Cooperation Framework on Innovation Systems between Finland & South Africa (COFISA)

Final Report:

Regional Economic Impact Assessment of Eastern Cape Universities

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COFISA
Cooperation Framework on Innovation Systems between Finland & South Africa

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ACRONYMS

ACTS	Automotive Component Technology Station
AIDC	Automotive Industry Development Centre
AMTC	Advanced Mechatronics Technology Centre
BMP	Biomass Processing
CAPEX	Capital Expenditure
COE	Centre of Excellence
COFISA	Cooperation Framework on Innovation Systems between Finland and SA
CUT	Central University of Technology
DCTS	Downstream Chemical Technology Station
DIS&TT	Department of Innovation Support & Technology Transfer
DMA	Distributed Multimedia Applications
DST	Department of Science and Technology
ECDC	Eastern Cape Development Corporation
ELIDZ	East London Industrial Development Zone
FEA	Finite Element Analysis
GGP	Gross Geographic Product
GMRDC	Govan Mbeki Research and Development Centre
HEI	Higher Education Institution
IAMER	Institute for Advanced Manufacturing and Engineering Research
IAT	Institute for Advanced Tooling
ICT	Information and Communications Technologies
IDC	Industrial Development Corporation
MOU	Memorandum of Understanding
MTRC	Manufacturing Technology Research Centre
NGO	Non Government Organisation
NIC	Nanotechnology Innovation Centre
NMMU	Nelson Mandela Metropolitan Municipality
NRF	National Research Foundation
OEM	Original Equipment Manufacturer
OFR	Optical Fibre Research
OPEX	Operational Expenditure
PDTS	Product Development Technology Station
PETCRU	Port Elizabeth Technikon Catalysis Research Unit
POC	Proof of Concept
PV	Photovoltaic
SEDA	Small Enterprise Development Agency
SOC	Sale of Concept
STP	Science and Technology Park

TDM	Tool & Die Making
TFMC	Telecommunications Facilities' Management Company
THIRP	Technology and Human Resources for Industry Programme
TTO	Technology Transfer Office
UK	United Kingdom
VW	Volkswagen
WSU	Walter Sisulu University

Section 1 INTRODUCTION

1.1 PROJECT BACKGROUND

The Cooperation Framework on Innovation Systems between Finland and South Africa (COFISA) is a programme launched in September 2006 as a collaborative effort between the Finish and South African governments to improve the South African National System of Innovation. The broad objectives of COFISA are based on South Africa's National Research and Development Strategy (August 2002) and include contributing to economic growth and development, poverty alleviation and an improved life for South Africa's citizens by improving the skill base and promoting science, technology and innovation.

COFISA comprises of four components, including:

1. Enhancement of the South African National System of Innovation
2. Supporting innovation in Gauteng, Western Cape and Eastern Cape
3. Piloting rural innovation mechanisms
4. Knowledge sharing and learning with Sub-Saharan Africa on systems of innovation

Through its engagement with stakeholders in the Eastern Cape (one of the target provinces of the programme) COFISA has noted a significant gap in information regarding the **role that Higher Education Institutions (i.e. Universities) play in the Eastern Cape Innovation System**. Internationally universities are recognised as playing a key role in innovation systems and through this involvement contributing towards economic growth and development; in the Eastern Cape the contribution and role played by universities in this context is not understood.

Because their role is not understood, it is anticipated that government, the private sector and other economic role-players (including the universities themselves) may not be taking full advantage of the four universities and maximising the potential positive impact that they can have on economic growth and development in the Province.

This study seeks to rectify this information gap and illustrate 1) the economic impact the four universities in the province have on the provincial economy and 2) specifically their contribution to the provincial innovation system. The outcomes of this research study are intended to provide COFISA and DST with information that can be used to illustrate the importance of universities in a regional economic context, and highlight how successfully/unsuccessfully the four universities are contributing to the provincial innovation system.

1.2 PROJECT PURPOSE

The following list outlines the project brief for this study:

1. Quantify the economic impact that the four universities directly have on the provincial economy in terms of:
    - The annual capital and operational expenditure of the university itself
    - The annual expenditure of students attending the university

    Together these two have been assumed to make up the impact of the universities on the provincial economy.
2. Broadly assess the contribution the universities have to a better skilled workforce in the Eastern Cape Province by commenting on whether students stay in the Eastern Cape or migrate out of the province after completing their studies.
3. Determine the value added by the four universities to economic growth and development through collaborative initiatives with industry, government and communities to promote community upliftment, innovation and business development.
4. Comment on the overall effectiveness of the universities in contributing to economic growth and development in the Province (and specifically on the system of innovation).

The scope of work to achieve this brief is briefly described below:

- Document university initiatives that have had/are likely to have a positive impact on the provincial economy. This includes business activities that have emerged, research collaboration and community upliftment programmes.
- Specific information to be gathered on these initiatives include (where applicable): types of initiatives, number of new jobs created, contribution to the economy (i.e. jobs, GGP).
- Number of teaching/research posts within Universities that are related to areas of collaboration with the private and public sectors.
- Identify the strengths of the universities and relate this to the competitive advantages that exist because of these strengths, specific focus areas that have the potential to stimulate economic growth as a result of university strengths should be identified.
- The focus of data collection will be on gathering secondary and primary date from universities and their provincial/local government and business partners

1.3 PURPOSE OF REPORT

This impact assessment report is the main deliverable for the study and is intended to present the outcomes of the economic impact assessment conducted of the 4 provincial universities. A chapter of the report is dedicated to examining the impact of each university independently and the total impact of all four universities is then presented.

1.4 REPORT OUTLINE

The remainder of this report is structured under the following chapters:

Section 2: Economic Impact Assessment Framework	This section provides a reference framework for the economic impact results presented in Sections 3 to 7 of the report. It explains how economic impacts are measured and which types of economic impacts can be measured.
Section 3: Impact of Nelson Mandela Metropolitan University	This section briefly profiles NMMU, with a focus on the research, innovation and technology transfer activities of the university and then presents the economic impact of the university on the Eastern Cape economy.
Section 4: Impact of Rhodes University	This section briefly profiles Rhodes University, with a focus on the research, innovation and technology transfer activities of the university and then presents the economic impact of the university on the Eastern Cape economy.
Section 5: Impact of University of Fort Hare	This section briefly profiles the University of Fort Hare, with a focus on the research, innovation and technology transfer activities of the university and then presents the economic impact of the university on the Eastern Cape economy.
Section 6: Impact of Walter Sisulu University	This section briefly profiles WSU, with a focus on the research, innovation and technology transfer activities of the university and then presents the economic impact of the university on the Eastern Cape economy.
Section 7: Conclusion	The total economic impact of HEIs in the province is quantified and presented in this chapter.

1.5 LIMITATIONS OF THE STUDY

- Obtaining information from universities took longer than anticipated where information was received.
- It proved difficult to obtain data particularly from Walter Sisulu University and to a lesser extent the University of Fort Hare where some of the data could not be made available because of inaccurate databases or corrupted data.[1]
- Universities categorise data using their own systems, which does not correspond to the systems used by other universities. For this reason it was often difficult to draw direct comparisons between the universities, for example between funding received from certain sources, etc.
- The Technology Stations and Telkom Centres of Excellence at the universities do not report on information in a standardised manner so it often proved difficult to obtain information in such a way that it could be quantified according to identified indicators. As a result information has been provided as it is made available by the station/centre.
- It became apparent as the project team began to interact with the HEIs that it would be no simple task to identify businesses supported by the universities and interview each one to determine the economic impact of the collaborative initiatives. As a result the economic impacts of the innovation and technology transfer initiatives are quantified where possible, but also qualitatively described.
- Many of the spin-off companies created out of industry-university collaboration are not yet operational so the economic impacts of these could not be determined.

[1] The project team would like to thank everyone that spent time providing Urban-Econ Eastern Cape with the information requested; it would not have been possible to produce this document without your assistance.

