

## USING UNIVERSITIES AS KNOWLEDGE PARTNERS IN REGIONAL INNOVATION SYSTEM

## **PLENARY SESSION 3**

Cooperating with knowledge creators: Models of collaboration with universities and R&D

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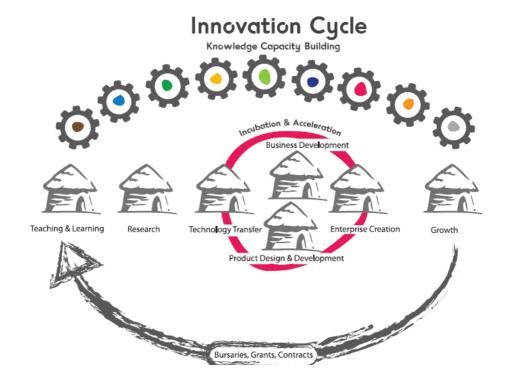
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#### **EXECUTIVE SUMMARY**

The region holds a strong position in the agriculture and mining sectors. Recent developments have indicated that the advantage in these arenas may be lost if not utilised effectively. Knowledge provided by the HE sector could boast a technology base with innovative projects which, given favourable conditions could contribute to a growth in new innovation-related industries. Innovative ideas could also originate from the <u>non-academic sector</u>, provided that environments exist that encourage innovation and fosters investment. Further research and commercialisation will develop both <u>low- and high-level innovation initiatives</u> towards <u>maximising local opportunities</u> which in turn should ultimately contribute to the region.

The universities developed a unique business plan with KNOWLEDGE as the overarching theme.

This approach attempts to bridge the gap between the struggling mining and agriculture sector and the general, non-academic citizens where high unemployment rates are eminent, with knowledge as the catalyst. The innovation Cycle is graphically described below.



#### INTRODUCTION

The Free State Province<sup>1</sup> in South Africa holds a strong position in the sectors of agriculture and mining although recent developments have indicated that the advantage in these arenas may be lost if not utilised effectively. Skills, expertise and resources provided by the higher education sector could progress to the forefront of developments as they boast a rapid developing technology base with a number of innovative research and developmental projects which, given favourable conditions could contribute to a growth in new local innovation-related industries.

However, innovative ideas could also originate from the <u>non-academic sector via general citizens</u>, provided that environments exist that encourage responsible innovation development, facilitates networking and collaboration, and fosters investment in infrastructure. Further research and development, and commercialisation will develop both <u>low- and high-level innovation initiatives</u> towards <u>maximising local opportunities</u> which in turn should yield producers and exporters of novel technologies and ultimately contribute to a lucrative and flourishing region.

It was within this backdrop that the Department of Science and Technology<sup>2</sup> of the National Government commissioned the two local universities (The University of the Free State (UFS)<sup>3</sup> and the Central University of Technology  $(CUT)^4$ ) to device a strategic plan for the establishment of a science and technology park in the region.

The universities subsequently developed a unique business plan with KNOWLEDGE as the overarching theme. The diagram attempts to explain the approach where the whole notion and well-published "innovation" chasm" is replaced with a Knowledge Capacity building programme. More particularly, emphasis is placed on the building blocks of the sustainable innovation programme, represented by African huts.

This approach attempts to bridge the gap between the struggling mining and agriculture sector and the general, non-academic citizens where high unemployment rates are eminent, with knowledge as the catalyst. The Free State Province is fortunate to have high quality universities that can step in as the knowledge partners of choice for the Science and Technology Park that is to be established in 2014.

#### INTRODUCTION TO THE FREE STATE PROVINCE

The Free State Province has traditionally held a strong position in the sectors of agriculture and mining. However, recent developments have indicated that the advantage in these areas may be lost if not exploited innovatively to counter the diminishing contribution of both sectors to the province's GDP. In sectors where the region does not perform well, e.g. biotechnology, pharmaceuticals (excluding clinical trials), environmental industries and large-scale manufacturing, there are ample opportunities for the province to exploit these areas via avenues provided by innovation and by effectively utilising existing centres of research activity in these areas.

