



# The impact of the TIA Seed Fund on technology projects at four Western Cape Universities

## Lessons learned from the first round of funding

Prepared by the Western Cape Economic Development Partnership (WCEDP)

### Acronyms used in this case study:

CE Certification:	European Conformity
CPUT:	Cape Peninsula University of Technology
DEDAT:	Department of Economic Development and Tourism
DST:	Department of Science and Technology
GOB:	General Operating Budget
HIV:	Human Immunodeficiency Virus
HIV-DRT:	HIV Drug Resistance Testing
IP:	Intellectual Property
IPR Act:	Intellectual Property Rights
NGS:	Next Generation Sequencing
NIPMO:	National Intellectual Property Management Office
NRF:	National Research Foundation
MBA:	Master of Business Administration
ROI:	Return on Investment
SU:	Stellenbosch University
TIA:	Technology Innovation Agency
TTO:	Technology Transfer Office
UCT:	University of Cape Town
UWC:	University of the Western Cape
VC:	Venture Capital

## Background to this case study

The Western Cape Economic Development Partnership (WCEDP) commissioned this case study in consultation with the Technology Innovation Agency (TIA). The information in this case study was gathered during a series of interviews with the following people:

- Saberi Marais, TIA Business Development Manager: Western Cape and Northern Cape
- University of Cape Town: Piet Barnard, Director: Research Contracts and Intellectual Property Services; Dr Andrew Bailey, Intellectual Property Manager; Francois Oosthuizen, Project Manager
- University of the Western Cape: Dr Douglas Sanyahumbi, Director; Dr Ana Casanueva
- Cape Peninsula University of

Technology: Prof Gary Atkinson-Hope, Director Technology Transfer and Industrial Linkages; Chris Lombard, TTO Business Manager

- University of Stellenbosch, Innovus: Anita Nel, Senior Director at Innovus; Dr Charles Marais; Prof Piet Steyn
- Lumkani: David Gluckman
- Tshedza: Mbavi Mabogo
- Custostech: Prof Gert-Jan van Rooyen, Information and Communications Technology; Herman Engelbrecht, Telecommunications – Signal Processing; Fred Lutz, Custostech COO

The interviewees were asked to reflect on the impact of the TIA Seed Fund in terms of bridging the gap between applied research and commercialisation, as well as on the challenges and successes associated with the process of funding. The input was summarised into a list of lessons emanating from the process.

## Introduction

South Africa is currently facing an innovation chasm. The chasm, as identified by Gideon de Wet<sup>1</sup>, illustrates the weak technology transfer flow from local South African research organisations to the local production and manufacturing industry. According to de Wet, local basic and applied research moves to overseas technology sources, where design and development takes place,

and the main technology transfer channel occurs between these overseas sources and the local economy. In this way South Africa is prevented from capitalising on local research and its potential revenue. South Africa needs to employ highly skilled people within the country in order for the economy to grow. The diagram below illustrates the innovation chasm and the intellectual property lost to the overseas technology innovation value chain. South Africa has to bear increasing foreign currency costs when importing technology based products and services.

<sup>1</sup> *Emerging from the Technology Colony: A View from the South*, Department of Engineering & Technology Management, University of Pretoria, South Africa.