Section 2 ECONOMIC IMPACT ASSESSMENT FRAMEWORK

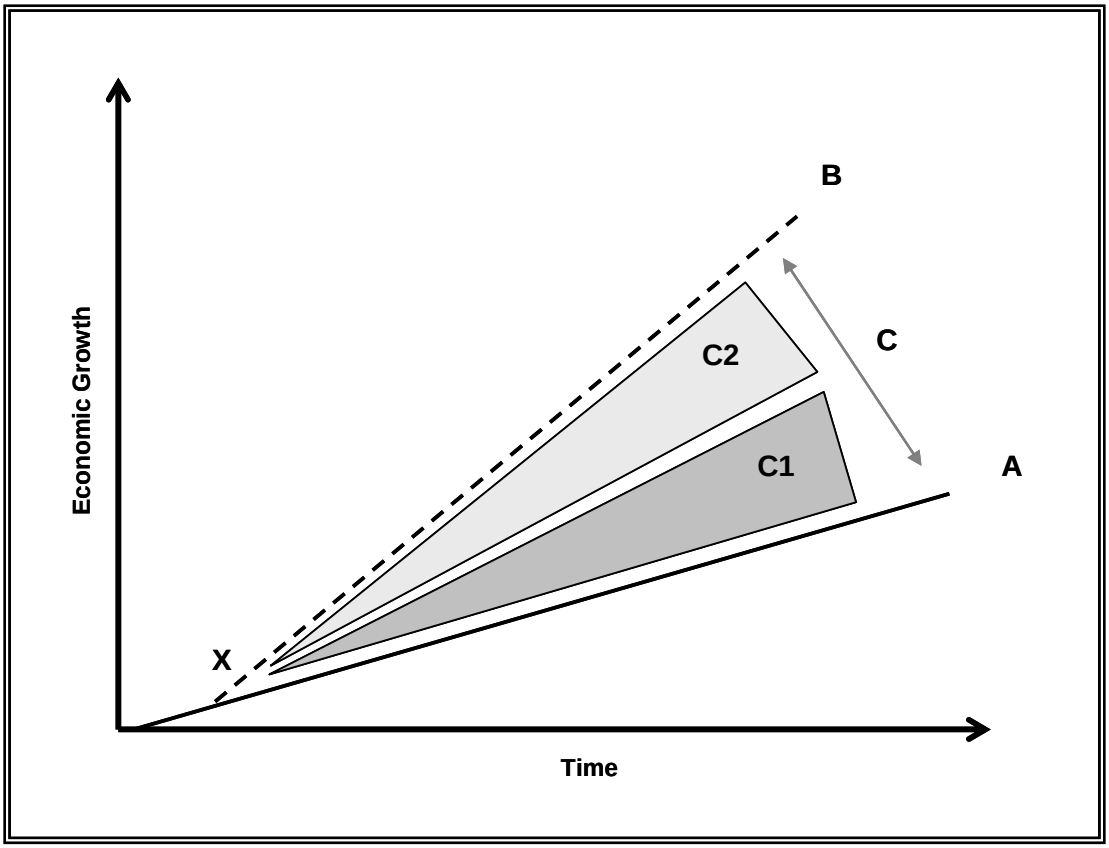
2.1 INTRODUCTION

This section of the report provides a reference framework for the economic impact results presented in Sections 3 to 7 of this report. It briefly illustrates how to measure an economic impact and defines the different types of economic impacts that will be measured in the following sections of this report.

2.2 MEASURING ECONOMIC IMPACTS

Economic impacts can be defined as the effects (positive or negative) of an intervention on the level of economic activity in a given area. The net economic impact is usually measured as the expansion or contraction of an area's economy, resulting from the changes in (i.e. opening, closing, expansion or contraction of) a facility, project or program. Economic impact assessments are therefore conducted to determine the change that an exogenous investment will create within the economy. A positive economic impact is diagrammatically pictured in Figure 2.1.

Figure 2.1 Measuring Economic Impacts



Economic impact analysis is based on the General Equilibrium Framework. General equilibrium analyses examine the entire economy and all economic agents. Such analyses assume that after an economy, initially in equilibrium ('A'), experiences an economic shock (i.e. 'X'), a period of adjustment occurs after which the economy returns to a new state of equilibrium (i.e. 'B'). Economic impact analysis is concerned with the adjustment period. The purpose of such analyses is to estimate the changes (i.e. 'C') which occur during the adjustment process.

In terms of this study, the economic impact (i.e. 'C') of HEI on the Eastern Cape economy is measured as the annual operational expenditure related to these institutions (i.e. 'C1') in addition to the impact that their collaboration with business has had on individual businesses (i.e. 'C2'). Together these two impacts make up the overall economic impact of HEI on the province.

2.3 TYPES OF ECONOMIC IMPACTS

The net economic impact of HEI on the economy of the Eastern Cape Province will be translated according to direct and indirect/induced economic effects as are defined below. In addition to this both capital and operational expenditure impacts (see below) will be measured.

2.3.1 Direct Economic Impacts

The direct impacts are the changes in local business activity occurring as a direct consequence of HEI operating in the province and/or collaborating with that specific business. For example, if a pharmaceutical company develops a new vaccination in collaboration with a HEI and it were to employ 3 new people as a result then a direct impact caused by the development of the new vaccination (an economic shock), would be the creation of 3 new employment opportunities and the subsequent additional income earned by the 3 employees.

2.3.2. Indirect/Induced Impacts

Indirect impacts are a *result of direct economic impacts*. For example, if the pharmaceutical company requires additional inputs from local businesses to manufacture and market its new vaccination then this results in an increase in demand for the products of these suppliers. This increase in demand by the pharmaceutical company leads to an increase in sales, employees and employee income for the suppliers of the pharmaceutical company. Induced economic impacts are the *results of both direct and indirect economic impacts*. The additional income generated by the pharmaceutical company and by the suppliers of the pharmaceutical company causes an increase in the demand for final consumer commodities. For example, the new employees of the pharmaceutical company and/or their suppliers will have additional disposable income available to spend on household goods and services in the local economy. This increase in demand generates an increase in sales in local commodity businesses (e.g. grocery and clothing stores). This is the induced economic impact of the economic shock to the local economy.

2.3.3 CAPEX and OPEX Impacts

It is important to understand that for most new investments there are two types of investments; there is an initial capital injection/expenditure (CAPEX) which takes the form of either construction of a new building or a modification of an existing structure and there is an annual investment made to maintain/operate the investment (OPEX).

In the case of this project a CAPEX investment would, for example be the expansion or building of a new building/facility by the university or it could be CAPEX investment by a company in a new machine/equipment as a result of collaboration with a HEI in the province. The OPEX of the university and/or business is all of the expenditure required to operate the university and/or business in a given year.

The economic impacts created by a capital injection (CAPEX) are **once-off impacts** that will occur for the duration of construction/investment. Thus economic impacts associated with the CAPEX phase are not sustainable economic impacts. Operational economic impacts, unlike capital expenditure economic impacts, are sustainable impacts and are calculated as an **annual impact** based on operational expenditure (OPEX) for a given year. It is important to note that CAPEX and OPEX impacts cannot be added together to determine the 'total' economic impact because of the temporal nature of economic impacts.

2.4 Indicators of Economic Impact

The following economic impact indicators will be quantified in the subsequent sections when describing the economic impact of HEIs on the Eastern Cape economy, namely:

1. *Production:* Otherwise referred to as '*New Business Sales*,' this indicator refers to the value of all inter- and intra-sectoral business sales generated in the economy as a consequence of an investment. In other words it equates to all additional business turnover that is generated as a result of the investment and/or change in the economy.
2. *Employment:* Reflects the number of *additional* jobs that result from an investment and/or exogenous change in the economy. A job is defined as one person employed for one year. This is the most popular measure of economic impacts because it is easier to comprehend than large, abstract Rand values. However, job counts have two major limitations: (1) they do not necessary reflect the quality of employment opportunities, and (2) they cannot be easily compared to the public costs of attracting those jobs (through subsidies, tax breaks or public investments).
3. *Gross Geographic Product (GGP):* This is a broader measure of the full income effect or value added within the economy. This measure essentially reflects the sum of wage income and corporate profits generated as a result of an investment in the economy.

2.5 Conclusion

The following sections of the report present the economic impact of each of the four HEIs in the province individually before presenting a consolidated impact assessment in Section 7. The results should be interpreted within the framework provided above.

Section 3 IMPACT OF NELSON MANDELA METROPOLITAN UNIVERSITY

3.1 INTRODUCTION

This section quantifies the economic impact of the Nelson Mandela Metropolitan University (NMMU) in terms of 1) capital and operational expenditure of the university as a business entity, 2) student spend by registered students at NMMU and 3) the research, technology transfer and innovation related initiatives. The conclusion of this section presents the overall economic impact of NMMU.

3.2 ECONOMIC IMPACT OF CAPITAL AND OPERATIONAL EXPENDITURE BY NMMU

The Nelson Mandela Metropolitan University is a comprehensive university combining the traditions of a University and a Technikon. It is located in Nelson Mandela Bay (Port Elizabeth) and was established in 2005 as a result of a merger between the University of Port Elizabeth, PE Technikon and Vista University (Port Elizabeth campus). NMMU is the largest university in the province with 22,661 students and 1,524 permanent employees in 2008. It has 5 campuses spread throughout Nelson Mandela Bay and another campus in George in the Western Cape.

Table 3.1 presents the direct and indirect economic impact created by the R17.8 million and R8.1 million capital investments made by NMMU in 2007 and 2008 respectively.

Table 3.1: NMMU Capital Investment Impacts

Indicator	2006[1]	2007	2008
Direct Impact			
New Business Sales	-	R20,223,000	R9,230,000
GGP	-	R3,269,000	R1,492,000
Employment	-	49	22
Indirect Impact			
New Business Sales	-	R46,556,000	R21,249,000
GGP	-	R8,653,000	R3,949,000
Employment	-	93	43
Total Impact			
New Business Sales	-	**R66,779,000**	**R30,479,000**
GGP	-	**R11,922,000**	**R5,441,000**
Employment	-	**142**	**65**

The capital investments that NMMU made in terms of new/upgrading of buildings, parking and other facilities resulted in a total increased demand for goods and services of R67 million in 2007 and R30 million in 2008. The investments also created a total of 207 new employment opportunities over the investment period. The economic impacts of capital expenditure can

[1] Capital expenditure data was not made available for 2006 and could not be modelled.

fluctuate considerably from one year to the next, depending on the size of the capital investment made. As indicated in Section 2, the capital investment impact is a short term impact for the duration of construction.

Table 3.2 presents the direct and indirect impact of the annual operational expenditure of NMMU on the regional economy.