Local industrial competitiveness, and hence the standard of living, will be strongly influenced by whether or not academic institutions, government, NGOs and formal/informal industry unitedly grasp the opportunities presented by innovation. This should, of course, be underpinned by the knowledge and skills of innovators and researchers in disciplines that the region needs. The skills, expertise and resources of, for example, the higher education and FET sectors, with their rapidly developing technology base, may lead development with innovative research and developmental

http://www.fsl.gov.za/

<sup>&</sup>lt;sup>2</sup> www.dst.gov.za

<sup>&</sup>lt;sup>3</sup> www.ufs.ac.za

<sup>&</sup>lt;sup>4</sup> www.cut.ac.za

projects. With the provision of favourable conditions this can contribute to growth in new local innovation-related industries.

The non-academic sector, which includes the general public, can also contribute in an environment that encourages responsible innovation development, facilitates networking and collaboration, and fosters investment in infrastructure. Further research and development and commercialisation will encourage both low- and high-level initiatives to maximise local opportunities. This in turn should yield producers and exporters of novel technologies and ultimately contribute to a lucrative and flourishing region.

A large number of small and medium-sized enterprises in the Central South African (CSA) region already manufacture goods and provide supporting services. The primary production of agricultural products by small-scale farmers, followed by secondary processing by informal vendors has, for example, become an increasingly important source of affordable food, employment and revenue. The effectiveness and efficiency of the small-scale entrepreneur are increasingly acknowledged and where ineffectiveness and low productivity do occur they can be attributed to a lack of technical and basic business skills.

The food processing industry (SMMEs and formal), has flourished in the Free State in recent years and can benefit from innovation and technological development. This includes enterprises that produce highly perishable products including dairies, red meat and chicken abattoirs of various sizes, egg production plants, bakeries, juice factories etc. In addition, an increasing number of formal farmers in the region provide added primary value to their products.

The city of Bloemfontein offers the largest number of catering and hospitality establishments per surface area in the country. Keeping in mind that many of these businesses, including retail outlets and informal vendors of various sizes, offer ready-to-consume food products, the benefit to the region of a food safety and hygiene service is evident.

These developments in the formal and informal industrial sectors have brought with them an everincreasing demand for supporting job creating commodities such as an adequate water supply, proper sanitation and waste management, and issues related to occupational health and safety have arisen. Finally, it is also vital that the wider community should be empowered to cope with such developments and make the most of them.

#### SCIENCE AND TECHNOLOGY PARKS

A science and technology park is an area with suitable facilities and a collection of professional people dedicated to scientific research on a business footing to commercialise the research outputs. Usually, science parks are associated with or operated by institutions of higher education. Typically businesses and organisations in these parks focus on product design advancement and innovation, as opposed to industrial parks that usually focus on manufacturing, and business parks that focus on business management and services.

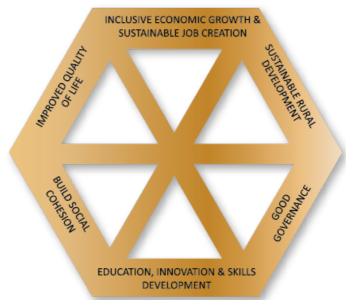
The purpose of science and technology parks is to enhance collaboration between academia, industry and government, to stimulate innovation and to promote the economic development and competitiveness of cities and regions by creating new business, adding value to companies and creating new knowledge-based jobs and regional wealth.

#### ENGAGEMENT WITH FREE STATE PROVINCIAL AND LOCAL GOVERNMENT

The team consulted with Free State provincial and local government officers to ensure that all aspects of the science and innovation park are aligned with and support the six pillars of the strategic

objectives of the Free State government. Table 1 summarises the alignment of the study with the Free State Provincial Growth and Development Strategy 2006.