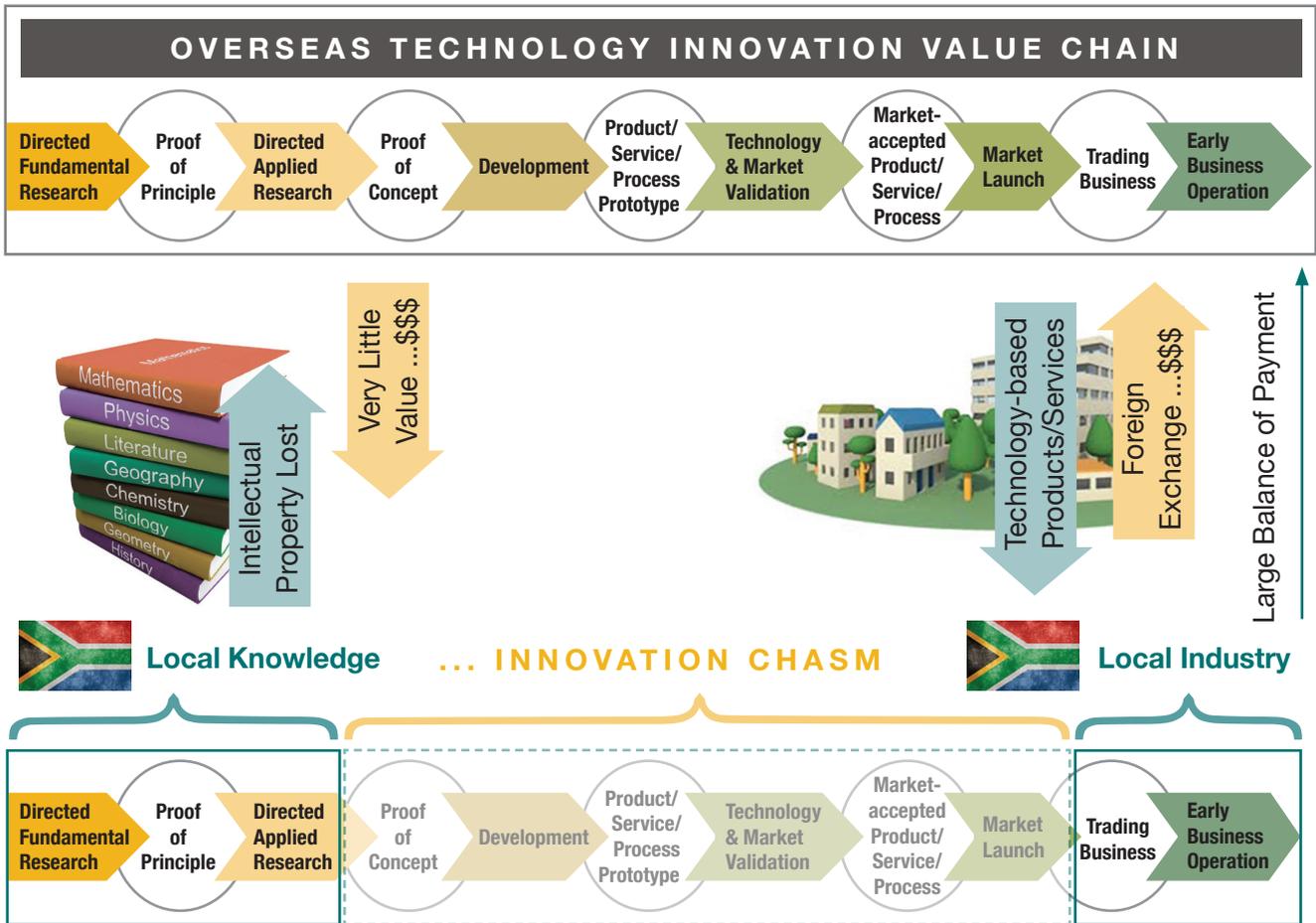


Figure 1: The innovation chasm (Source: TIA)

In order to prevent the loss of intellectual property and opportunity, as well as avoid the cost of importing technology based goods and services, South Africa has to fund innovation and close the chasm. The purpose of this case study is to look at the TIA Seed Fund as a mechanism to address this issue.

Innovation is far more than thinking up creative new ideas and developing those ideas into products that can go to market. It is about a networked, innovation system involving partnership and cooperation that supports knowledge sharing and innovation

processes. Stanley Ridge makes the point that innovation involves “very significant new attitudes to intellectual property, partnership, and management that includes much more sharing of knowledge than we are used to, and a drastically reduced strategic body of knowledge reserved as exclusive intellectual property”.<sup>2</sup> Ridge states that: “an invention or a new idea becomes an innovation only when it is implemented and benefits the economy and/or society. Even then, it is of limited value unless it generates new challenges and prompts new knowledge development thus promoting ongoing innovation.”<sup>3</sup>

<sup>2</sup> Stanley Ridge, SISG notes 17/11/2014

<sup>3</sup> Stanley Ridge, (2010) *Innovation, innovation systems, science parks and living labs*, University of the Western Cape, from <http://www.scidev.net/en/policy-briefs/the-system-of-innovation-approach-and-its-relevanc.html>

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Ridge quotes SciDev<sup>4</sup> as identifying two main features of the successful innovation process:

- *The first is that innovation is essentially the result of an interactive process between many actors, including companies, universities and research institutes. Individual organisations rarely possess all the knowledge necessary for the whole process of innovation. As a result, they need to combine scientific, design, engineering and operational knowledge from different sources.*
- *The second feature is that innovation does not follow a linear path that begins with research, moves through the processes of development, design and engineering, and production, and ends with the successful introduction of new products and processes. Rather, it tends to involve continuous feedback loops between the different stages.*

Thus innovation is only effective when it is an ongoing process of cooperation and sharing of knowledge, for the good of the economy and society as a whole. Based on this view, this case study examines the role of the TIA University Seed Fund in bridging the funding chasm between research and market and it highlights the role of the Technology Transfer Offices set up in terms of the IPR Act. It draws out the key lessons learned from the first round of TIA Seed funding to four Western Cape universities, and showcases a project from each university.

## About the Technology Innovation Agency

The Technology Innovation Agency (TIA) is an initiative of the Department of Science and Technology (DST) established in terms of the Technology Innovation Agency Act, 2008 (Act No 26 of 2008). Amongst other objectives, the Act aims: “To provide for the promotion of the development and exploitation in the public interest of discoveries, inventions, innovations and improvements, and for that purpose to establish the Technology Innovation Agency; to provide for its powers and duties and for the manner in which it must be managed and controlled.”<sup>5</sup>

The Act defines technological innovation as “the application in practice of creative new ideas, which includes inventions, discoveries and the processes by which new products and services enter the market and the creation of new businesses.”<sup>6</sup> The legislative mandate 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 of all South Africans by developing and exploiting technological innovations.”<sup>7</sup>

TIA is governed by an independent Board, as per the stipulations of the Act. The Board members are appointed by the Minister, in consultation with the National Assembly, “on the grounds of their knowledge and

4 Stanley Ridge, (2010) *Innovation, innovation systems, science parks and living labs*, University of the Western Cape, from <http://www.scidev.net/en/policy-briefs/the-system-of-innovation-approach-and-its-relevanc.html>

5 Technology Innovation Agency Act, 2008 (Act No. 26 of 2008)

6 Technology Innovation Agency Act, 2008 (Act No. 26 of 2008)

7 Technology Innovation Agency Act, 2008 (Act No. 26 of 2008)



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TIA's funding objective is to enable technology development to achieve social and economic returns thus contributing towards broader economic growth. TIA's role within the NSI is to build and nurture a culture of innovation by making South African institutions and industries innovation leaders rather than consumers of innovation. TIA provides risk funding schemes and innovation support programmes as core offerings. The Seed Fund, Technology Development fund and Commercialisation Support Fund are positioned as its risk funding schemes.