Table 3.2: NMMU Operational Investment Impacts

Indicator	2006	2007	2008
Direct Impact			
New Business Sales	R1,053,327,000	R1,088,035,000	R1,123,887,000
GGP	R236,380,000	R244,169,000	R252,215,000
Employment	2,709	2,799	2,891
Indirect Impact			
New Business Sales	R1,701,360,000	R1,757,422,000	R1,815,331,000
GGP	R276,000,000	R285,103,000	R294,498,000
Employment	2,977	3,075	3,176
Total Impact			
New Business Sales	**R 2,754,687,000**	**R2,845,457,000**	**R2,939,218,000**
GGP	**R512,388,000**	**R529,272,000**	**R546,713,000**
Employment	**5,686**	**5,874**	**6,067**

Expenditure by NMMU in 2008 resulted in the direct creation of 2,891 employment opportunities and a further 3,176 indirect/induced employment opportunities in the regional economy. NMMU contributed **R1.1 billion** (directly) to additional demand for goods and services in the regional economy because of its operation and directly contributed **R252 million** to GGP. These are significant ongoing and sustainable impacts, which increase each year in line with inflation.

3.3 Economic Impact of Registered Students at NMMU

The operation of NMMU attracted 22,661 students to register at the university in 2008. Table 3.3 presents a brief profile of these students in 2008.

Table 3.3 NMMU Profile of Registered Students, 2008

		% of Students
Field of Study	Science, Engineering & Technology	34%
	Business & Management	27%
	Education	16%
	All Other Humanities & Social Sciences	23%
	Total	**100%**
Major Qualification	Occasional Students	3%
	Undergraduate Certificates & Diplomas	44%
	Undergraduate Degrees	41%
	Postgraduate, Below Master's Level	5%
	Postgraduate, Master's Degrees	6%
	Doctoral Degrees	1%

	Total	**100%**
Origin of Students	Eastern Cape	77%
	Other RSA Provinces	14%
	African Countries	-
	Overseas	9%
	Total	**100%**

Source: NMMU, 2009

It is evident that NMMU is primarily an undergraduate university, with a strong emphasis on science and technology and business management degrees/diplomas. Only 1% of students at NMMU are completing their Doctorate. Over ¾ of students registered at NMMU are from the Eastern Cape and only 9% of the student body comes from other parts of Africa and overseas.

The students attending NMMU create an economic impact on the regional economy through their expenditure on food, rent (those staying in accommodation off-campus), entertainment, clothing, etc. Table 3.4 presented the impact of NMMU students' spend on the regional economy in 2006, 2007 and 2008.

Table 3.4 NMMU Student Expenditure Impacts

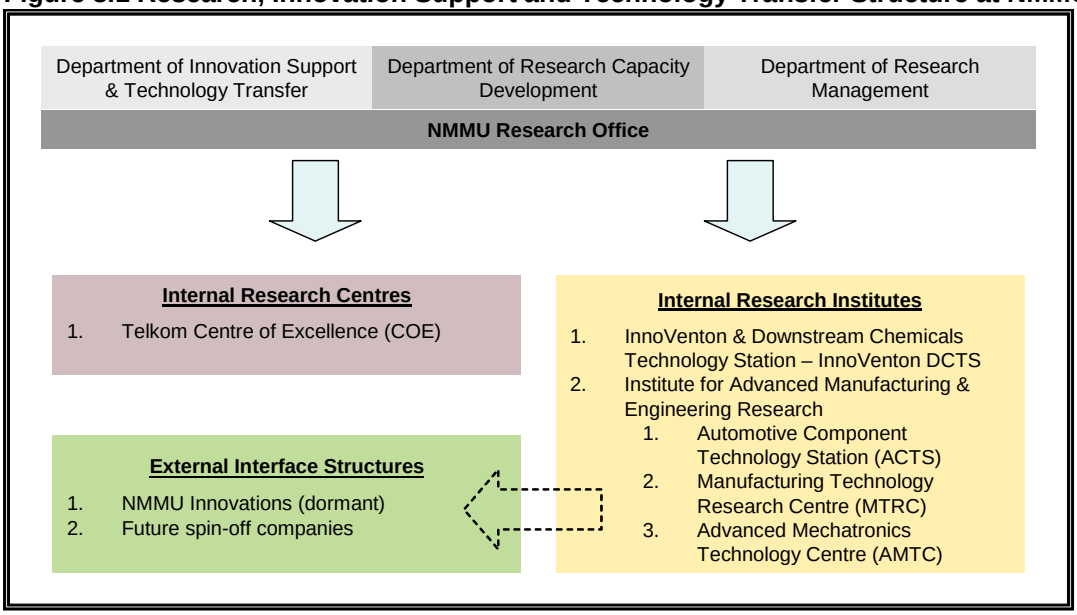
Indicator	2006	2007	2008
Direct Impact			
New Business Sales	R556,043,000	R583,271,000	R618,281,000
GGP	R124,783,000	R130,894,000	R138,750,000
Employment	1,430	1,500	1,590
Indirect Impact			
New Business Sales	R898,134,000	R942,113,000	R 998,663,000
GGP	R145,703,000	R152,837,000	R162,011,000
Employment	1,572	1,648	1,747
Total Impact			
New Business Sales	**R1,454,177,000**	**R1,525,384,000**	**R1,616,944,000**
GGP	**R270,486,000**	**R283,731,000**	**R300,761,000**
Employment	**3,002**	**3,148**	**3,337**

The student expenditure impact is a sustainable impact, which increases slightly from year to year in line with inflation. In 2008 the 22,661 students created a total demand for new goods and services of over **R1.6 billion** – this more than 50% of the total impact of the operation of the NMMU as a business entity (Refer to Table 3.3) and is a significant impact. Student spend also created an additional 3,337 employment opportunities in the regional economy.

3.4 Research, Innovation Support and Technology Transfer Impacts of NMMU

NMMU has a number of entities that conduct research and contribute towards innovation activities and technology transfer in the Eastern Cape. The key entities involved with innovation and technology transfer are depicted in Figure 3.1.

Figure 3.1 Research, Innovation Support and Technology Transfer Structure at NMMU



Source: NMMU, 2009

NMMU has a research office, made up of three departments, including:

- Department of Innovation Support & Technology Transfer
- Department of Research Capacity Development
- Department of Research Management

The research office does not conduct research itself, but provides the *support structures* necessary for other departments, units, faculties, academics and students to conduct research. The Department of Research Management deals with all National Research Foundation (NRF) funding applications and the Department of Innovation Support & Technology Transfer (DIS&TT) deals with intellectual property management and commercialisation; all patent applications are made through this department. The department of IS&TT also provides assistance to departments to access external research grants and funding.

NMMU plays three main roles within the regional innovation system: 1) Technology Transfer, 2) new knowledge creation through research projects and 3) training in R&D and Innovation. NMMU does not have any *external interface structures* that contribute to the above role or that commercialise research outcomes on behalf of the university (NMMU has a dormant company that may play this role in future), but the university does have a number of internal interface structures that have close linkages with industry.

The NMMU receives funding from many different sources to support new knowledge creation (i.e. research), training and technology transfer. Table 3.5 illustrates the funders that supported NMMU in 2008.

Table 3.5 Sources of Research Funding, NMMU (2008)

Source of Research Funding	Value of Funding (Rands)	% of Funding
THRIP Funding	7,648,437	21.3%
National Research Foundation (NRF)	21,579,744	60.0%
RSA Government Funding	338,000	0.9%
Development Agency	282,900	0.8%
Foundation	1,582,645	4.4%
NGOs	170,000	0.5%
Private Companies	1,066,949	3.0%
Parastatals	1,017,995	2.8%
Science Councils	2,268,232	6.3%
TOTAL	**35,954,902**	**100%**

Source: NMMU, 2009

It is evident that over ¾ of the research funding received by NMMU in 2008 was from the NRF, through the THRIP programme and other funding programmes. Of the R35.9 million in funding received in 2008, **R33.5** million of this was for the Faculty of Science, Engineering and Technology.

From 2006-2008 roughly 49% of the research funding at NMMU was spent on basic research while the other 51% was spent on applied research. This proportion has changed drastically in 2009 where to date 78% of the funding has been spent on applied research. In 2008 NMMU had a total of 516 researchers, 54 of which were NRF rated researchers (i.e. 10%).

Table 3.6 quantifies the research outputs originating from NMMU in 2008.

Table 3.6 Research Outputs, NMMU (2008)

Type of Research Output	Number
Number of Accredited Publications	286
Number of Conference Proceedings	66
Number of Books	16
Number of Accredited Journal Articles	189
Provisional Patents	6
Products	1
Businesses Established	3
Commercialisation Income (Rands)	1,305,000
Shares in Companies	3

Source: NMMU, 2009

Fifty nine percent of the accredited publications were from the Science, Engineering and Technology Faculty within NMMU while most of the books published were from the Faculty of Education.

The table above shows that the research outputs being generated by NMMU are still primarily the traditionally accepted outputs against which HEI are assessed (e.g. accredited publications), although new forms of outputs are beginning to emerge along with an increasing shift away from purely academic research to more innovative and industry orientated research.

The NMMU is in the process of establishing a regional **Technology Transfer Office (TTO)** in the Department of IS&TT.[2] It will be the first Technology Transfer office in the Eastern Cape Province and initially will assist the other 3 HEIs in the province with technology transfer activities. The presence of the TTO should have additional economic impacts on the regional economy. It is also important to note that the Department of IS&TT only became operational 2 years ago and one would expect to see an increase in patents, development of new businesses and in commercialisation income in future as their ongoing initiatives begin to bear fruit.

