial statements.

1.17 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 which are 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.

MEASUREMENT

The amount of each segment item reported is the measure reported to management for the purposes of making decisions about allocating resources to the segment and assessing its performance. Adjustments and eliminations made in preparing the entity's financial statements and allocations of revenues and expenses are included in determining reported segment surplus or deficit only if they are included in the measure of the segment's surplus or deficit that is used by management. Similarly, only those assets and liabilities that are included in the measures of the segment's assets and segment's liabilities that are used by management are reported for that segment. If amounts are allocated to reported segment surplus or deficit, assets or liabilities, those amounts are allocated on a reasonable basis.

1.18 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 legislation, appropriation or similar.

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.

ACCOUNTING POLICIES
as at 31 March 2023 (continued)

The approved budget is prepared on an accrual basis and presented by economic classification linked to performance outcome objectives.

The approved budget covers the fiscal period from 01/04/2022 to 31/03/2023.

The consolidated AFS 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.

The Statement of comparative and actual information has been included in the consolidated AFS as the recommended disclosure when the consolidated AFS and the budget are on the same basis of accounting as determined by National Treasury.

1.19 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 those family members who may be expected to influence, or be influenced by that person 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 consolidated AFS.

1.20 EVENTS AFTER REPORTING DATE

Events after reporting date are those events, both favourable and unfavourable, that occur between the reporting date and the date when the financial statements are authorised for issue. Two types of events can be identified:

- those that provide evidence of conditions that existed at the reporting date (adjusting events after the reporting date); and
- those that are indicative of conditions that arose after the reporting date (non-adjusting events after the reporting date).

The economic entity will adjust the amount recognised in the financial statements to reflect adjusting events after the reporting date once the event occurred.

The economic entity will disclose the nature of the event and an estimate of its financial effect or a statement that such estimate cannot be made in respect of all material non-adjusting events, where non-disclosure could influence the economic decisions of users taken on the basis of the financial statements.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS
as at 31 March 2023

2. NEW STANDARDS AND INTERPRETATIONS

2.1 STANDARDS AND INTERPRETATIONS EFFECTIVE AND ADOPTED IN THE CURRENT YEAR

No new standards were adopted in the year under review.

2.2 STANDARDS AND INTERPRETATIONS ISSUED, BUT NOT YET EFFECTIVE

The economic entity has not applied the following standards and interpretations, which have been published and are mandatory for the economic entity's accounting periods beginning on or after 01 April 2023 or later periods.

Standard/ Interpretation:	Effective date: Years beginning on or after	Expected impact:
• GRAP 104 (amended): Financial Instruments	01 April 2025	Impact is currently being assessed
• GRAP 25 (amended): Employee Benefits	01 April 2025	Impact is currently being assessed
• IGRAP 21: Effect of Past Decisions on Materiality	01 April 2023	Unlikely there will be a material impact

3. PROPERTY, PLANT AND EQUIPMENT

	(R thousands)					
	March 2023			March 2022		
	Cost	Accumulated depreciation and impairment	Carrying value	Cost	Accumulated depreciation and impairment	Carrying value
Economic entity						
Furniture and office equipment	28,622	(25,405)	3,217	27,744	(23,859)	3,885
Motor vehicles	371	(360)	11	371	(350)	21
Leasehold improvements	1,864	(1,864)	–	1,864	(1,811)	53
Laboratory equipment	12,279	(10,707)	1,572	11,191	(10,034)	1,157
Total	**43,136**	**(38,336)**	**4,800**	**41,170**	**(36,054)**	**5,116**
Controlling entity						
Furniture and office equipment	28,622	(25,405)	3,217	27,744	(23,859)	3,885
Motor vehicles	371	(360)	11	371	(350)	21
Leasehold improvements	1,864	(1,864)	–	1,864	(1,811)	53
Laboratory equipment	12,279	(10,707)	1,572	11,191	(10,034)	1,157
Total	**43,136**	**(38,336)**	**4,800**	**41,170**	**(36,054)**	**5,116**

NOTES TO THE ANNUAL FINANCIAL STATEMENTS
as at 31 March 2023

3. PROPERTY, PLANT AND EQUIPMENT (CONTINUED)

RECONCILIATION OF PROPERTY AND EQUIPMENT – ECONOMIC ENTITY – MARCH 2023

	(R thousands)			
	Opening balance	Additions	Depreciation and impairment	Total
Furniture and office equipment	3,885	877	(1,545)	3,217
Motor vehicles	21	–	(10)	11
Leasehold improvements	53	–	(53)	–
Laboratory equipment	1,157	1,088	(673)	1,572
	5,116	**1,965**	**(2,281)**	**4,800**

RECONCILIATION OF PROPERTY, PLANT AND EQUIPMENT – ECONOMIC ENTITY – 2022

	(R thousands)				
	Opening balance	Additions	Disposals	Depreciation	Total
Furniture and office equipment	5,173	1,290	(40)	(2,538)	3,885
Motor vehicles	42	–	–	(21)	21
Leasehold improvements	–	65	–	(12)	53
Laboratory equipment	1,535	–	–	(378)	1,157
	6,750	**1,355**	**(40)**	**(2,949)**	**5,116**