## About the Technological Transfer Offices at SA universities

The National Research and Development Strategy of 2002 found that in South Africa there was "inadequate intellectual property legislation and infrastructure" and that "inventions and innovations from publicly financed research [are] not effectively protected and managed."<sup>10</sup>

In 2008 the SA government promulgated the Intellectual Property Rights from Publicly Financed Research and Development Act, Act 51 of 2008, and the Act came into force in August 2010. The Act aims "To provide for more effective utilisation of intellectual property emanating from publicly financed research and development; to establish the National Intellectual Property Management Office and the Intellectual Property Fund; to provide for the establishment of offices of technology transfer at institutions; and to provide for matters connected therewith."<sup>11</sup> As a result of this Act, publicly funded institutions have to identify, protect, develop, manage and, where applicable, commercialise IP from publicly funded research. The Act stipulates

that institutions must establish and maintain a technology transfer office (TTO), which is responsible for undertaking the obligations of the institution in terms of the Act. Two or more institutions may create a regional office, and the National Intellectual Property Management Office (NIPMO), which administers the Act, may provide support to the institution for the establishment of the TTO.

The functions of the TTO include the following:<sup>12</sup>

- Develop and implement, on behalf of the institution(s), policies for intellectual property/invention disclosure, identification, protection, development, commercialisation and benefit-sharing arrangements;
- Receive disclosures of potential intellectual property emanating from publicly funded research and development;
- Analyse the disclosures for any commercial potential, the likely success of such commercialisation, the existence and form of the intellectual property rights, the stage of development thereof and the appropriate form for protecting those rights;
- Attend to all aspects of statutory protection of the intellectual property;
- Refer disclosures to NIPMO on behalf of an institution;
- Attend to all aspects of intellectual property transactions and the commercialisation of the intellectual property;
- Conduct evaluations on the scope of statutory protection of the intellectual property in all geographic territories subject to commercialisation potential of the intellectual property; and
- Liaise with NIPMO as provided for in this Act.

<sup>10</sup> www.nipmo.org.za 1 December 1014

<sup>11</sup> No. 51 of 2008: Intellectual Property Rights from Publicly Financed Research and Development Act, 2008

<sup>12</sup> No. 51 of 2008: Intellectual Property Rights from Publicly Financed Research and Development Act, 2008

## About the TIA University Seed Fund

This case study specifically examines the University component of the TIA Seed Fund, which aims to enable universities to achieve technical and business proof of concept on university based projects by providing grant funding to bridge the chasm between research and commercialisation. It also aims to build a “fundable” pipeline for TIA.

The Seed Fund is a means for TIA to focus on enabling the earlier stages of technology innovation development by partnering with universities across South Africa. TIA recognised that the availability of funding was a challenge universities experienced when progressing their project pipeline towards commercialisation. In accordance with the IPR Act universities have policies to manage innovation, they have technology transfer offices (TTOs) and they have the responsibility to manage and commercialise the university’s output. TIA positioned the Seed funding to meet the needs of universities and innovators: to enable the university to evaluate the commercial and technical assumptions underpinning their innovations. The Seed Fund also aims to catalyse the technology transfer of the innovation so that at the end of the project the risks in the opportunities are understood and the researchers and TTO could apply for follow-on funding from the TIA or any other appropriate funder and be able to demonstrate the potential for a return on investment where appropriate.

The Seed Fund took two years of engagements with Universities before being launched nationally. TIA was not looking at an immediate

Return on Investment at such an early stage of technology development, but instead viewed the fund as assisting researchers and universities to better understand each project’s value proposition and steer them towards viable business models, thus enabling innovators to get a step closer to commercialisation. The TTOs provided application evaluations, project management, governance, reporting, monitoring and evaluation.

Fundable activities under the Seed Fund included:<sup>13</sup>

- initial proof of concept
- prototype development
- sourcing of IP opinions
- production of market samples
- refining and implementing designs
- conducting field studies
- support of certification activities
- piloting and scale-up and techno-economic evaluation
- detailed primary market research
- business plan development

In awarding the funding, TIA wasn’t looking for outputs to be a bankable business plan (although in some instances that has been the case). The TIA Seed Fund allocates up to R500 000 which is strictly limited to the project and excludes the general operating budget for staff costs. During the 2013/2014 financial year, R26 million was disbursed to 70 Seed Fund projects.<sup>14</sup>

<sup>13</sup> Introduction to Technology Innovation Agency, Saberi Marais

<sup>14</sup> TIA Annual Report 2013/2014 pg 5

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## About the University Seed Fund

### General lessons learnt

In terms of governance, a university based management committee decides on which projects to fund, and specifies the conditions attached to each award. This committee includes a TIA representative, university representatives and external experts. The university ensures that there is an audit trail, project monitoring and evaluation. TIA relied on the TTOs as they focus on governance for the benefit of the university. They also have project management skills, understand networks, understand the technology, and understand the innovation lifecycle. They have the ability to liaise with the innovators and they know how to position the application as they have business and IP sense.