One such example is the development of Rubber Nano Products, which is the IP holding company established to develop research by a NMMU Doctoral student around zinc oxide replacement in vulcanised rubber. NMMU holds a 5% share in the company and the company is making a R4 million investment in research at NMMU as a result of the project. It is expected that the company will only become operational in a number of years.

Much of the impact presented in Table 3.6 has been created through DIS&TT and the university-industry interfaces linked to NMMU. Four of these interfaces will be briefly described below to illustrate the impact these initiatives can have on the regional economy. An attempt has been made to quantify the economic impact of these interfaces where possible, but it is difficult to establish a baseline of information as the entities do not track their own impact and businesses that they engage with find it very difficult to isolate the impact of their interaction with a university and then to quantify this impact.

3.4.1 Automotive Components Technology Station (ACTS)

The Automotive Components Technology Station (ACTS) was established in 2002 as a part of the Technology Station Programme funded by the Tshumisano Trust at the Department of Science and Technology. The technology station falls within the Secondary Manufacturing Cluster of DST and is a leading R&D and technology support centre for the *secondary manufacturing industry*, with a specific focus on the automotive component sector.

ACTS operates as a separate NMMU entity and is one of the three centres that make up the Institute for Advanced Manufacturing and Engineering Research (IAMER) along with the Manufacturing Technology Research Centre (MTRC) and the Advanced Mechatronics Technology Centre (AMTC). The IAMER controls the research, technology and innovation

[2] The new Intellectual Property guidelines for Higher Education Institutions requires all HEIs to have a technology transfer office or function

activities within the Faculty of Engineering; MTRC, AMTC and ACTS function as the Faculty's interface with industry.

ACTS primarily undertakes projects in the following categories:

1. R&D
2. Product Development
3. Technology Demonstration and Training
4. Problem Solving – short term consultancies

The Original Equipment Manufacturer's (OEMs) (i.e. General Motors SA, VW, BMW and Daimler Chrysler) have recognized ACTS as a provider of technology support to their suppliers. As a result the OEMs refer suppliers to ACTS and have provided financial support to the Technology Station for bursaries and major equipment.

Roughly 30% of ACTS clients in the automotive sector are OEMs and 1st tier suppliers while the other 70% are 2nd, 3rd and 4th tier suppliers. (*Source: ACTS RALIS report, 2009*) While the emphasis of ACTS is to assist SMEs in the automotive sector, ACTS also assists clients in other manufacturing sectors. ACTS generates more than 50% of its income from external sources, the other income source is primarily grants. 75-80% of ACTS's clients are SMEs and the center also does work with larger companies such as VW, GM and Eskom. The majority of ACTS's clients are in the Eastern Cape Province, although its largest client is based in Gauteng.

ACTS has worked together with other Technology Stations in the country (and specifically in the Eastern Cape) on various projects:

- Downstream Chemical Technology Station (DCTS) at NMMU
- Product Development Technology Station (PDTS) at CUT
- Advanced Tooling Station at WSU

In addition to the working relationships ACTS has with other Technology Stations, it has also developed partnership and cooperation agreements with other South African and International organisations. Table 3.7 provides a list of such agreements and partnerships.

Table 3.7: ACTS Partnerships and Cooperation Agreements

Institution/Organisation	Nature of Agreement
SEDA	Memorandum of Understanding
AMI – CSIR Light Metals Initiative	Memorandum of Understanding
SPII	Project to project basis
AIDC	Memorandum of Understanding
ECDC	Project basis
Aluminum Federation of South Africa	Project basis
Brauschweig-Wolfenbuettel University of Applied Sciences (Germany)	Logistics & production planning, electrical mechanical engineering, materials, automotive, joining technology and industrial engineering
Ingolstadt University of Applied Sciences (Netherlands)	Automotive Engineering
University of Groningen (Netherlands)	Applied Physics – electron microscopy

University of Plymouth (UK)	Mechanical engineering
University of Stuttgart (Germany)	Laser Technologies
University of South Carolina (USA)	Mechanical engineering
FaME38 Facility at the ESRF-ILL (UK)	Engineering
University of Michigan (USA)	Electrical engineering
University of Lund (UK)	-

Source: Tshumisano Trust Annual Report, 2009

Through ACTS's international partnerships and collaboration agreements the Technology Station has been able to introduce South African companies to international technology that they previously did not have access to. This is of significant economic benefit to these companies.

Table 3.8 presents the economic impact that ACTS has had since its inception.

Table 3.8: ACTS Economic Impact

Impact Categories		2003	2004	2005	2006	2007	2008
SME Support Activities	Total Projects	100	159	217	231	206	259
	No. of Participating SMEs	68	107	139	147	148	136
Project Impact Categories	Export Facilitated	62	57	96	182	161	202
	Productivity Improvements	47	58	164	197	170	231
	New or Larger Market	21	22	41	69	31	21
	Technological Innovation	15	39	62	61	32	44
	Employment Retained/ Created	6	11	25	33	11	21
Training Activities	No. of SMEs Attending	-	-	-	16	23	33
	No. of delegates attending	-	-	-	111	62	67
No of Students Involved		96	140	82	229	144	215
Financial Expenditure	Operational (OPEX) Rm				3.03	3.16	4.90
	Capital (CAPEX) Rm				0.680	2.60	0.080

Source: Tshumisano Trust Annual Report, 2009

In 2008 ACTS registered 259 projects on its books and interacted with 136 SMEs on those projects. Out of the 259 projects, 77% of them were export facilitation related and 89% resulted in productivity improvements. A smaller 16% of projects undertaken in 2008 resulted in technological innovation. ACTS is currently working to launch its 1st commercialization project, a platform and process development project worth R25 million.

The Internship Programme of ACTS has had a large impact on students in that they receive practical industry experience while they are furthering their studies. In 2008 ACTS involved 215 Masters or Doctoral students in its projects. It is important to note that ACTS staff indicated that there is a very limited market in the Eastern Cape for highly qualified engineers and the majority of the students that move through ACTS obtain employment overseas after graduation or move to other parts of South Africa.

ACTS has 9 technical staff (i.e. engineers) and 2 administrative personnel. Ten of these jobs have *directly* been created as a result of ACTS and would be lost if ACTS discontinues operation.

3.4.2 InnoVenton and Down Stream Chemicals Technology Station: InnoVenton/DCTS

In 2005 three units of the former PE Technikon, namely the Port Elizabeth Technikon Catalysis Research Unit (PETCRU), ChemQuest, and the Materials Resource Centre were amalgamated to form one operating entity within NMMU called InnoVenton. In 2006 a Downstream Chemicals Technology Station was established at NMMU under the Technology Station Programme of the Tshumisano Trust. DCTS falls in the Agro-Chemicals Processing Cluster of DST. It was agreed that activities of the Technology Station would be incorporated into InnoVenton to form InnoVenton: Downstream Chemicals Technology Station (DCTS).

InnoVenton DCTS aims to be a self-sustaining entity funded primarily through grant funding (TT, NRF, THRIP) and commercial income generated by doing contract R&D, analytical and testing services and corporate training. InnoVenton DCTS has six operating units, namely:

1. Organic Process Development Research Unit (ORPD)	Incorporates the recently announced NRF Niche Area for Innovative Batch Chemical Technologies
2. InnoVenton Contracts	Incorporates the only multi-purpose kilo-lab facility at a higher education institution in South Africa
3. InnoVenton Technology Support	Provides support to SMEs in the secondary & tertiary chemical manufacturing industry with the view to improve products and production technologies, stimulate technology transfer and increase skills levels.
4. InnoVenton Analytical	SANAS accredited commercial analytical service in the environmental, agric-food, pharmaceutical, and manufacturing industries.
5. InnoVenton Training	Provides corporate short courses and skills programs to individuals and industries in the chemical and allied chemical sector.
6. InnoVenton Quality	Provides a quality support function for InnoVenton activities, as well as a service to external clients in the chemical and allied chemical sector

The main outputs that InnoVenton DCTS aims to achieve include:

- Trained students and industry stakeholders
- Analytical and testing services
- New knowledge creation
- Technology solutions for industry
- New business development

The following are some of the highlights that have been achieved by InnoVenton DSTC in the past 3 years:

- Signing of a collaboration and commercialization MOU with Phytolutions GmBH (Jacobs University, Germany) to form a JV company in South Africa for a marine micro-algae project to develop and promote the technology developed by Phytolutions GmBH

- The imminent creation of a company called Biomass Processing (BMP) to hold IP developed by InnoVenton in fields related to biomass conversion. 70% of the company will be owned by NMMU and 30% owned by the InnoVenton Staff Trust.
- National Fuel Chemicals Centre – The business plan for the establishment of a R25 million National Fuels Chemicals Centre at InnoVenton has been endorsed by DST. The NFCC will support the Biofuels industry and fuel quality upgrade projects undertaken by the fuel industry in preparation for changes to auto fuel standards in the country.
- Introduction of a new BSc (Hons) Formulation Science – the only one in South Africa
- 2 Patents were drafted in 2008 and submitted for filing through DIS&TT
- Signed commercialisation agreement for a new insect repellent (RepelloX) with InnoVenton's investment partner Afrepell Manufacturing Pty (Ltd)
- Signed a commercialisation agreement for a rose preservation process with African Floralush IP and African Floralush Operations
- Commissioning of the Kilo-Lab in 2006 (only one of its kind at a HEI in RSA)
- Past clients of InnoVenton include Sastech, Aspen Pharmacare, CSIR, CPT, ChemTech, Engen, Cape Wool SA, Mbuyisi Creations, Katco, Raindrop and Khulani Aloe Vera

Table 3.9 illustrates the economic impact that InnoVenton DCTS has had since its inception.