RECONCILIATION OF PROPERTY AND EQUIPMENT – CONTROLLING ENTITY – MARCH 2023

	(R thousands)			
	Opening balance	Additions	Depreciation and impairment	Total
Furniture and office equipment	3,885	877	(1,545)	3,217
Motor vehicles	21	–	(10)	11
Leasehold improvements	53	–	(53)	–
Laboratory equipment	1,157	1,088	(673)	1,572
	5,116	**1,965**	**(2,281)**	**4,800**

RECONCILIATION OF PROPERTY AND EQUIPMENT – CONTROLLING ENTITY – MARCH 2022

	(R thousands)				
	Opening balance	Additions	Disposals	Depreciation	Total
Furniture and office equipment	5,173	1,290	(40)	(2,538)	3,885
Motor vehicles	42	–	–	(21)	21
Leasehold improvements	–	65	–	(12)	53
Laboratory equipment	1,535	–	–	(378)	1,157
	6,750	**1,355**	**(40)**	**(2,949)**	**5,116**

In the 2023 financial year, leasehold improvements were impaired to R Nil as the lease period had come to an end.

PLEDGED AS SECURITY

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

DEPRECIATION RATES

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

NOTES TO THE ANNUAL FINANCIAL STATEMENTS
as at 31 March 2023 (continued)

3. PROPERTY, PLANT AND EQUIPMENT (CONTINUED)

The depreciation methods and average useful lives of property, plant and equipment have been assessed as follows:

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

4. INTANGIBLE ASSETS

	(R thousands)					
	March 2023			March 2022		
	Cost	Accumulated depreciation and impairment	Carrying value	Cost	Accumulated depreciation and impairment	Carrying value
Economic entity						
Computer software	9,985	(9,577)	408	9,112	(8,374)	738
Work in progress	6,753	–	6,753	–	–	–
Website	873	(873)	–	873	(873)	–
Total	**17,611**	**(10,450)**	**7,161**	**9,985**	**(9,247)**	**738**
Controlling entity						
Computer software	9,985	(9,577)	408	9,112	(8,374)	738
Work in progress	6,753	–	6,753	–	–	–
Website	873	(873)	–	873	(873)	–
Total	**17,611**	**(10,450)**	**7,161**	**9,985**	**(9,247)**	**738**

RECONCILIATION OF INTANGIBLE ASSETS – ECONOMIC ENTITY – MARCH 2023

	(R thousands)				
	Opening balance	Additions	Disposal	Amortisation	Total
Computer software	738	–	–	(330)	408
Work in progress	–	6,753	–	–	6,753
	738	**6,753**	**–**	**(330)**	**7,161**

RECONCILIATION OF INTANGIBLE ASSETS – ECONOMIC ENTITY – MARCH 2022

	(R thousands)		
	Opening balance	Amortisation	Total
Computer software	1,450	(712)	738
Website	349	(349)	–
	1,799	**(1,061)**	**738**

NOTES TO THE ANNUAL FINANCIAL STATEMENTS
as at 31 March 2023 (continued)

4. INTANGIBLE ASSETS (CONTINUED)

RECONCILIATION OF INTANGIBLE ASSETS – CONTROLLING ENTITY – MARCH 2023

	(R thousands)				
	Opening balance	Additions	Disposals	Amortisation	Total
Computer software	738	–	–	(330)	408
Website	–	6,753	–	–	6,753
	738	**6,753**	**–**	**(330)**	**7,161**

RECONCILIATION OF INTANGIBLE ASSETS – CONTROLLING ENTITY – MARCH 2022

	Opening balance	Amortisation	Total
Computer software	1,450	(712)	738
Website	349	(349)	–
	1,799	**(1,061)**	**738**

During the current year, the Agency commenced with the development of an Enterprise-wide Resource System for the management of projects throughout the lifecycle. The development is expected to be completed early in the 2023/24 financial year.

RESTRICTED TITLE

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

5. INVESTMENTS IN CONTROLLED ENTITIES

Name of company	Reporting period end	% holding 2023	% holding 2022	Carrying amount 2023	Carrying amount 2022
iThemba Pharmaceuticals (Pty) Ltd	31 December	–%	50.10%	–	–
Natural Carotenoids South Africa (Pty) Ltd*	31 July	98.80%	98.80%	–	–
Bio2Biz (Pty) Ltd**		–	–%	–	–
				–	**–**

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

During the current year, the liquidation process for iThemba Pharmaceuticals (Pty) Ltd was finalised. This investment is accordingly derecognised with no residual financial impact to the Agency.

* The investment in Natural Caretonoids is currently in progress of deregistration, and remains dormant with no assets and liabilities to be reported on. All net assets were previously transferred into an established technology platform called Microalgal Technology Development and Demonstration Centre

** The investment in Bio2Biz was deregistered during the prior year and resulted in a profit on disposal of R174,978.

CONTROLLED ENTITY'S REPORTING DATE IS DIFFERENT 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 a 3 month period of the reporting period of the controlling entity, the AFS 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 2023.