In terms of administering the fund, all of the four universities have a TTO. Three of the four universities (UCT, SU and CPUT) have the advantage of already having an internal seed fund and the institutional knowledge gained from the experience of running the internal fund. UWC does not have an internal seed fund.

At UCT essentially all of the same people who had served on the internal seed fund sat on the larger selection panel that was assembled for the TIA Seed Fund, with the UCT TTO benefitting from their experience. The panel, which meets quarterly, has a diverse skills set so is able to provide expert guidance and advice. The TTO can contact the panel members via email if necessary.

The UCT TTO was fairly strict with the applicants and received a number of projects that had great merit but needed more detail. The UCT TTO has used the projects to, *inter alia*, conduct intellectual property landscape analysis or preliminary freedom to operate, often using the

services of an Indian service provider which has proven effective and reasonable in terms of cost. This means that when applications are made to TIA, the proposal is more comprehensive in terms of an understanding of patents, landscape and freedom to operate, in addition to the business model.

The UWC TTO reported that the TIA Seed fund was structured to make it easy to apply. The process itself was smooth, decisions were quick, and money was transferred quickly.

After working through the first round of funding, the four Western Cape universities have varying results and insights, and the lessons are listed below.

- There is a gap in funding between the applied research stage and the commercialisation stage. The TIA Seed Fund is viewed as a critical source of funding in the university innovation space by the TTOs and the academics. Without the TIA funding a number of the projects would not get to market, as there is a lack of alternative funding in the seed space.
- The support that the project received from the TTOs was critical, with many of the researchers stating that they couldn't have done it without the TTO team. The leverage value added by the TTO in terms of legal advice, faculty and administration staff doubled the funding value in some instances.
- The universities received an unfunded mandate to manage the funds. The universities have different levels of administrative support. UCT, SU and CPUT have internal seed funds and the experience that comes with running an internal seed fund, while UWC does not have an internal seed fund. CPUT spent

the year setting up systems to administer the fund.

- The amount of R500 000 is enough to do significant testing at the university level. In the UCT TTO experience, it was enough to cover the costs of European certification marking which is critical to accessing the European market and it geared the opportunity for an international licensing deal.
- Innovators need time to work on their projects. TIA Seed Fund projects happen outside of normal working hours and demands, which means that they are often put aside in favour of work-related deadlines. One suggestion was to second researchers for three-month periods to

allow them to focus on the project. In addition, Innovators need financial support while working to commercialise their research. There is a need for innovation bursaries to cover living expenses.

- There has been increased collaboration with other universities and individuals.
- In the UCT experience knowledge of certification processes has been brought into the faculty.

## Funded projects and the benefits of the Seed Fund

**TABLE 1: FUNDED PROJECTS AND EXPECTED COMMERCIALISATION ROUTE**

University	Amount	Specific sector	Expected Commercialisation route	New IP	Previous IP
UCT	R500 000	Biotechnology, Aquaculture, Food		X	
UCT	R500 000	Agriculture, ICT	Spin Off Company	X	
UCT	R475 840	Oil & Gas	Spin Off Company	Possible	
UCT	R282 750	Biotechnology	Licensing	X	
UCT	R500 000	Pharmaceutical	Licensing		X
UCT	R436 468	Electronics	Spin Off Company		X
UCT	R493 800	Chemical Analysis	Spin Off Company		X
UCT	R500 000	Energy	Spin Off Company	X	X
UCT	R500 000	Healthcare	Licensing	X	

CPUT	Unavailable	Engineering	Spin Off Company		
CPUT	R286 000	Biomedical	Commercialised		
CPUT	R291 500	Food technology	In development		
CPUT	R500 000	Engineering	In development		
CPUT	R455 000	Engineering	At risk of reallocation		
CPUT	R270 000	Electrical engineering	In development		
CPUT	R480 000	Industrial design	In development		
CPUT	R386 000	Electrical engineering	In development		
CPUT	R303 000	Electrical engineering	In development		
UWC	R500 000	Health	Licensing		
SU	R230 000	Food safety and analysis	Licensing		X
SU	R380 000	Human health	Licensing		X
SU	R250 000	Human health	Spin Off Company		X
SU	R350 000	Human health	Licensing		X
SU	R224 000	Energy management	Licensing		X
SU	R500 000	Energy for social development	Licensing	Possible	
SU	R250 000	Water purification	Spin Off Company	Possible	
SU	R250 660	Infrastructure planning	Licensing	Possible	
SU	R500 000	Biotechnology	Spin Off Company	Possible	
SU	R250 000	Manufacturing for human health	Spin Off Company		X
SU	R494 050	Engineering	Spin Off Company		X
SU	R499 537.81	Environment and Tourism	Spin Off Company		X
SU	R301 250	Aquaculture	Spin Off Company		
SU	R486 000	Optimisation of process engineering systems	Licensing	Possible	

SU	R500 000	Digital security	Spin Off Company		X
SU	R494 532	Education	Licensing	X	
SU	R137 000	Electricity Distribution	Project terminated		

Table 1 outlines the projects supported by the Seed Fund at the various Western Cape based universities.