Table 3.9: InnoVenton DCTS Economic Impact

Impact Categories		2006	2007	2008
Quality Support Activities	Total projects completed	4	7	8
New Products	POC's Documented	2	2	-
	SOC Transactions Completed	0	0	-
Training Activities	No. of courses presented	6	5	13
	No. of industry attending	41	116	61
	No. of students attending	28	12	43
Commercialisation Agreements signed		3	0	0
No of Students Involved		29	44	30
Fiscal Targets	External services turnover Rm	-	-	1.44
	Major projects turnover Rm	-	-	1.33
	Commercial Income Rm	N/A	2.93	N/A
Technology Services Turnover	Analytical Services Rm	1.49	1.57	-
	Technology Support Rm	0.487	0.638	-
	Contracts Rm	0.152	0.354	-
Financial Expenditure	Operational (OPEX) Rm	-	5.56	5.67
	Capital (CAPEX) Rm	-	1.53	0.425

Source: InnoVenton DSTS Annual Reports, 2006, 2007 & 2008 & Tshumisano Trust Annual Report, 2009

The Internship Programme of DCTS has a large impact on students in that they receive practical industry experience while they are furthering their studies. In 2008 DCTS involved 30 Masters or Doctoral students in its projects. InnoVenton DCTS has also contributed towards skills development by creating the first BSc (Hons) Formulation Science course in South

Africa and presented 13 training courses in 2008 to 128 participants (from NMMU and industry).

The center employs 19 staff members including 6 interns. In 2008 InnoVenton DCTS generated R1.4 million in contracts with industry. It was not possible to identify how many SMEs the technology station engaged with. Two patents were drafted, one for a rose preservation process and one for a new insect repellant. Both of these projects are currently being taken into the commercialisation phase; the text box below describes the two companies that have been established in more detail.

Afrepell Technologies: InnoVenton and NMMU were approached by the entrepreneur to establish the company, which will sub-contract the manufacture of insect repellent and insect repellent products. The company will look at markets in the South Africa, Africa, US and Europe. Production will be based in Gauteng and the company is expected to start operations in 2010. Already one staff member has been employed to start rolling out the product later this year.

African Floralush IP: This is an IP holding company for the rose preservation project in which NMMU holds 25%, the Industrial Development Corporation (IDC) holds 40% and the remaining 35% is held by the entrepreneur.

African Floralush: This is the operating company, which is based in Muldersdrift, Gauteng. The firm produces cut flowers and floral arrangements with chemically treated flowers that preserve the life time of the flowers by up to a year. The flowers are marketed nationally at present and will be marketed internationally from next year. The firm employs 14 staff members, 10 semi-skilled and 4 skilled. NMMU is a 5% shareholder in the company, the IDC holds 40% and the entrepreneur holds the remaining 50% of the shares). Inputs into the company from the side of NMMU include financial support (1-2% of the financing), skilled human resources and infrastructure. The company is still conducting R&D and has plans to expand its operations and its markets in future.

3.4.3 Telkom Centre of Excellence

The Centres of Excellence (CoE) Programme is a partnership between Telkom, the telecommunications industry and the South African government, which establishes scientific and engineering research entities at South African universities and Technikons for the purpose of promoting research in the information and communication technology field and to provide facilities for scientists and engineers to conduct research. The aim of the CoE is to 'deliver high quality manpower, specific research, and prototype software products of interest to the industry partners.' (CoE, 2009)

Each Centre of Excellence consists of one or more units, each specialising in a research area. Currently the NMMU Centre of Excellence has three units:

1. **Distributed Multimedia Applications (DMA) Unit in the Department of Computer Science and Information Systems** - The DMA Unit has two research foci 1) User Interface Applications both intelligent and adaptive and 2) internal architecture. The main partners for this unit include Dimension Data, Telkom and Globaldata Logistix. The unit employs 1 full time administrative staffer and 3 part time employees (2 research assistants and one administrative assistant). The Unit also rents out its facilities and equipment. There are 10 postgraduate students (Master and Doctoral students) within the Unit.
2. **Optical Fibre Research (OFR) Unit in the Department of Physics** - The Fibre Optic Unit researches the physical aspects of communication networks specialising in fibre optics. Industry partners include Aberdare Cables. The unit employs 1 part time Research Assistant.
3. **Photovoltaics (PV) Unit in the Department of Physics** - The Photovoltaics (PV) Unit is supported by TFMC, Telkom, National Research Foundation and THRIP. The PV module research team has interaction with local and international PV companies and research institutes. It conducts both research around development and provides advisory services. This research includes new solar technologies for the telecoms industry, the evaluation of thin film PV technologies and optimization of remote PV systems. The CoE has close links to the Centre for Energy Research (also operated through the Department of Physics) and the majority of the industry partnering is conducted through this unit. Industry partners include WWF, ESKOM, NMBM and local renewable energy companies. The Centre has undertaken R&D work for a number of small enterprises located in the Eastern Cape. The employment directly associated with this unit is one research assistant and one admin assistant. The unit is training 5 Masters and 2 PHD students.

The CoE contributes to the provision of highly trained technical staff for the partner companies. The students also have the opportunity to collaborate, develop or adapt new knowledge for application in a specific context.

3.5 CONCLUSION

Just by virtue of operating in the Eastern Cape Province the NMMU has a significant and sustainable economic impact on the regional economy as summarised in Table 3.10. NMMU contributed R4.5 billion to demand for new products and services in 2008 and almost R847 million to regional GGP. Almost 9,500 employment opportunities are created in the regional economy because of NMMU. This is a significant number when one considers the unemployment rate in the Eastern Cape is one of the highest in the country.

Table 3.10: Total Economic Impact of NMMU, 2008

Indicator	Direct	Indirect	TOTAL
New Business Sales	R1,742,168,000	R2,813,994,000	**R4,556,162,000**
GGP	R390,965,000	R456,509,000	**R847,474,000**
Employment	4,481	4,923	**9,404**

The impact presented above *excludes* any research, innovation and technology transfer initiatives that NMMU is involved with. Although it is not possible to quantify the specific (direct and indirect) economic impact of such activities on the regional economy in term of new business sales, GGP and employment, it is evident that NMMU and its related industry interface structures are having an important economic impact including:

- Training and skills development of industry and NMMU students through the development of appropriate short courses
- Introducing South African companies to international technology that they previously did not have access to at foreign universities
- Providing Masters and Doctoral students with practical industry experience while completing their studies
- Direct job creation through the establishment of Technology Stations (26 direct jobs) and Centres of Excellence (1 full time job).
- Development of new degrees (e.g. BSc (Hons) Formulation Science) that are not available anywhere else in South Africa
- Drafting patents and commercializing research findings – there are currently 5 commercialisation projects that are ongoing through ACTS and InnoVenton DCTS that will result in millions of Rands in investment and the creation of many jobs.
- Two of the commercialisation projects combined have already created 15 full time jobs.
- Making infrastructure and resources available to industry, that they would not otherwise have access to, e.g. Kilo-Lab at InnoVenton DCTS is the only one of its kind at a HEI in the whole of South Africa

NMMU was awarded Most Improved Institution for Technological Innovation in 2008 in the Innovation Fund's National Innovation Competition and it is expected that NMMU can significantly improve the positive economic benefits of its research, innovation and technology transfer initiatives with support from other stakeholders in the provincial innovation system.

Section 4 IMPACT OF RHODES UNIVERSITY

4.1 INTRODUCTION

This section quantifies the economic impact of Rhodes University in terms of 1) capital and operational expenditure of the university as a business entity, 2) student spend by registered students at Rhodes and 3) the research, technology transfer and innovation related initiatives. The conclusion of this section presents the overall economic impact of Rhodes University.

4.2 ECONOMIC IMPACT OF CAPITAL AND OPERATIONAL EXPENDITURE BY RHODES UNIVERSITY

Rhodes University is located in the town of Grahamstown in the Cacadu District and was established in 1904 by an Act of Parliament. Rhodes is the smallest university in the Eastern Cape with a total student population of 6,327 in 2008. The university employed 1,428 permanent employees in 2009, of which 26.4% are research and instructional staff and 40.6% are administrative staff (Rhodes, 2009).

Table 4.1 presents the direct and indirect economic impact created by the R4.7 million and R3.7 million capital investments made by Rhodes in 2007 and 2008 respectively.

Table 4.1: Rhodes University Capital Investment Impacts

Indicator	2006[1]	2007	2008
Direct Impact			
New Business Sales	-	R5,367,000	R4,236,000
GGP	-	R868,000	R685,000
Employment	-	13	10
Indirect Impact			
New Business Sales	-	R12,356,000	R9,752,000
GGP	-	R2,296,000	R1,813,000
Employment	-	25	20
Total Impact			
New Business Sales	-	**R17,723,000**	**R13,988,000**
GGP	-	**R3,164,000**	**R2,498,000**
Employment	-	**38**	**30**

The capital investments that Rhodes University made in terms of new buildings and other facilities (or upgrading of existing facilities) resulted in a total increased demand for goods and services of R18 million in 2007 and R14 million in 2008. The new investments also created a total of 38 and 30 new employment opportunities in 2007 and 2008 respectively. The economic impacts of capital expenditure can fluctuate considerably from one year to the next

[1] 2006 Capital expenditure data unavailable

depending on the size of the capital investment made. Rhodes University has made relatively small capital investments in the last two years.