Where the reporting dates differ with more than 3 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.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS
as at 31 March 2023 (continued)

6. INVESTMENTS IN ASSOCIATES

Name of entity	Reporting period end	(R thousands) % holding 2023	% holding 2022	Carrying amount 2023	Carrying amount 2022
Active Investments					
Lifeassay (Pty) Ltd	28 February	26.00%	26.00%	–	–
Ribotech (Pty) Ltd	31 August	35.00%	35.00%	–	–
Tenacent SA (Pty) Ltd	28 February	20.00%	20.00%	222	234
Investments in the process of deregistration/ liquidation					
Niocad (Pty) Ltd	28 February	22.00%	22.00%	–	–
Edgi Tech (Pty) Ltd	28 February	26.00%	26.00%	–	–
Silverlake Trading (Pty) Ltd	28 February	28.00%	28.00%	–	–
Eyeborn (Pty) Ltd	31 March	25.00%	25.00%	–	–
Femtech (Pty) Ltd*	28 February	69.00%	69.00%	–	–
				222	234

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

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

	(R thousands)			
	Economic entity		Controlling entity	
	March 2023	March 2022	March 2023	March 2022
Movements in Carrying Value				
Opening balance	234	296	–	–
Share of deficit	(12)	(62)	–	–
Closing balance	**222**	**234**	**–**	**–**

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 CONTROLLED ENTITY'S INTEREST IN ASSOCIATE

Total assets	2,069	2,394
Total liabilities	(61,243)	(61,720)
Revenue	3,872	3,427
Deficit	(525)	(497)

NOTES TO THE ANNUAL FINANCIAL STATEMENTS
as at 31 March 2023 (continued)

6. INVESTMENTS IN ASSOCIATES (CONTINUED)

ASSOCIATES WITH DIFFERENT REPORTING DATES

Some of the associates have reporting dates that differ from the controlling entity. If the reporting date is within a 3 month period of the reporting period of the controlling entity, the AFS 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 the year end. The entity has utilised latest financial available information for the purposes of disclosure. In certain instances such disclosure is greater than a year old.

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 R Nil and the economic entity has no obligation for any deficit of the associate. The total unrecognised deficit for the current period is R489,974 (2022: R434,827). The accumulated unrecognised deficit to date amount to R56,719,650 (2022: R56,556,115).

7. LOANS AND RECEIVABLES

	(R thousands)			
	Economic entity		Controlling entity	
	March 2023	March 2022	March 2023	March 2022
Other entities				
Agriprotein (Pty) Ltd*	–	4,486	–	4,486
The loan had fixed monthly repayment terms and interest was accrued at prime.				
Synexa (Pty) Ltd	757	2,114	757	2,114
This loan has fixed quarterly repayment terms over a period of 6 years and accrues interest at prime.				
The Biologicals and Vaccines Institute of Southern Africa (Pty) Ltd (Biovac)	23,300	23,300	23,300	23,300
The shareholder loan has no fixed date of repayment and currently bears no interest payment.				
Balancell Energy (Pty) Ltd	21,410	–	21,410	–
Following a restructuring process, the debt previously owed by Balancell (Pty) Ltd is repayable based on royalties on sales made. Total repayments of R22 million is receivable on the debt with no further interest accruing. Royalties are repayable at 6% of revenue generated on the sales or leasing of BMS until the outstanding amount as been paid in full				
Stone Three Digital (Pty) Ltd	4,889	–	4,889	–
The Agency disbursed funding to the entity as part of funds of managed on behalf of the Innovation Fund. The loan has quarterly repayments over a 5 year period with interest accruing at the prime rate, subject to the recipient attaining profitability. The loan is recognised in the current year following meeting the recognition criteria per GRAP.				
Artisan Biomed (Pty) Ltd	–	5,000	–	5,000
The Agency disbursed funding amounting to R5 million to the entity as part of funds of managed on behalf of the Innovation Fund. This loan has fixed monthly repayments with interest accruing at prime. The loan was repayable over a 5 year period. During the current year, the loan was fully repaid in the current year.				
	50,356	**34,900**	**50,356**	**34,900**

NOTES TO THE ANNUAL FINANCIAL STATEMENTS
as at 31 March 2023 (continued)

7. LOANS AND RECEIVABLES (CONTINUED)

	(R thousands)			
	Economic entity		Controlling entity	
	March 2023	March 2022	March 2023	March 2022
Reconcilation of Loans and Receivables				
Opening balance	34,900	34,605	34,900	34,605
Repayment of loans	(13,140)	(4,897)	(13,140)	(4,897)
Interest earned	139	192	139	192
Adjustment to provision for impairment	22,957	–	22,957	–
Loans granted	5,500	5,000	5,500	5,000
	50,356	**34,900**	**50,356**	**34,900**
Non-current assets	48,647	23,925	48,647	23,925
Current assets	1,709	10,975	1,709	10,975
	50,356	**34,900**	**50,356**	**34,900**

LOANS TO ECONOMIC ENTITIES IMPAIRED

* The economic entity holds collateral as security for the loan issued to Agriprotein (Pty) Ltd, even though the value thereof has diminished over time. This investment in Agriprotein (Pty) Ltd was impaired during the 2021 financial year due to the company being placed under business rescue. The business rescue plan was finalised by 30 June 2022 and the provision for impairment was reversed based on the final approved plan and recoveries received.

As of 31 March 2023, loans to economic entities of R117,568,000 (2022: R140,526,000) were impaired and provided for. The movement from the prior year to current year includes current year impairment and a reversal of prior year impairment.