The specific experiences of the four universities (University of Cape Town, University of the Western Cape, Cape Peninsula University of Technology, University of Stellenbosch), along with project examples, are set out below.

## University of Cape Town

The UCT TTO recommended 25 projects for funding in the first round of the TIA Seed Fund and of those, nine projects were funded. The UCT TTO had identified the capacity within the university for commercially viable innovation, and noted that potential projects were stalling as a result of a lack of funding. The TIA Seed Fund enabled the funding of mature projects within the university.

### Innovation challenges

The UCT TTO recognises that academics tend to patent too early. ADMET tests and clinical trials need to be run, which is something that the TIA Seed Fund can enable.

NIPMO funding allowed for the hiring of three new staff members which means that the projects are now well run and supported.

### Challenges with the TIA Seed Fund

The reporting is onerous, and without the

appointment (on NIPMO funding) of Francois Oosthuizen as the project manager, the UCT TTO would have struggled to comply. The project manager keeps the academics on track and unblocks anything capable of threatening a project.

### Successes

**Move towards commercialisation:** All nine projects are doing well. Probably more than half have the potential to apply to another funder to go to the market. Some don't need a second round of funding, and they can go to market. Six of the nine will create new IP. Four will fulfill the objectives of the IPR Act. Six of the nine will assist spin off companies that were incubated or formed already. These projects are definitely targeting the right areas. The others are looking at license opportunities.

The TIA Seed Fund stimulated a hidden need within the university, and academics now ask about when the next round of funding, having realised that there is an option to take their research to the next stage, i.e. commercialisation.

**Increasing collaboration:** There is increasing collaboration on projects. For example NMMU has included UCT in a trial involving ostrich chicks.

**A streamlining of processes:** The UCT TTO has created a charter and they have learnt a lot. It will streamline things in terms of approvals for budget/project deviations. Each round is

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an improvement. The seed fund is teaching the TTO people how to manage seed funds and screen for successful projects – it’s experiential training.

**Increased learning about market requirements:** One of the projects involves analytical equipment to test catalysts in operating conditions. The university has an incubated company that has already sold some of the units internationally, which has attracted a top X-Ray Diffraction company that wants to integrate the product into their unit. It is critical to get CE certification marking as they are in the European market. The funding required is daunting but it has geared up the opportunity for an international licensing deal. It has brought back knowledge of CE to the department and they now know how to set up the system. The university is selling one or two units a year whilst with the licensing deal in place one is looking at selling about 30 a year. This project has developed South Africa’s manufacturing capability as the units are manufactured here and sent to Europe; without the CE marking there would be no deal.

### Conclusion

For the UCT TTO the TIA Seed Fund has been extremely successful and something that they had known was necessary in the environment for a long time. They believe that the TIA Seed Fund is the key to unlocking potential in the university.

In the past, academics did their research and then they had to apply to TIA for large amounts. They were deterred by the amount of time required in order to prepare a proposal document, so often didn’t bother to apply. The TIA Seed Fund was more attractive as the application process required less time and enabled them to take their work to the next stage.

According to Dr Andrew Bailey, Intellectual Property Manager, the TIA Seed Fund is an absolutely critical component of the innovation landscape and if it was taken away they would be in serious trouble. Dr Bailey reported that universities are trying all sorts of avenues to fill this funding space but they struggle to get a database of angel investors. He added that the TIA Seed funding process was quick and easy.

### UCT Showcased project: Lumkani

Lumkani (which means “Be aware”) was one of the nine funded projects. The project was initiated in 2012 when Samuel Ginsberg, a senior lecturer in the Electrical Engineering faculty, concerned about shack fires, set a thesis topic to build a fire detector for under \$1. Francois Petousis, a final-year Engineering student, took up the challenge and built one, but it needed to move from theory to the product stage.

David Gluckman joined the team in 2013 with a mandate to build a business model that needed to be profit driven but to do good at the same time. They applied for TIA funding in April 2014 and received the funds six weeks later. The project was well developed and focused on social enterprise as the vehicle toward community development. They worked with TTO project manager Francois Oosthuizen, who pushed them to budget, which was a useful exercise. The funding allowed them to pay for David’s time, to invest in the injection mold, R&D costs, testing and to roll out 2 000 fire detectors. They are collaborating with NGOs and there is community engagement as people buy the unit.

Gluckman reported that Lumkani would have struggled without the support of Oosthuizen and the UCT TTO office. “Francois has been outstanding with quotes, administration systems and legal systems. The Seed Fund

made things easier for us. I don't think that UCT has had a project that started and commercialised in seven months. That couldn't have happened without TIA. It would have taken longer." From the UCT TTO's perspective Lumkani has taught them about different models, as there are a number of NGOs assisting with the project.