Table 4.2 presents the direct and indirect impact of the annual operational expenditure of Rhodes University on the regional economy.

Table 4.2: Rhodes University Operational Investment Impacts

Indicator	2006	2007	2008
Direct Impact			
New Business Sales	R492,953,000	R572,466,000	R664,805,000
GGP	R110,625,000	R128,469,000	R149,191,000
Employment	1,268	1,473	1,710
Indirect Impact			
New Business Sales	R796,230,000	R924,662,000	R1,073,810,000
GGP	R129,171,000	R150,006,000	R174,202,000
Employment	1,393	1,618	1,879
Total Impact			
New Business Sales	**R1,289,183,000**	**R1,497,128,000**	**R1,738,615,000**
GGP	**R239,796,000**	**R278,475,000**	**R323,393,000**
Employment	**2,661**	**3,091**	**3,589**

Rhodes University expenditure in 2008 resulted in the direct creation of 1,710 employment opportunities and a further 1,879 indirect/induced employment opportunities in the region. Rhodes directly contributed **R665 million** to additional demand for goods and services in the region because of its operation and contributed **R149 million** to GGP (direct contribution). These are significant ongoing and sustainable impacts, which increase each year in line with inflation.

4.3 Economic Impact of Registered Students at Rhodes University

In 2008 6,327 students registered at Rhodes University. Table 4.3 presents a brief profile of these students.

Table 4.3 Rhodes University Profile of Registered Students, 2008

		% of Students
Field of Study	Science, Engineering & Technology	22%
	Business & Management	15%
	Education	10%
	All Other Humanities & Social Sciences	53%
	Total	**100%**
Major Qualification	Occasional Students	0.6%
	Undergraduate Certificates & Diplomas	5%
	Undergraduate Degrees	74%
	Postgraduate, Below Master's Level	6%
	Postgraduate, Master's Degrees	10%
	Doctoral Degrees	4%
	Total	**100%**

Origin of Students	South Africa	79%
	African Countries	19%
	Overseas	2%
	Total	**100%**

Source: Rhodes, 2009a

Rhodes University is primarily an undergraduate university, with a strong academic focus on the Humanities (especially Journalism and Media Studies and Language and Literature Studies), Information Systems, Business/Management Sciences, Chemistry, Pharmacy, and Environmental and Biological sciences. Much of the student body at Rhodes comes from outside the Eastern Cape because the University is nationally and internationally recognised as a good university. Almost 1 in 5 students at Rhodes come from other African countries.

The University's focus on research is highlighted in the high percentage of students studying towards postgraduate qualifications (20%) of which 4% are Doctoral and 10% Masters Studies. This is compared to only 7% of registered students at NMMU studying towards postgraduate qualifications. The high quality of research emanating from Rhodes University is attributed in part to the high quality of supervision on Masters and Doctoral studies.

The students attending Rhodes create an economic impact on the regional economy through their expenditure on food, rent (those staying in accommodation off-campus), entertainment, clothing, etc. Table 4.4 presented the impact of Rhodes students' spend on the regional economy in 2006, 2007 and 2008.

Table 4.4 Rhodes University Student Expenditure Impacts

Indicator	2006	2007	2008
Direct Impact			
New Business Sales	R152,759,000	R166,819,000	R192,804,000
GGP	R34,281,000	R37,436,000	R43,268,000
Employment	393	429	496
Indirect Impact			
New Business Sales	R246,740,000	R269,450,000	R311,421,000
GGP	R40,028,000	R43,712,000	R50,521,000
Employment	432	471	545
Total Impact			
New Business Sales	**R399,499,000**	**R436,269,000**	**R504,225,000**
GGP	**R74,309,000**	**R81,148,000**	**R93,789,000**
Employment	**825**	**900**	**1,041**

The student expenditure impact is a sustainable impact, which increases slightly from year to year, depending on inflation. In 2008 the 6,327 students created a total demand for new goods and services of over **R504 million**. In total student spend also created an additional 1,041 employment opportunities in the regional economy.

4.4 Research, Innovation Support and Technology Transfer Impacts of Rhodes University

Research at Rhodes University is headed by the Deputy Vice Chancellor of Research and Development who oversees the operation of the Research Office (headed by the Director: Research Office). The Research Office is made up of:

- Research Administration
- Postgraduate Financial Aid

The Research Department at Rhodes is a lean department concentrating on the administration of research funding and the management of research and contracts. A central focus of the Research Office has been to grow the number of women and black researchers, to promote interdisciplinary collaboration and to focus on internationally recognised research as well as research that is specific to national and regional development issues. Research strategies adopted by the university to achieve these goals include:

- increasing the number and quality of its postgraduates and research outputs,
- an increased regional research focus and collaboration while building on international links and activities,
- sourcing increased internal and external funding opportunities
- fostering research in identified niche areas as well as in innovative and entrepreneurial fields (Rhodes, 2009b)

Rhodes University is ranked in the top 3 universities nationally for research output per capita academic staff member. The per capita output has been consistently over 60% higher than the national average (Rhodes, 2008). The output of accredited publications has increased each year, reaching a new high of 264 units in 2008. The institution has also a high approval rate of submissions to the Department of Education for subsidies, 89% of publications submitted to the Department in 2006 were approved (Rhodes, 2008).

Rhodes University receives funding from many different sources to support its research efforts. Table 4.5 provides the breakdown of sources of research funding in 2007.

Table 4.5 Sources of Research Funding, Rhodes (2007)

Source of Research Funding	Value of Funding (Rands)	% of Funding
RSA Government Funding	R 2,347,958	2.1%
Government Research Institutes	R 6,421,404	5.7%
THRIP Grants	R 1,335,000	1.2%
Innovation Fund	R 100,000	0.1%
National Research Foundation (NRF)	R 3,361,835	3.0%
Agency Funding	R 8,545,084	7.6%
Science Council Funding	R 275,440	0.2%
Private Companies	R 10,274,439	9.2%
Other SA HEI's	R 267,254	0.2%
SA Non-profit Organisations	R 1,674,343	1.5%

Donations	R 105,739	0.1%
Foreign Income	R 17,757,149	15.8%
General University Funds	R 59,788,389	53.3%
TOTAL	**R112,254,034**	**100%**

Source: Rhodes, 2009a

It is evident that Rhodes University itself funds over ½ of the research conducted at Rhodes, with a further 16% of funding coming from foreign income. Private companies are the 3rd highest funder of research at Rhodes. Of the funding received in 2007, 48% of the funding went to the Faculty of Science and a further 36% went to the Faculty of Humanities. The majority of Rhodes research is conducted in the Eastern Cape (58%), with smaller percentages being conducted in the Western Cape (14%) and Gauteng (10%).

Table 4.6 quantifies the research outputs originating from Rhodes in 2008.

Table 4.6 Research Outputs, Rhodes (2008)

Type of Research Output	Number
Number of Accredited Publications	Unknown
Number of Conference Proceedings	36
Number of Books	21
Number of Accredited Journal Articles	264
Provisional Patents	Unknown
Research chairs (NRF/DST)	2
Products	-
Businesses Established	-
Commercialisation Income (Rands)	-
Shares in Companies	-

Source: Rhodes, 2009a

The focus of the Research Office at present is to deal with Intellectual Property in terms of its impediment to publishing rather than actively encouraging patenting and the commercialisation of university research. For this reason most of the research outputs at Rhodes are still traditional forms of academic outputs.

The current Rhodes Intellectual Property Policy and staff contracts vests copyright of research conducted by *teaching staff* during their term of employment at the university with the individual staff member unless the terms of their bursary, grant or university support stipulate otherwise. Similarly patent rights are held by staff and students unless they are researchers or the terms of their bursary stipulate otherwise.

This policy has a number of implications, including

- It can provide incentives for staff and students to undertake research and innovate because they can share directly in the benefits of the innovation
- However it also puts the burden of the lengthy and costly process of patenting and commercialisation on the individual. As a result the patents coming out of Rhodes are

generally vested with the business that academics and/or students partner with on a specific project.
- Rhodes University is not directly involved in the creation of companies that spinoff from teaching staff and student research[2].

Staff members also conduct a variety of outside consultancy work for private and public institutions in their own capacity. The University requests that academics apply for authorisation to conduct this work however the value of consultancy work was not available at the time of writing this report.

Rhodes University does not have a Technology Transfer office like NMMU or Technology Stations like NMMU and WSU that interact directly with industry and explore opportunities for commercialisation of research. The university does however have a number of collaborative structures that interact closely with the private sector and act as centres of innovation and technology transfer.

4.4.1 Centre for Entrepreneurship

The Centre for Entrepreneurship at Rhodes University assists individuals to start and manage their own business venture and encourages entrepreneurship. To achieve this goal the centre provides training workshops, consultancy projects, assistance with developing business plans and feasibility studies and assistance with operational areas of business such as finances, marketing and technical plans.

The centre is an accredited agent of the Department of Trade and Industry's referral system BRAIN (Business Referral and Information Network). (COFISA, 2007) The Centre predominantly services the local community of Grahamstown; only a small portion of its work is with students and/or academics wishing to set up their own business because of research emanating from their tenure at Rhodes University. This implies that the potential economic impact of the centre can be felt by the whole community of Grahamstown and is not isolated to staff and students of Rhodes.
The Centre for Entrepreneurship has assisted some academics and students develop business concepts and commercialise their research. Staff at the Centre noted that the cost of patenting is a significant deterrent to individuals seeking to patent products, as stated above many individuals then partner with businesses and the businesses carry the costs of patenting. Examples of businesses and potential businesses that have been developed with support of the Centre for Entrepreneurship include:

- The business concept for Biobalsam® won 2nd prize at the National Innovation Competition in 2008 and is based on the development of a product Biobalsam® developed by Rhodes Ichthyology students. This product was proven to prevent fungal breakouts in Cyprinid (common carp and koi) and Salmonid (salmon and trout) eggs. There is interest in commercialising the product.