RECONCILIATION OF PROVISION FOR IMPAIRMENT ON LOANS AND RECEIVABLES

Opening balance	140,526	140,526	140,526	140,526
Unused amounts reversed	(22,958)	-	(22,958)	-
Closing Balance	**117,568**	**140,526**	**117,568**	**140,526**

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 are improbable.

8. OTHER FINANCIAL ASSETS

Designated at fair value				
The Biologicals and Vaccines Institute of Southern Africa (Pty) Ltd (Biovac)	3,000	3,000	3,000	3,000
This relates to a 12.5% shareholding loan with no fixed date of repayment and currently bears no interest payments.				

9. TRADE AND OTHER RECEIVABLES

Trade debtors	5,292	3,727	5,292	3,727
Deposits	277	270	277	270
Other receivables	5,761	6,967	5,761	6,967
Provision for bad debt	(7,096)	(6,445)	(7,096)	(6,445)
	4,234	**4,519**	**4,234**	**4,519**

Included in other receivables is R3,367,200 (2022: R3,367,200) to be recovered from the DSI and an amount of R2,292,721 (2022: R3,455,219) in respect of receivables for royalty commitments.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS
as at 31 March 2023 (continued)

9. TRADE AND OTHER RECEIVABLES (CONTINUED)

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 period end, due to the short term nature of these balances.

TRADE AND OTHER RECEIVABLES PAST DUE BUT NOT IMPAIRED

Trade and other receivables which are less than 3 months past due are not considered to be impaired. At 31 March 2023, R345,364 (2022: R3,367,200) were past due but not impaired.

TRADE AND OTHER RECEIVABLES IMPAIRED

As of 31 March 2023, other receivables of R2,199,725 (2022: R6,445,000) were impaired and provided for.

	(R thousands)			
	Economic entity		Controlling entity	
	March 2023	March 2022	March 2023	March 2022
The ageing of these loans is as follows:				
3 to 6 months	3,183	3,423	3,183	3,423
Over 6 months	3,913	3,022	3,913	3,022

RECONCILIATION OF PROVISION FOR IMPAIRMENT OF TRADE AND OTHER RECEIVABLES

Opening balance	6,445	4,194	6,445	4,194
Provision for impairment	3,370	3,424	3,370	3,424
Reversal of provision	(2,719)	(1,173)	(2,719)	(1,173)
	7,096	**6,445**	**7,096**	**6,445**

The creation and release of provision for impaired receivables have been included in operating expenses in deficit. Amounts charged to the allowance account are generally written off when there is no expectation of recovering additional cash.

No collateral is held as security.

10. PREPAYMENTS

Prepayments comprises a total amount of R1,157,366 (2022: R1,210,425) for rentals for the Western Cape, Durban and Pretoria offices as well as Bio-Safety and Bio-Processing Platforms. In addition this amount also includes software licences totalling R1,652,439 (2022: R2,121,381) which are paid in advance, as well as R436,162 (2022: R Nil) relating to assets not delivered as at 31 March 2023 .

11. CASH AND CASH EQUIVALENTS

Cash and cash equivalents consist of:				
Bank balances	433,852	436,230	433,852	436,230

The carrying value approximates the fair value of cash and cash equivalents at period end, due to the short term nature of these balances.

The entity moved to a paycard system during the 2021 financial year and therefore no physical cash is held on hand.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS
as at 31 March 2023 (continued)

	(R thousands)			
	Economic entity		Controlling entity	
	March 2023	March 2022	March 2023	March 2022

12. FINANCE LEASE OBLIGATION

Minimum lease payments due				
– within one year	–	63	–	63
Present value of minimum lease payments due				
– within one year	–	63	–	63

It is the economic entity policy to lease certain office equipment under finance leases. The remaining leases were completed within the 2023 financial year.

The average lease term was 3 years and the average effective borrowing rate was 0% (2022: 0%).

13. COMMITTED CONDITIONAL GRANTS

Committed conditional grants and receipts comprises of:				
Africa Programmes	10,090	11,584	10,090	11,584
Agriculture Bio-economy Partnership Programme	5,887	23,196	5,887	23,196
Bio-manufacturing Enterprise Management	20,715	19,746	20,715	19,746
CPGR Rellocation	–	1,854	–	1,854
Clothing & Textile Hub	4,525	4,678	4,525	4,678
Fibrelux Technology Diffusion Initiative	40	38	40	38
ICT Flagship Programme	–	230	–	230
Innovation Fund	210,816	133,030	210,816	133,030
Innovation for Inclusive Development	60,080	90,486	60,080	90,486
Joint Technology Innovation Programme	186	1,392	186	1,392
Limpopo Agri Food Technology Station	141	133	141	133
SABDI	2,872	6,004	2,872	6,004
Seed Fund Programme	720	239	720	239
Strategic Industrial Bio-innovation Programme	2,480	10,097	2,480	10,097
Technology Stations Programme	1,382	30,089	1,382	30,089
Vaccine Development & Management Strategy	6	3,044	6	3,044
	319,940	**335,840**	**319,940**	**335,840**
Movement during the year				
Balance at the beginning of the year	335,840	147,202	335,840	147,202
Additions during the year	246,856	351,908	246,856	351,908
Income recognition during the year	(262,756)	(163,270)	(262,756)	(163,270)
	319,940	**335,840**	**319,940**	**335,840**
Non-current liabilities	28,675	56,672	28,675	56,672
Current liabilities	291,265	279,168	291,265	279,168
	319,940	**335,840**	**319,940**	**335,840**

Committed conditional grants represent specific contracts with primarily the DSI. Funds payable under the contract have been disclosed between amounts expected to outflow based on programme requirements.