### Q&A David Gluckman

#### What motivates you?

I am motivated to test the social enterprise model. It marries social impact and gain.

#### What advice do you have for entrepreneurs?

To make sure you understand the problem you are trying to solve 100%. Don't get obsessed with the outcome and steam ahead with one solution and build something no one wants.

#### What would help the innovation landscape right now?

There needs to be a lot more funding of smaller amounts. There are a lot of projects that could be tested with R50 000 - R100 000. Even R10 000 would allow someone to see what they can do. The barrier to entry mustn't be great, even in the absence of formal education. The government should provide complete grant funding and say: "go and do something awesome". [www.lumkani.com](http://www.lumkani.com)

## University of the Western Cape

Dr Douglas Sanyahumbi and Dr Ana Casaneuva manage the UWC TTO, the youngest of the four university TTOs. UWC currently does not have a pre-seed fund. In the last ten years UWC has grown into a research university and ranks highly. The team has been trying to put systems in place to set up a pre-seed fund at the university to help de-risk the technology in order to approach external funders. The idea is that when there's monetary value that accrues

to UWC from IP commercialisation activities, the benefits are shared with the IP creator and the University, but a portion should go to a UWC TTO seed fund. The TIA Seed Fund has been a good tool, with the UWC TTO reporting that after agreeing on an activity based budget it was easy to manage the funds with an auditable trail.

### Innovation challenges

In the past, the UWC TTO has not found engagements with TIA very productive. In their experience the TIA Act is good but the implementation and execution has been ineffective and UWC TTO engagements with TIA have been minimal, as the processes, including due diligence are laborious. When the TIA Seed Fund was proposed they engaged and felt that for the first time TIA was starting to understand its role as a funding organisation in a high-risk space and were providing money at risk without unrealistic expectations.

### Challenges with the TIA Seed Fund

The biggest issue for UWC was around TIA's first right of refusal which had no time limit. According to Dr Sanyahumbi there is room to structure a concept of TIA putting in R500 000 and getting a percentage if it is commercialised, not a first right of refusal. There are not many VCs in SA ready to fund the tech space.

The UWC TTO negotiated TIA's request for first right of refusal, and put a three-month limit on the clause. TIA sits on an internal steering committee and can review any UWC TTO recommendations. Initially the UWC TTO considered a number of projects but they decided that only one was ready to move forward, an HIV drug resistance testing project. The project research was complete and it was awarded R500 000. It was very successful and the UWC TTO entered into talks with two VC investors.

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## Successes

The UWC TTO reports increased collaboration in the Western Cape amongst the TTOs, with the sharing of documents and healthy competition.

## Conclusion

The TIA Seed Fund was a very useful fund because at this point the UWC TTO doesn't have any funding and it enabled them to de-risk technology. From the time the UWC TTO signed the contract with its project and publicised it, other researchers flooded the office for funding. According to Dr Sanyahumbi early seed fund is the hardest funding to raise and there is nowhere to go for R500 000 for risk investment – which is why public money needs to be made available.

## UWC showcased project: Seq2Res™

The UWC project, Seq2Res™, was a six-month HIV drug resistance testing project that received R500 000. The research had already been completed but there was a need for a push to approach investors and clients. The current cost of drug resistance testing is extremely expensive and the idea was to reduce the cost of HIV-DRT testing so that routine testing could be implemented in the public health space. The benefit of identifying the correct drug upfront is that downstream costs are reduced. When there is ongoing treatment failure due to the wrong drug being prescribed, patients begin to lose faith in the treatment programme which results in higher levels of defaulting and higher patient management costs.

Next Generation Sequencing (NGS) technology allows the processing of large numbers of patient samples at a time but it produces

complex data that needs to be analysed by an expert, which increases the costs. The UWC team developed the Seq2Res™ technology to allow the production of individualised drug resistance reports that can be analysed by clinicians and researchers. The South African National Bioinformatics Institute's (SANBI) HIV Molecular Evolution research group, under the leadership of Prof Simon Travers, developed the platform technology.

Because it is platform technology, the algorithm can be changed for different diseases so it can be used to combat hepatitis as well as TB. The TIA funding was crucial in ensuring that the project didn't stall. The TIA-UWC Seed Fund enabled the further development of Seq2Res™ to increase its versatility by allowing all major NGS machine data to be analysed, as well as increase its scalability by migrating the platform to the cloud. It also funded the development of a business plan for the setting up of a start-up company to commercialise the technology. Seq2Res™ managed to raise significant follow on funding from the MRC Strategic Health Innovation Partnership to commercialise the technology.

## Cape Peninsula University of Technology

The TTO office at CPUT was established five years ago. Prof Gary Atkinson-Hope, director of the unit points out that while innovation is needed in order to uplift the country, it is not a quick fix. The spin out of companies takes time, with eight to nine year run-up before patenting, then four to five years of spinning out and commercialising.

Prof Atkinson-Hope believes that the Seed Fund is the most important vehicle established by TIA to date in supporting universities, the heart of knowledge generation. According to Prof Atkinson-Hope the value of the TIA Seed

Fund lies in the fact that it is run by a university management committee and the university has input on which innovation projects to support for prototype development.