[2] The University also does not keep a register of innovation and/or commercialisation activity of its staff or students so it was not possible to quantify precisely the number of businesses that have been created as spin-offs from students

- Makana Meadery is a company that specialises in the production of Honey Meade and is a company established by a former student of Rhodes University. The company has recently branched out into production of bio diesel.
- Another academic developed an organic fertiliser through her research and established a company called Micro-Root in conjunction with University of Pretoria and North West University to produce and market the fertiliser to nurseries.

4.4.2 Telkom Centre of Excellence

The Centres of Excellence (CoE) Programme is a partnership between Telkom, the telecommunications industry and the South African government, which establishes scientific and engineering research entities at South African universities and Technikons for the purpose of promoting research in the information and communication technology field and to provide facilities for scientists and engineers to conduct research. The aim of the CoE programme is to 'deliver high quality manpower, specific research, and prototype software products of interest to the industry partners.' (CoE, 2009)

The Telkom's Centre of Excellence in Distributed Multi-Media at Rhodes was established in 1997 and primarily focuses on projects related to Distributed Multi-Media including:

- Protocols for fixed and mobile networks
- IP telephony
- Audio engineering networks
- Virtual reality
- Distributed agents

The CoE employs one full-time employee (research assistant) and two part-time employees (coordinator and research assistant). The industry partners in the Rhodes CoE include Telkom, Business Connexion, Comverse and Verso Technologies. Clients of the CoE at Rhodes include Telkom and Open Voice, who have experienced the greatest economic benefit from the Rhodes CoE in terms of the acquisition of highly trained professionals in the ICT sector. Other impacts of the Rhodes CoE have included bringing products closer to application then they would have been.

The Rhodes CoE promotes open source development and has not patented any of its advancements. The Rhodes CoE also does not own shares in spin-off companies that have emerged out of research conducted at the CoE although there is a tentative plan to develop a private company for the commercialisation of income from the Rhodes CoE.

The Rhodes CoE has led to 2 former Post Graduate students developing their own companies based on their research in automotive engineering and software development. There are also plans to invest R3.6 million into a software development factory specialising in ICT for development that will be located in Grahamstown. The project is called ESTIMA and is a venture by Rhodes University, the University of Fort Hare and eKhaya ICT. Initially the software factory will be attached to Rhodes University and the intention is to develop a spin-off company in future. Operations will start in 2010 and the proposed staff complement is 3 full time skilled employees and 2 administrative staff members. This is a direct economic

impact as a result of collaboration between Rhodes University and the Centres of Excellence Programme.

The Rhodes CoE is currently implementing the **Siyakhula Living Lab** project in partnership with the Telkom Centre of Excellence at University of Fort Hare and COFISA. The project promotes a multi disciplinary approach to research and innovation in the ICT field, combining the computer science, anthropology and the education departments at the two universities. The project takes ICT infrastructure and products to marginalised communities in the Eastern Cape, provides training to people in the communities, tests the ICT products in the field and then develops new products that are better at addressing the ICT needs of rural communities, based on the practical experience gained in the field. The 2 projects in the Eastern Cape are in the villages of Dwesa and Nkwalini and the Siykhula Living Lab has roughly 200 users.

The Siyakhula Living Lab project's primary economic impact is anticipated to be the availability of ICT infrastructure, products, services and software for communities who previously did not have access to this technology. It is expected that the project will also lead to an improvement in skills levels amongst the rural populations that make use of the centres and may improve their employability. Additional economic impacts will be felt if new products are developed as a result of the project.

4.4.3 Department of Science and Technology/Mintek Nanotechnology Innovation Centre

The DST/Mintek Nanotechnology Innovation Centre (NIC) is a national programme that is geographically spread across the country at 3 research centres located at 1) the University of the Western Cape, 2) University of Johannesburg and 3) Rhodes University in the Eastern Cape. The objectives of NIC are threefold:

1. Development of research platforms
2. Formation of collaborative networks
3. Human capital development in nanotechnology

Ultimately the DST/Mintek NIC aims to stimulate a culture of entrepreneurship and collaboration through research geared at product development and innovation.

The DST/Mintek NIC (Sensors) centre at Rhodes University investigates technologies for cancer treatment and the development of biosensors for disease treatment and water contamination. Specific areas of research include:

- Selected Agrotoxins in food (associated with some cancers);
- Selected Biotoxins (for security applications);
- Neurotransmitters (associated with brain diseases); and,
- Water pollutants from agriculture (e.g. pesticides).

(Source: Rhodes, 2008 and NIC, 2009)

As Sensors at Rhodes University was only recently established it has not been possible to quantify the economic impact of the centre on the regional economy.

4.5 CONCLUSION

Just by virtue of operating in the Eastern Cape Province Rhodes University has a significant and sustainable economic impact on the regional economy as summarised in Table 4.10. Rhodes University contributed just over R2 billion to demand for new products and services in 2008 and approximately R400 million to GGP. Nearly 5,000 employment opportunities are created in the regional economy because of Rhodes University.

Table 4.10: Total Economic Impact of Rhodes University, 2008

Indicator	Direct	Indirect	TOTAL
New Business Sales	R857,609,000	R1,385,231,000	**R2,242,840,000**
GGP	R192,459,000	R224,723,000	**R417,182,000**
Employment	2,206	2,424	**4,630**

The impact presented above *excludes* any research, innovation and technology transfer initiatives that Rhodes is involved with. Although the focus of Rhodes University's research output is primarily on traditional academic outputs such as accredited journal articles and books (and it is recognised for this achievement), there are a number of collaborative initiatives taking place between Rhodes University and industry/government that are acting as interfaces between the university and industry/communities and are having an economic impact.

Although it is not possible to quantify the specific (direct and indirect) economic impact of such activities on the regional economy in term of new business sales, GGP and employment, it is evident that Rhodes and its related interface structures are having an important economic impact including:

- There are at least 4 companies that have been established through the Centres located at Rhodes Universities and 2 other business concepts are in the process of being commercialized.
- The only DST/Mintek Nanotechnology Innovation Centre (NIC) in the Eastern Cape is located at Rhodes University and will result in technology transfer, product development and skills development
- Development of highly skilled researchers and professionals in the ICT and nanotechnology fields
- Provision of infrastructure, products and services and skills development in the field of ICT in two rural communities in the Eastern Cape. Roughly 200 individuals make use of the Siyakhula Living Labs.

Section 5 IMPACT OF UNIVERSITY OF FORT HARE

5.1 INTRODUCTION

This section quantifies the economic impact of the University of Fort Hare in terms of 1) operational expenditure of the university as a business entity, 2) student spend by registered students at Fort Hare and 3) the research, technology transfer and innovation related initiatives. The conclusion of this section presents the overall economic impact of the University of Fort Hare.

5.2 ECONOMIC IMPACT OF OPERATIONAL EXPENDITURE BY THE UNIVERSITY OF FORT HARE

The University of Fort Hare is located in the small town of Alice in the Amathole District Municipality with satellite campuses in East London and Bhisho. It is the 2nd smallest university in the Eastern Cape with a total student population of 9,332 in 2008. The university employed 769 permanent employees in 2007, of which 38% were research and instructional staff and 58% were administrative staff.

The University of Fort Hare came into existence in 1916 and is the oldest historically black university in Southern Africa.[1] The University played a key role in higher education for black Africans throughout the continent from 1916 to 1959. Many Fort Hare alumni played mayor roles in subsequent independence movements and in government positions of newly independent African countries. Following a decision by the Department of Education in January 2004, the University of Fort Hare has incorporated the former Rhodes University East London campus into its portfolio.

Table 5.1 presents the direct and indirect impact of the annual operational expenditure of Fort Hare University on the regional economy from 2006-2008.[1]

Table 5.1 Fort Hare University Operational Investment Impacts

Indicator	2006	2007	2008
Direct Impact			
New Business Sales	R714,674,000	R837,429,000	R981,639,000
GGP	R160,382,000	R187,930,000	R 220,293,000
Employment	1,838	2,154	2,525
Indirect Impact			
New Business Sales	R1,154,359,000	R1,352,636,000	R1,585,569,000
GGP	R187,269,000	R219,435,000	R257,224,000
Employment	2,020	2,367	2,774

[1] At the time of writing this report the capital investment data for Fort Hare was unavailable and therefore could not be included in the analysis.

Total Impact			
New Business Sales	**R1,869,033,000**	**R2,190,065,000**	**R2,567,208,000**
GGP	**R347,651,000**	**R407,365,000**	**R477,517,000**
Employment	**3,858**	**4,521**	**5,299**

The expenditure by the University of Fort Hare in 2008 resulted in the direct creation of 2,525 employment opportunities and a further 2,774 indirect/induced employment opportunities in the regional economy. Additional demand for goods and services in the regional economy amounted to R2.5 billion by Fort Hare as well as contributing R480 million to GGP (direct contribution). These are significant ongoing and sustainable impacts, which increase each year in line with inflation.