Committed conditional grants have been split between current and non-current portions based on expected outflows from programmes.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS
as at 31 March 2023 (continued)

	(R thousands)			
	Economic entity		Controlling entity	
	March 2023	March 2022	March 2023	March 2022

14. TRADE AND OTHER PAYABLES

Trade payables	13,234	11,336	13,232	11,333
Employee related accruals	13,395	12,342	13,395	12,342
Other payables	35,044	25,507	35,044	25,507
	61,673	**49,185**	**61,671**	**49,182**

15. REVENUE

DSI allocation received during the year	458,370	447,703	458,370	447,703
Committed conditional grant funding recognised for:				
Africa programme	2,244	5,962	2,244	5,962
Agriculture Bio-economy Partnerships Programme	38,419	20,356	38,419	20,356
Bio-Africa Programme	3,044	3,367	3,044	3,367
Bio-Manufacturing Enterprise Management	244	–	244	–
Centre for Proteomic and Genomic Research	1,855	–	1,855	–
Clothing & Textile Hub	428	–	428	–
Innovation Fund	35,502	31,877	35,502	31,877
Innovation for Inclusive Development	49,867	12,773	49,867	12,773
Joint Technology Innovation Programme	1,120	–	1,120	–
SABDI	2,859	1,385	2,859	1,385
Seed Fund Programme	13,168	16,603	13,168	16,603
Strategic Industrial Bio-innovation Programme	22,469	20,849	22,469	20,849
Technology Innovation Cluster Programme	–	77	–	77
Technology Stations Programme	97,637	58,388	97,637	58,388
	727,226	**619,340**	**727,226**	**619,340**

16. OTHER INCOME

Royalties received	6,549	5,430	6,549	5,430
Sundry receipts	712	1,862	712	1,862
Reversal of provision for impairment	25,671	–	25,671	–
	32,932	**7,292**	**32,932**	**7,292**

17. INTEREST REVENUE

Investment revenue				
Interest earned – Loans and receivables	139	192	139	192
Interest earned – Bank	14,959	8,035	14,959	8,035
	15,098	**8,227**	**15,098**	**8,227**

NOTES TO THE ANNUAL FINANCIAL STATEMENTS
as at 31 March 2023 (continued)

	(R thousands)			
	Economic entity		Controlling entity	
	March 2023	March 2022	March 2023	March 2022

18. EMPLOYEE RELATED COSTS

Basic remuneration and re-imbursive allowances	95,766	90,500	95,766	90,500
Defined contribution plans	7,303	7,081	7,303	7,081
Performance bonus	9,440	7,062	9,440	7,062
Medical aid	3,403	3,302	3,403	3,302
	115,912	**107,945**	**115,912**	**107,945**

19. PROJECT FUNDING EXPENDITURE

Project grants – third party	578,642	458,855	578,642	458,855
Project funding is made up of the following:				
Africa Programmes	3,287	5,961	3,287	5,961
Global Cleantech Innovation Programme	1,080	1,000	1,080	1,000
Innovation for Inclusive Development	45,690	14,891	45,690	14,891
Innovation Skills Development Programme	3,605	2,424	3,605	2,424
Seed Fund Programme	26,953	41,806	26,953	41,806
Technology Development	284,423	194,161	284,423	194,161
Technology Innovation Cluster Programme	3,014	32,214	3,014	32,214
Technology Platforms Programme	60,525	54,418	60,525	54,418
Technology Stations Programme	144,251	107,014	144,251	107,014
Thought Leadership & BioConvention	5,686	3,367	5,686	3,367
Youth Technology Innovation Programme	128	1,599	128	1,599
	578,642	**458,855**	**578,642**	**458,855**

20. IMPAIRMENT

Provision for bad debts	3,363	3,424	3,363	3,424

NOTES TO THE ANNUAL FINANCIAL STATEMENTS
as at 31 March 2023 (continued)

	(R thousands)			
	Economic entity		Controlling entity	
	March 2023	March 2022	March 2023	March 2022

21. OTHER OPERATING EXPENSES

Other operating expenses include expenditure such as:				
Auditors remuneration	965	896	965	896
Cleaning	461	491	461	491
Consulting and professional fees	2,370	1,614	2,370	1,614
Electricity	2,062	1,761	2,062	1,761
IT expenses	6,337	8,260	6,337	8,260
Insurance	473	657	473	657
Legal fees	12,505	318	12,505	318
Marketing	2,963	408	2,963	408
Placement fees	260	231	260	231
Printing and stationery	108	171	108	171
Repairs and maintenance	285	75	285	75
Security	1,720	1,144	1,720	1,144
Sponsorships	660	–	660	–
Staff welfare	232	229	232	229
Subscription and certification costs	715	1,519	715	1,519
Telephone and fax	761	785	761	785
Training	1,106	3,743	1,106	3,743
Travel	7,819	3,290	7,819	3,290