These six pillars are:



# TABLE 1: ALIGNMENT OF THE STRATEGIC OBJECTIVES OF THE FREE STATE GOVERNMENT WITH THOSE OF THE SCIENCE AND TECHNOLOGY PARK

Free State Province Growth and Development Strategy	FREE STATE SCIENCE AND INNOVATION PARK
Pillar 1 Inclusive economic growth and sustainable job creation	<ul> <li>The science and innovation park has a strong focus on business development and the creation of jobs and regional wealth.</li> <li>Furthermore, all business initiatives at the science and innovation park are aligned with potential off-take arrangements, among others, along the N8 Corridor, at Tshiame Industrial Development and the Harrismith Gateway Development.</li> </ul>
Pillar 2 Education, innovation and skills development	<ul> <li>Strong focus on teaching, learning and results oriented research at higher education institutions</li> <li>Promoting innovation and entrepreneurship as part of all curriculums</li> <li>Entrepreneurship programme</li> </ul>
Pillar 3 Improved quality of life	<ul> <li>The procurement of local services by the science and innovation park will contribute to wider job creation and the growth of the local economy in the Free State Province.</li> </ul>
Pillar 4 Sustainable rural development	• The science and innovation park will actively promote and assist government with the development and implementation of incentives and tax breaks for entrepreneurs and developers who will be developing businesses in the rural areas of the Free State Province.
Pillar 5 Build social cohesion	<ul> <li>The science and innovation park will actively promote and assist government with the development of an art, cultural and heritage programme and promote buy-in as regional development benefitting all. Social Innovation will also be</li> </ul>

	investigated with the aim to develop suitable action plans.
Pillar 6	<ul> <li>The governing board of the science and innovation park</li> </ul>
Good governance	comprises representatives of all stakeholders, functions in
	accordance with the King IV Report and has put in place
	auditable financial management practices.

#### **BUSINESS MODEL**

The stakeholders of the regional innovation system developed the draft mission and vision statement for a science and innovation park during a workshop held in Bloemfontein in 2013.

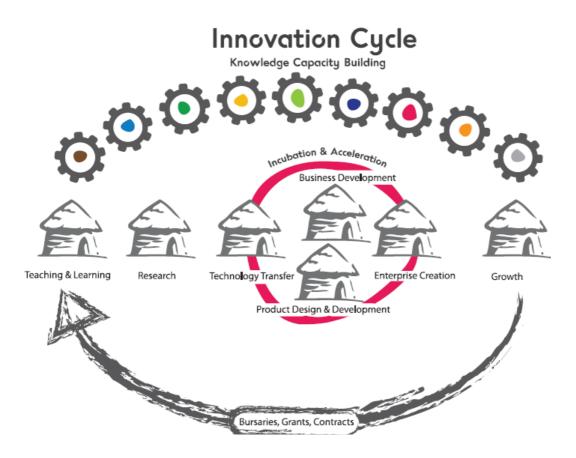
#### Mission

To provide an enabling environment (accommodation, expertise, facilities, support services) for cooperation between academia and industry so as to effectively transform innovation emanating from research and development at UFS and CUT into business ventures which create value to benefit South Africa in general, and the Free State Province in particular.

#### Vision

To become an active and nationally-renowned centre which supports the national economy by creating wealth, jobs and societal well-being through innovative, technological and knowledge-based businesses emanating from quality research undertaken at UFS and CUT

Following the outcome of the abovementioned workshop a core team developed the business model of the proposed Fuama Park that can graphically be explained as follows:



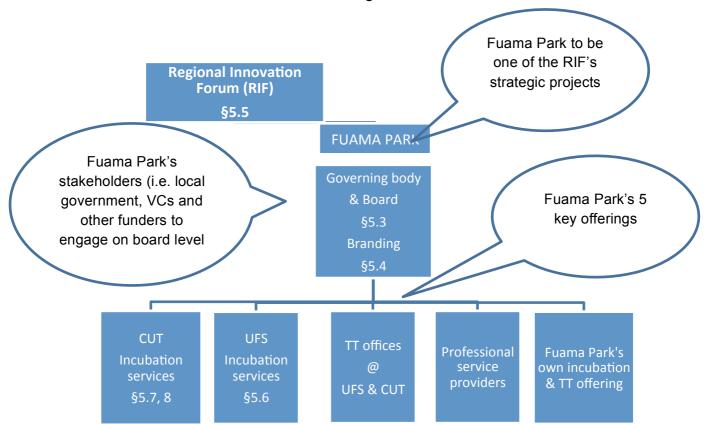
Essentially the proposed strategic business model for the Science and Innovation Park consolidates a number of existing innovation-related entities at CUT, UFS and other regional initiatives in various physical spaces, and accommodates some external tenants to reflect the science and innovation park's vision of becoming an active and nationally renowned centre.