### Innovation challenges

While DEDAT supports CPUT and has agreed to support their innovators so that they can focus on their projects, a lack of funding for student living expenses results in the loss of researchers and innovators who take up jobs in order to survive. Innovation funding is usually for the development of equipment only and not for the living expenses of students, which could be covered by innovation bursaries.

NIPMO and the DST support CPUT innovation but when the money runs out the staff leave because there is no budget to keep them. In such a teaching environment, what is needed is a scarce skill allowance that could supplement staff salaries to induce them to stay within the university.

### Challenges with the TIA Seed Fund

Chris Lombard, the CPUT TTO Business Manager, found that one of the major challenges with the TIA Seed Fund was that TIA assumed that the CPUT TTO knew how to run the fund. Lombard had to put together the systems in terms of how the finance system works, the budgeting, procurement and cost coding, all of which are CPUT internal systems challenges and not fund management challenges. Another major challenge was that the university finance department didn't know how to deal with it. Setting up the systems took three months, which cut into the CPUT TTO's operating time. TIA requires the money to be spent within the year, which put pressure on the CPUT TTO.

While the CPUT researchers are well versed in the reporting requirements of the university's

internal fund, the TIA Seed Fund was new to the academics, and its procedures proved challenging.

While the university is geared towards university procurement, the project is geared towards commercialisation where one can't afford to wait, so this created a tension that the CPUT TTO struggled with. The university has long processes, which the students found frustrating. Lombard reported that in future rounds he would make sure that as soon as the money is allocated he would meet the researchers and take them through the compliance rules.

A further challenge was that the university procurement closes at the beginning of November until early January, which meant nothing could happen during this period.

One of the TTO's biggest mistakes was assuming that post-graduate students had project management skills.

### Conclusion

Prof Atkinson-Hope wants to see the TIA Seed Fund expanded to innovation bursaries rather than see the fund dissolved. He questions the point of the NRF funding a research project just to see the researcher walk away when he or she can't get another level of funding to commercialise a product.

### CPUT showcased project: TshedzaApp

Tshedza, which means "light/knowledge" in Venda, is a career guidance application (dubbed TshedzaApp) that empowers high school learners to perform their own career planning. TshedzaApp is in a way a "digital career counselor".

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Realising that the current efforts of face-to-face counselor-led career guidance has its limitations (such as lack of access for learners in the rural areas, high costs, lack of a comprehensive solution) and in cases where it is offered in schools it is usually in the classroom format that compromises the personal and individual requirements of the learners, Mbavhalelo Mabogo developed a complementary platform that would empower learners to make better career decisions by themselves.

TshedzaApp also addresses the issue of mentoring and coaching through an intelligent algorithm that digitally pairs up a learner with an industry professional, with over 100 professionals ranging from engineering, health and academia already signed up to be a digital career mentor

A mechanical engineer with an MBA (USB), Mabogo had the business skills to spur the start up. He and his team worked on, and bootstrapped, the project for a year before receiving the TIA Seed funding. An initial application for funding to TIA was not successful because of the stage of development of the product, but his presentation to the TIA Seed Fund board was quickly approved, which was timeous as it meant he could get the people he needed to work on the project.

Mabogo is a faculty work integrated learning and community engagement coordinator in the faculty of engineering, and he works on this project at night. Mabogo reports that the CPUT TTO has done everything in its power to help the project and he appreciates their efforts. "It wouldn't have been possible to get this far without them," he says. "It's been a learning curve and I appreciate the learning."

#### Q&A with Mbavhalelo Mabogo

##### **What is your unique selling proposition?**

Our platform empowers learners to take charge in their career planning by providing them with synthesised information critical for decisionmaking. Our uniqueness lies in our simplicity in design and an intuitive architecture that is able to generate multiple career path combinations based on the learners' individual preferences, all at their fingertips.

##### **When will it be available?**

The alpha version will be completed by the end of 2014 (on Android only), with the beta version available for the public in January 2015. We have a Facebook page (TshedzaApp) that we are using to engage with learners and gathering feedback. A web platform is also currently in development for learners that do not have smartphones or are currently in other platforms.

##### **What has been the most challenging aspect to the project?**

It was the first time the CPUT TTO administered the TIA Seed Fund and we were in the forefront of development so we experienced all the challenges first. Eventually we got used to the system. It was very frustrating dealing with CPUT's processes and requirements. The payment systems are not friendly to the speedy development required for software and garage technology requirements. The university should pursue having an innovation financial processing arm that is agile and can respond to the swift needs of an innovation environment. This way we can purely focus on development and not run around looking for documentation.

##### **Where to from here?**

We have a beta test software build that we are planning to release mid January 2015. From there its test, feedback, rectify, test again until we are sure that every aspect is working as designed and intended. We also need to talk to TIA about the next stage for market development funding and securing of rollout partnerships.