22. TAXATION

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

23. CASH GENERATED FROM OPERATIONS

Surplus	22,509	22,593	22,521	22,655
Adjustments for:				
Depreciation and amortisation	2,611	4,010	2,611	4,010
Profit on sale of investments	–	(175)	–	(175)
Deficit/(surplus) from equity accounted investments	12	62	–	–
Debt impairment	3,363	2,251	3,363	2,251
Interest on loan accounts	(139)	(192)	(139)	(192)
Assets written off	–	(28)	–	(28)
Reversal of provision for impairment	(25,671)	–	(25,671)	–
Changes in working capital:				
Trade and other receivables	(366)	(3,484)	(366)	(3,484)
Prepayments	85	172	85	172
Trade and other payables	12,196	(18,310)	12,196	(18,310)
	14,600	**6,899**	**14,600**	**6,899**

NOTES TO THE ANNUAL FINANCIAL STATEMENTS
as at 31 March 2023 (continued)

	(R thousands)			
	Economic entity		Controlling entity	
	March 2023	March 2022	March 2023	March 2022

24. COMMITMENTS

Operating leases – as lessee (expense)

Minimum lease payments due				
– within one year	1,594	8,464	1,594	8,464
– in second to fifth year inclusive	2,087	-	2,087	-
	3,681	**8,464**	**3,681**	**8,464**

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.

25. CONTINGENCIES

CONTINGENT LIABILITIES

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

Funding agreements	209,533	238,741	209,533	238,741

Legal proceedings:
There are several legal proceedings that are currently ongoing, these legal proceedings relate to prior or existing investments made by the Technology Innovation Agency, either for refunds of grants, repayment of loans or incorrect disclosure on the value of shares sold.

The estimated costs are as follows:

Legal costs	5,202	3,200	5,202	3,200

CONTINGENT ASSETS

This matter relates to a sale of shares transaction whereby the controlling entity disposed of its 49% shareholding in Kapa Biosystems (Pty) Ltd to Kapa Biosystems Inc. It later transpired that the purchase price for the shares was significantly undervalued and that the Agency was in fact entitled to an additional amount. The arbitration in this matter is presently ongoing. The amount owing to the controlling entity is uncertain at this time.

The Agency advanced R5 million to Technovera (Pty) Ltd under a loan instrument, which is repayable on the attainment of profitability. The project has displayed significant progress, reflecting a probability of the return of funds.

26. RELATED PARTIES

Relationships

Members	Refer to members' report note 27
Controlled entities	Refer to note 5
Associates	Refer to note 6
National Department	Department of Science and Innovation
National Goverment Business Enterprise	Council for Scientific and Industrial Research
National Public Entities	Agricultural Research Council
	Medical Research Council of South Africa
	South African Nuclear Energy Corporation
	Mintek
	Insurance Sector Education and Training Authority
	South African National Accreditation System
	Companies and Intellectual Property Commission

NOTES TO THE ANNUAL FINANCIAL STATEMENTS
as at 31 March 2023 (continued)

	(R thousands)	
	Controlling entity	
	March 2023	March 2022

26. RELATED PARTIES (CONTINUED)

RELATED PARTY BALANCES

Amounts included in trade receivables regarding related parties		
Department of Science and Innovation	3,367	3,367
Committed conditional grants		
Department of Science and Innovation	(309,872)	(330,840)

RELATED PARTY TRANSACTIONS

Allocations received		
Department of Science and Innovation	(726,193)	619,340)
Transactions with		
Agricultural Research Council	10,641	5,334
Council for Scientific and Industrial Research	43,857	22,547
Medical Research Council for South Africa	10,806	12,328
Mintek	1,049	837
South African Nuclear Energy Corporation	457	1,377
Insurance Sector Education and Training Authority	–	1,935
South African National Accreditation System	33	–
Companies and Intellectual Property Commission	1	–

NOTES TO THE ANNUAL FINANCIAL STATEMENTS
as at 31 March 2023 (continued)

27. MEMBERS EMOLUMENTS

EXECUTIVE MEMBERS

	(R thousands)			
	Emoluments	Bonus	Allowances	Total
2023				
Mr P Krappie – Acting CEO	2,273	338	543	3,154
Mr I Abdoola – CFO	2,526	284	94	2,904
Mr BM Mphahlele – Executive: Commercialisation	2,146	227	2	2,375
Dr VN Phehane – Executive: Bio-Economy	2,128	208	4	2,340
Mr V Skosana – Acting Executive: Innovation Enabling	1,283	159	169	1,611
Ms MJ Matlolane – Acting Executive: Corporate Services (from 01 August 2022)	1,022	206	139	1,367
Mrs PA Dekker – Executive: Corporate Services (resigned 31 July 2022)	710	–	–	710
	12,088	**1,422**	**951**	**14,461**

*Allowances including the following: Cell phone, car, acting, travel and subsistence.

Performance bonuses paid during the period relate to the 2021/22 financial ear.