It is recognised that the stakeholders spent considerable time and effort to build their respective reputations and brands in the Free State region and their respective trademarks are highly valued. The Science and Innovation Park will therefore promote a new, distinctive trademark that is acceptable to and supported by all stakeholders, whilst not risking the dilution of existing brands.

The science and innovation park will therefore not be a single physical entity, but will have a distributed physical presence where activities are taking place in various locations.

It is, however, envisaged that the science and innovation park will eventually attract a critical mass to support the building of a physical building in the near future.

The proposed Board of Directors will oversee the integration of all initiatives of the Science and Innovation Park and manage the proposed innovation fund.



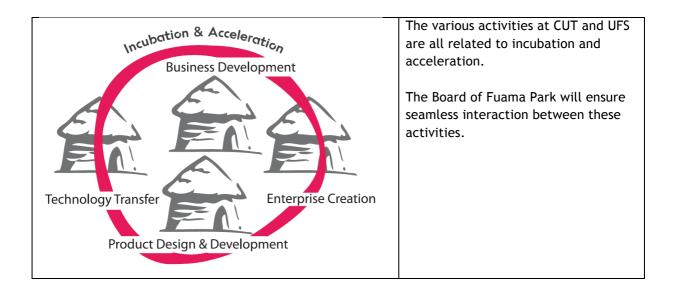
### Governing Structure

#### INTEGRATION OF PROPOSED BUSINESS MODEL

The detailed integration of proposed business model is represented below. All stakeholders can contribute to any need that may be identified in the regional innovation system. It should be clear from the image that capacity building remains the common denominator.

Park and Activity	Service Provider/Stakeholder
Teaching & Learning	UFS and CUT Teaching and learning, with emphasis on entrepreneurial training modules in curriculums
Research	UFS and CUT Applied research, with emphasis on innovative research. It is envisaged that students with entrepreneurial thinking will become innovative researchers
Technology Transfer	<b>UFS and CUT</b> Both institutions to offer comprehensive technology transfer services, in compliance with NIMPO and the IPR Act.

Business Development	IdeaStart at UFS
Product Design & Development	FABLAB, PDTS, CRPM at CUT
Enterprise Creation	RIF, UFS and CUT
Growth	<i>RIF, Industry</i> Industry to ensure sustainability of the innovation cycle by employing the entrepreneurs, sponsoring and conducting research at CUT and UFS and providing bursaries and internships.



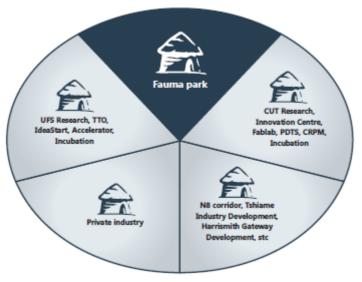
### CAPACITY BUILDING

The knowledge capacity building initiative aims to be the bridge that will ensure that all activities are fully integrated and supportive, whilst avoiding duplication of efforts.