## University of Stellenbosch

Innovus, University of Stellenbosch's TTO, approved 17 projects for TIA Seed Funding and only one project was withdrawn halfway through the project due to an external partner withdrawing support. According to Anita Nel, the Director of Innovus, the impact of the TIA Seed Fund was phenomenal and probably the best intervention ever in South Africa for post research development work and technology transfer activities. 'It is a true pity that it was so shortlived, as we could have worked miracles with this instrument,' she says. 'In our case, we are already seeing the positive effect on the majority of funded projects and it helps a lot to ripen these projects in order to make them more market ready. I am a very keen supporter of this "no strings attached" early stage funding and am impressed by the strategic and forward thinking of the founders of this initiative.' Nel recently visited Israel to look at the innovation culture there and was impressed that government sees their role not as "making money" but "losing money to stimulate innovation". "The TIA seed fund probably falls in that category," she says, "and I do hope that TIA will revive this, as it really makes a difference."

Innovus manager, Charles Marais, agreed that the TIA Seed Fund was the most important intervention by the state in 20 years and the perfect instrument for universities to commercialise. "The money was thrown over the wall to the TTO and we were told to do our best," he says. "This required a great deal of trust by TIA and the funding was received with gratitude by the universities. The TIA Seed Fund allowed us to proceed with confidence and it removed barriers."

### Challenges with the TIA Seed Fund

The unfunded mandate that came with the funding, i.e. the management of the funds, meant that Innovus needed to hire a consultant,

Prof Piet Steyn, to liaise with the academics and report on the projects.

### Conclusion

The Innovus team believes that the TIA Seed Fund is the most important intervention by the state in 20 years and it is the perfect instrument for universities to commercialise. Trust was an important element in the relationship between TIA and the TTO. The unfunded mandate to manage the funding that came with the funding was a challenge. Although Innovus knew how to do the job, they did not have the people to do it and had to hire them.

## University of Stellenbosch showcased project: Custostech

Custostech is a company launched by three University of Stellenbosch academics, Prof Gert-Jan van Rooyen, Herman Engelbrecht, and Fred Lutz, who developed an anti-piracy product that combats digital piracy by incentivising anonymous whistleblowing. An embedded crypto-currency in the media allows for the identification of a person who commits a copyright infringement by uploading protected media. Custostech has created the opportunity for "bounty hunters" to search the Internet for illegally uploaded material that contains the embedded crypto-currency. The first person to download the illegally uploaded material receives the crypto-currency, which alerts the system to the fact that an illegal upload has taken place, and identifies the uploader who then faces the piracy consequences. The whistleblower remains anonymous, and receives both the media and the crypto-currency reward. The whistleblower can be anywhere in the world as crypto-currency knows no boundaries.

While the Custostech team received significant support from Innovus in terms of legal advice, and contracts of incorporation, the TIA Seed

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Fund made it possible for them to take their product a step closer to commercialisation. The funding allowed the team to do market research by attending a trade fair in Los Angeles. The Custotech team found the TIA application process particularly quick and easy, because of the support received from Innovus. The Custotech team identified their main challenge as one of sourcing ongoing funding. While TIA provided a six-month runway, the team needs to find more funding in order to retain the student they have employed to work on the project. “R5 million would be the next stage for us,” says Prof van Rooyen. “There is room in the R1 million to R10 million gap for a government-based funder to give a grant with some upside for the investor but not a pure equity model. Somewhere between the TIA Seed Fund and the TIA VC there is a gap for blue sky investment where well-developed technology already tested in the market is given an additional opportunity to commercialise.”

Prof van Rooyen points out that ICT industry changes so fast that while traditional proof of concept works well in other industries, the ICT industry needs prototypes.

## Conclusion

There is a funding gap between applied research and commercialisation. Private investors are unlikely to be interested in “no strings attached” investment opportunities. As acknowledged in the IPR Act, it is the role of the state to provide money to capitalise on the commercial potential in universities and to enable innovative research projects to get closer to commercialisation and therefore more attractive to investors.

The TIA Seed Fund has had a significant impact on innovation by enabling technology projects

at four Western Cape universities to move a step closer to commercialisation. The model of a TTO administering the fund has proved effective, however an unfunded mandate to manage the funding has proved costly in terms of time and overheads to the TTOs. The funding process has resulted in spin off companies, new licenses, new IP, increased collaboration, increased knowledge and skill retention.

In order to capitalise on the commercial potential of technology research at universities, innovation should be seen by all roleplayers as a networked system involving partnership, cooperation and knowledge sharing.<sup>15</sup>

<sup>15</sup> Stanley Ridge SISG notes 17/11/2014

## Acknowledgement:

Written by Gill Cullinan for the Western Cape Economic Development Partnership

## Contacts:

Cape Peninsula University of Technology: [www.cput.ac.za](http://www.cput.ac.za)  
 Custostech: [www.custostech.com](http://www.custostech.com)  
 Lumkani: [www.lumkani.com](http://www.lumkani.com)  
 Technology Innovation Agency: [www.tia.org.za](http://www.tia.org.za)  
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 University of Cape Town: [www.rcips.uct.ac.za](http://www.rcips.uct.ac.za)  
 University of Stellenbosch: [www.innovus.co.za](http://www.innovus.co.za)  
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**EDP**

**WESTERN CAPE**  
 Economic  
 Development  
 Partnership

**Telephone:** 021 832 0200

**Email:** [info@wcedp.co.za](mailto:info@wcedp.co.za)

**Office Address:** 10th Floor, Triangle House  
 22 Riebeek Street, Cape Town, 8001

**[www.wcedp.co.za](http://www.wcedp.co.za)**