2022				
Mr P Krappie – Acting CEO	1,968	233	543	2,744
Mr I Abdoola – CFO	2,234	-	28	2,262
Mr BM Mphahlele – Executive: Commercialisation	1,945	140	3	2,088
Dr VN Phehane – Executive: Bio-Economy	1,948	137	2	2,087
Mrs PA Dekker – Executive: Corporate Services	1,823	183	-	2,006
Mr V Skosana – Acting Executive: Innovation Enabling (from 01 April 2021)	1,198	128	166	1,492
	11,116	**821**	**742**	**12,679**

* Allowances including the following: Cell phone, car, acting and travel and subsistence.

Performance bonuses paid during the 2021/22 period relate to the 2020/21 financial year.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS
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	(R thousands)		
	Members' fees	Allowances	Total

27. MEMBERS EMOLUMENTS (CONTINUED)

BOARD MEMBERS

2023			
Ms M Modise (Chairperson)	257	–	257
Ms A Canca	142	–	142
Ms EL Matlali	135	–	135
Ms JSP Matsebula	164	12	176
Mr TG Ramasike	231	–	231
Dr R Iyer	136	–	136
Mr BA Mboniswa	213	–	213
	1,278	**12**	**1,290**
March 2022			
Mr TG Ramasike	183	-	183
Ms JSP Matsebula	160	4	164
Mr BA Mboniswa	131	-	131
Ms M Modise	70	-	70
Ms EL Matlali	48	-	48
Ms A Canca	43	-	43
Dr R Iyer	41	-	41
Dr SJ Lennon (until 31 Otober 2021)	125	-	125
Dr M Madikizela (until 31 Otober 2021)	98	-	98
Dr PL Mlengana (until 31 Otober 2021)	23	-	23
	922	4	926

NOTES TO THE ANNUAL FINANCIAL STATEMENTS
as at 31 March 2023 (continued)

28. RISK MANAGEMENT

FINANCIAL RISK MANAGEMENT

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

LIQUIDITY RISK

The economic entity's risk to liquidity is a result of the funds available to cover future commitments. The economic entity manages liquidity risk through an ongoing review of future commitments and credit facilities.

ECONOMIC ENTITY

	(R thousands)			
	Less than 1 year	Between 1 and 2 years	Between 2 and 5 years	Over 5 years
At 31 March 2023				
Trade and other payables	61,674	–	–	–
At 31 March 2022				
Trade and other payables	49,185	–	–	–
Finance Lease	63	–	–	–

CONTROLLING ENTITY

At 31 March 2023				
Trade and other payables	61,671	–	–	–
At 31 March 2022				
Trade and other payables	49,182	–	–	–
Finance Lease	63	–	–	–

CREDIT RISK

Credit risk consists mainly of cash deposits, cash equivalents and trade debtors. The entity only deposits cash with major banks with high quality credit standing and limits exposure to any one counter-party.

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 of the value of the investment, the loan/investment is impaired and further funding is carefully considered.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS
as at 31 March 2023 (continued)

28. RISK MANAGEMENT (CONTINUED)

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

	(R thousands)			
	Economic entity – 2023	Economic entity – 2022	Controlling entity – March 2023	Controlling entity – March 2022
Financial instrument				
Cash and cash equivalents	433,852	436,230	433,852	436,230
Trade and other receivables	11,330	10,964	11,330	10,964
Loans and receivables	55,103	40,615	55,103	40,615

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 based on the management is of the opinion that at the period end the amount is recoverable.

MARKET RISK

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

	(R thousands)					
	Current interest rate	Due in less than a year	Due in one to two years	Due in two to three years	Due in three to four years	Due after five years
Financial instrument						
Cash reserves at Standard Bank	-%	33,776	–	–	–	–
Cash reserves at CPD (SARB)	7.42%	400,075	–	–	–	–

FOREIGN EXCHANGE RISK

The economic entity does not hedge foreign exchange fluctuations.

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

NOTES TO THE ANNUAL FINANCIAL STATEMENTS
as at 31 March 2023 (continued)

	(R thousands)			
	Economic entity		Controlling entity	
	March 2023	March 2022	March 2023	March 2022

29. FRUITLESS AND WASTEFUL EXPENDITURE

Opening balance as previously reported	85	85	–	–

30. IRREGULAR EXPENDITURE

Opening balance as previously reported	11,912	11,620	3,989	3,697
Opening balance as restated	**11,912**	**11,620**	**3,989**	**3,697**
Add: Irregular Expenditure – current	1,105	292	1,105	292
Add: Irregular Expenditure – prior period	3,395	–	3,395	–
Closing balance	**16,412**	**11,912**	**8,489**	**3,989**

NARRATIVE

Economic entity: 13 controlled entities were inherited when the trusts (Biopad, Lifelab, Plantbio, Tshumisano, Innovation Fund, Cape Biotech Trust) were combined to form the Agency. 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: One contract was signed outside the Delegation of Authority resulting in irregular expenditure of R143,750. The necessary controls have been reviewed to confirm that this was an isolated incident and necessary consequences against management have been instituted.

The Agency previously approved the establishment of an external platform in the Northern Cape. Following the initial establishment period, the Agency incurred additional costs on behalf of the platform in order to secure assets for the benefit of the NSI. No evidence of the approval for the incurrence of expenditure on behalf of the platform was documented, thus incurring irregular expenditure. The identification of such expenditure includes an amount of R961,021 in the current year and R3,395,353 relating to previous years. This matter is being further reviewed internally.