KNOWLEDGE	All these activities are aligned with a comprehensive entrepreneurship
CAPACITY	curriculum as further elaborated on in §6 of this report.
	<ul> <li>Teaching and Learning         <ul> <li>CUT compulsory entrepreneurship module - e.g. Renewable Energy Technologies</li> <li>UFS Faculty of Economic Management Sciences - e.g. entrepreneurship and innovation module</li> <li>Optional workshops</li> <li>UFS IdeaStart Accelerator Programme</li> <li>CUT Institute for Continuing Education</li> </ul> </li> </ul>
	Research and Technology Transfer         -       Existing UFS postgraduate workshops         -       Additionally developed UFS postgraduate workshops         -       Business skills         -       Intellectual property
	- CUT product design and facilities workshops, CUT CRPM
	- UFS Business School gap year programme
Ö	<ul> <li>Enterprise Development (Incubation)</li> <li>Business plans</li> <li>CUT Vision 2020 Innovation and Incubation Programme</li> <li>UFS New Managers Programme (NMP)</li> <li>UFS Centre for Labour Law short courses</li> </ul>
	Growth (acceleration)

Ö	<ul> <li>Utilise credit earned towards further management capacity development at UFS Business School</li> <li>Management Development Programme (MDP)</li> <li>Bachelor in Management Leadership (BML)</li> <li>Master in Business Administration (MBA)</li> </ul>
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#### THE FREE STATE SCIENCE AND INNOVATION PARK



Free State Science & Innovation Park

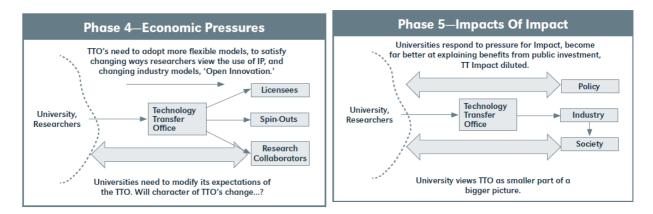
The Free State Science and Innovation Park is a distributed park including the Fuama Park, UFS and CUT research and innovation activities, private industry, and regional activities.

# TECHNOLOGY TRANSFER AT UNIVERSITIES - IMPORTANCE WITHIN THE CONTEXT OF SCIENCE PARKS

European and other First World Countries have very sophisticated and well established approaches and processes in respect of Technology Transfer, i.e. the identification, protection and commercialisation of intellectual property emanating from research activities at universities, with the aim to license the IP and/or to establish spin off companies.

There is, however, a recent trend to transform this approach, with a refreshing hypothesis posed by Tom Hockaday, Director of ISIS, Oxford University's technology transfer office<sup>5</sup>. Hockaday essentially argues that current technology transfer activities should progress from the current *phase 4* - where economic pressure forces universities to license technologies and establish spin off companies in an attempt to increase third stream funding, to *phase 5* - where technology transfer in IMPACT driven.

<sup>&</sup>lt;sup>5</sup> Hockaday, Tom; Phases Of Growth In University Technology Transfer, les Nouvelles; December 2013



Furthermore, European countries can learn much from cross border and Southern African countries, where resources are limited and where innovation is need driven, as opposed to the creative appetite of European entrepreneurs that do not necessarily considered market trends and needs.

#### Development of a capacity-building strategy

We believe that our innovative Technology Transfer model, as described in this proposal, has the ability to redefine Technology Transfer in Europe and developing countries alike. In this respect the The Free State Science and Innovation Park attempts to put in place technology transfer activities that will further add to the role that universities can play in science parks.

Some key aspects of the model that will be finalised are:

#### • Exchange programme

This programme has a direct objective to developing mainly scientists AND Technology Transfer officers with appropriate commercialisation aptitude, through an apprenticeship programme comprising a range of interventions including experiential and formal training, together with dedicated mentoring support to each candidate, tailored to fast track their development in a 2 year time frame.

#### • Mentorships and coaching programmes

- o for researchers (project specific) and
- TT officers (TT office specific)

#### • Training courses on Technology Transfer

- Existing programmes of our Consortium Partners will be used in the first instance and modified where required and integrated with each other to ensure coherence of the courses.
- However, we will also make use of best practice course available in the market place (e.g. WIPO courses) because we firmly believe that knowledge transfer should not be about designing a set of course packs, but rather a best practice Technology Transfer Strategy, as is proposed. The best courses available in the marketplace should then "follow strategy".

In fact, this approach will ensure that our target market (i.e. innovative researchers AND technology transfer officers) are exposed to real life growth opportunities in this exiting field.