31. SEGMENT INFORMATION

GENERAL INFORMATION

IDENTIFICATION OF SEGMENTS

The economic entity is organised and reports to management on the basis of four major functional areas and administration: Bio-economy, Commercialisation, Strategic Engagements, Corporate Relations and Administration. The segments were organised around the type of service delivered and the target market within the NSI. Management uses these same segments for determining strategic objectives. Segments were aggregated for reporting purposes. The segments have changed from the prior financial year as the current mechanism of reporting is more accurate and aligned to the new five year strategic plan.

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.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS
as at 31 March 2023 (continued)

31. SEGMENT INFORMATION (CONTINUED)

SEGMENT SURPLUS

Controlling entity – March 2023

	(R thousands)					
	Bio-economy	Commer-cialisation	Innovation Enabling Programmes	Technology Stations Programmes	Administration and strategic engagements	Total
Revenue						
Revenue from non-exchange transactions	274,745	112,017	105,176	147,574	87,714	727,226
Interest received	139	–	–	–	14,959	15,098
Other Income	712	32,220	–	–	–	32,932
Total segment revenue	**275,596**	**144,237**	**105,176**	**147,574**	**102,673**	**775,256**
Entity's revenue						**775,256**
Expenditure						
Employee related costs	31,800	19,176	17,608	2,850	44,478	115,912
Project funding expenditure	242,537	104,055	87,326	144,724	–	578,642
Other operating expenditure	1,259	5,099	242	–	51,593	58,193
Total segment expenditure	**275,596**	**128,330**	**105,176**	**147,574**	**96,071**	**752,747**
Total segmental surplus						**22,509**

Controlling entity – March 2022

Revenue						
Revenue	257,054	103,242	74,021	107,262	77,761	619,340
Interest received	192	–	–	–	8,035	8,227
Other income	175	6,603	–	–	689	7,467
Total segment revenue	**257,421**	**109,845**	**74,021**	**107,262**	**86,485**	**635,034**
Entity's revenue						**635,034**
Expenditure						
Employee related costs	28,037	16,703	17,902	1,877	43,426	107,945
Project funding expenditure	221,552	86,044	44,037	107,262	–	458,895
Other operating expenditure	894	1,730	1,582	–	41,395	45,601
Total segment expenditure	**250,483**	**104,477**	**63,521**	**109,139**	**84,821**	**612,441**
Total segmental surplus						**22,593**

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32. BUDGET DIFFERENCES

MATERIAL DIFFERENCES BETWEEN BUDGET AND ACTUAL AMOUNTS

The following outlines differences between budget and actual amounts which are greater than R1.5 million.

A. **Specific contracted income**
During the period, additional funding was availed by the shareholder (DSI) through specific contracted programmes resulting in the increase in funds managed and disbursed.

B. **Other income**
Following commercialisation of additional projects in the year, further royalty income was accrued based on contractually agreed terms.

C. **Interest received**
Following increases in the SARB repo rate, additional interest was earned on surplus funding.

D. **Employee related costs**
Employee costs were lower than budget. This is attributable to both a higher vacancy ratio and savings that were realised as vacancies were filled later than anticipated.

E. **Project expenditure**
Additional project expenditure was recorded during the year as a result of an increased number of specific contracted programmes managed during the period compared to budget.

F. **Depreciation**
A lower than budgeted depreciation and amortisation expense was recorded as a result of both lower amortisation due to software developments still in progress at year end as well as from overall revision of the useful lives aligned to GRAP Standard requirements.

G. **Other operating expenditure**
Following the return to normal operations after COVID lockdown, additional costs, including travel, were incurred during the period. In addition, legal costs were incurred in defending an ongoing legal matter which contributed to the increase.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS
as at 31 March 2023 (continued)

33. PRIOR PERIOD ERROR

BALANCELL (PTY) LTD

During previous periods, interest was incorrectly not accrued for fully within the financial records. Accordingly, the amount of loan receivable and provision was understated by R10.4 million. In order to correct, both the loan and the impairment amount of the loan was increased by R10.4m to the total value of R22 million being the total amount recoverable.

This had an overall nil impact on the Statement of Financial Position, Statement of Comprehensive Income and Statement of Changes in Net Assets.

LOAN AMOUNTS ADVANCED TO VARIOUS PROJECTS UNDER THE INNOVATION FUND

During the previous period, advances were granted as soft loans to various recipients. During the previous period, an advance of R5 million to Artisan Biomed (Pty) Ltd was expensed instead of the financial asset being raised. The respective loans and receivables have been appropriately raised together with the reversal of the expense. In addition, amounts payable to the DSI was increased given that such amounts are returnable to the DSI under the Innovation Fund contract.

The impact of the changes are as follows:

	(R thousands)			
	Net change in prior period balance		Net change in prior period balance	
Statement of financial position				
Increase in loans and receivables	–	5,000	–	5,000
Increase in total assets	–	5,000	–	5,000
Increase in committed conditional grants	–	5,000	–	5,000
Increase in total liabilities	–	5,000	–	5,000
Statement of financial performance				
Increase in other income	–	1,173		1,173
Increase in impairment	–	1,173	–	1,173

No changes has been effected to the opening net assets as at 01 April 2021.



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