5.3 Economic Impact of Registered Students at the University of Fort Hare

The university had 9,332 registered students in 2008 and Table 5.2 presents a brief profile of these students.

Table 5.2 University of Fort Hare Profile of Registered Students, 2008

		% of Students
Field of Study	Science, Engineering & Technology	23%
	Business & Management	7%
	Education	34%
	All Other Humanities & Social Sciences	36%
	Total	**100%**
Major Qualification	Occasional Students	0 %
	Undergraduate Certificates & Diplomas	7%
	Undergraduate Degrees	78%
	Postgraduate, Below Master's Level	6%
	Postgraduate, Master's Degrees	6%
	Doctoral Degrees	2 %
	Total	**100%**
Origin of Students	Eastern Cape	75.5%
	Other provinces of South Africa	8.8%
	African Countries	15.5%
	Overseas	0.2%
	Total	**100%**

Source: UFH, 2009

The University is predominantly an undergraduate or teaching university; with only 8% of the students registered for a Masters or Doctoral degree. The University's academic focus includes African and Democracy Studies; Education; Agriculture and Environment; Science and Technology; Management and Development and Industry and Commerce.

The student body is primarily made up of students that originate from the Eastern Cape, although there is also a large contingent of students from other African countries (16%). This is not surprising considering the university's historical role in the African continent.

The students attending Fort Hare create an economic impact on the regional economy through their expenditure on food, rent (those staying in accommodation off-campus), entertainment, clothing, etc. Table 5.3 presents the impact of Fort Hare students' spend on the regional economy in 2006, 2007 and 2008.

Table 5.3 Fort Hare University Student Expenditure Impacts

Indicator	2006	2007	2008
Direct Impact			
New Business Sales	R131,907,000	R147,162,000	R173,670,000
GGP	R29,602,000	R33,025,000	R38,974,000
Employment	339	379	447
Indirect Impact			
New Business Sales	R213,060,000	R237,699,000	R280,516,000
GGP	R34,564,000	R38,562,000	R45,507,000
Employment	373	416	491
Total Impact			
New Business Sales	**R344,967,000**	**R384,861,000**	**R454,186,000**
GGP	**R64,166,000**	**R71,587,000**	**R84,481,000**
Employment	**712**	**795**	**938**

The student expenditure impact is a sustainable impact, which increases slightly from year to year in line with inflation. In 2008 the 9,332 students created a total demand for new goods and services of just over **R450 million**. In total student spend also created an additional 938 employment opportunities in the regional economy.

It is interesting to note that although the University of Fort Hare has 3,000 students more than Rhodes University, the economic impact of the Fort Hare students is less than those of Rhodes. This is because of the demographic profile of students attending the two universities; on average University of Fort Hare students have less income to spend than Rhodes students.

5.4 Research, Innovation Support and Technology Transfer Impacts of the University of Fort Hare

The University of Fort Hare research function is administered through two entities; the Govan Mbeki Research and Development Centre (GMRDC) on the Alice campus and the Projects Office on the East London campus.

The GMRDC was founded in honour of Govan Mbeki and was traditionally a research and resource centre. It now incorporates the office of the Dean of Research. The Centre services staff on research and R&D related matters across the Fort Hare campuses and administers the University's NRF research budget. It is tasked with building research capacity among staff and post graduate students and works in collaboration with donors and national/international research bodies. The Centre also oversees the University's research and ethical policies.

The Projects Office administers research projects across the University of Fort Hare campuses and all of the outside funding that the university receives.

The GMRDC and Projects Office do not have the capacity to administer intellectual property; staff and researchers who approach the research office for assistance are directed to patent attorneys. The University does not have an Intellectual Property Policy and there is a need to review employment contracts around the issue of intellectual property.

The research strategy of the University of Fort Hare recognises the need for research to address local, regional and national needs. It seeks ways to engage in a critical dialogue with partners to build research in areas which complement the university's historical niche as an African university while ensuring internationally recognised excellence. The research niche areas for the University of Fort Hare include:

1. Unlocking the Potential of Indigenous Plants for Sustainable Livelihoods
2. Culture, Heritage and Social Transformation
3. Sustainable Agricultural and Land Use Strategies
4. Water Resources for Sustainable Development

At the time of writing this report there was limited information available about the sources and value of research funding at the University of Fort Hare. In 2008 the University received R3,315,000 in funding through GMRDC; this funding was directed at the social sciences and humanities department. The University of Fort Hare had 10 NRF rated researchers in 2008; the majority of which are in the Agriculture and Sciences Faculty.

Table 5.4 quantifies the research outputs originating from the University of Fort Hare in 2008.

Table 5.4 Research Outputs, University of Fort Hare (2008)

Type of Research Output	Number
Number of Accredited Publications	-
Units of Conference Proceedings & Books	8
Number of Accredited Journal Articles	87
Provisional Patents	-
Research Chairs	2[2]
Products	-
Businesses Established	3
Commercialisation Income (Rands)*	-
Shares in Companies	3

** This information was outstanding at the time of writing the report. Source: UFH, 2009*

The University of Fort Hare has a number of internal research entities that conduct research and contribute towards innovation activities and technology transfer. The University of Fort Hare does not have a Technology Transfer Office (TTO) like NMMU. It is expected that the University of Fort Hare will make use of the NMMU TTO in the short to medium term. The primary vehicle for the commercialisation of university research, assets and outputs at the University of Fort Hare is an external interface structure called Fort Hare Solutions.

[2] In the field of Social Science and Science.

5.4.1 Fort Hare Solutions

Fort Hare Solutions is a Pty Ltd company set up for the purpose of commercialising university research, outputs and assets. The University of Fort Hare owns 100% of the shares in the company. The company is still trying to establish itself as a viable, operational entity and also determine the role that it will play in innovation. To date two subsidiary companies have been established through Fort Hare Solutions. Both are wholly owned by Fort Hare Solutions.

Fort Hare Blue	Fort Hare Multi-Media
Fort Hare Blue Pty Ltd was established in February 2009 and is responsible for the commercialisation of the University's sports talent and venues. The company has been established and has an acting CEO (no additional employees); however it is waiting to signing a service level agreement with UFH to give it authority to act on behalf of the university and so is not operational yet. Once the company begins operating it will be tasked with administering sports sponsorships, fund raising, talent management, marketing and venue management. The company reports to 2 Board of Directors: Fort Hare Blue Board of Directors and the Fort Hare Solutions Board of Directors.	Fort Hare Multi-Media Pty Ltd specialises in advertising for television and radio, sound recording, advertising and marketing. The firm employs 4 people in highly skilled occupations. The company is still in its infancy as it was established in 2008. The company's main client is the Provincial Department of Sports, Arts and Recreation. There are plans to expand the business to include music lessons through the University of Fort Hare, conference facilities and a jazz club.

5.4.2 Telkom Centre of Excellence

The Centres of Excellence (CoE) Programme is a partnership between Telkom, the telecommunications industry and the South African government, which establishes scientific and engineering research entities at South African universities and Technikons for the purpose of promoting research in the information and communication technology field and to provide facilities for scientists and engineers to conduct research. The aim of the CoE programme is to 'deliver high quality manpower, specific research, and prototype software products of interest to the industry partners.' (CoE, 2009)

The Telkom Centre of Excellence in Developmental E-Commerce and E-Learning started in 1998 as a unit of the Telkom Centre of Excellence in Distributed Multimedia at **Rhodes University**. In 2002 the University of Fort Hare's Centre of Excellence became an independent centre run by the University of Fort Hare. The university currently has one part-time employee (research director), who derives assistance from academics, who do not form part of the centre in terms of salary earners. The industry partners in the Fort Hare CoE include Telkom, Grintek, Telecoms and Tellabs. It is operated through the university's Department of Computer Science, employs 3 people and primarily focuses on the following types of projects:

- Technical skills around databases, web-based front ends, storage technologies and network (both fixed and wireless) delivery

- Next generation electronic commerce.

The Fort Hare CoE is currently implementing the **Siyakhula Living Lab** project in partnership with the Telkom Centre of Excellence at Rhodes University and COFISA. Refer to Section 4 of this report for an overview of the Siyakhula Living Lab project. The Siyakhula Living Lab project's primary economic impact is anticipated to be the availability of ICT infrastructure, products, services and software for communities who previously did not have access to this technology. It is expected that the project will also lead to an improvement in skills levels amongst the rural populations that make use of the centres and may improve their employability. Additional economic impacts will be felt if new products are developed as a result of the project.

5.5 CONCLUSION

Just by virtue of operating in the Eastern Cape Province the University of Fort Hare has a significant and sustainable economic impact on the regional economy as summarised in Table 5.5. The University of Fort Hare contributed just over R3 billion to demand for new products and services in 2008 and approximately R562 million to GGP. Almost 6,300 employment opportunities are created in the regional economy because of the University of Fort Hare.

Table 5.5: Total Economic Impact of the University of Fort Hare, 2008

Indicator	Direct	Indirect	TOTAL
New Business Sales	R1,155,309,000	R1,866,085,000	**R3,021,394,000**
GGP	R259,267,000	R302,731,000	**R561,998,000**
Employment	2,972	3,265	**6,237**

The impact presented above *excludes* any research, innovation and technology transfer initiatives that University of Fort Hare is involved with. The two main vehicles through which the University of Fort Hare is involved in innovation and technology transfer is through the specific company established to commercialise research, outputs and assets (Fort Hare Solutions) and through the collaborative initiatives being carried out through the Telkom Centre of Excellence.

Although it is not possible to quantify the specific (direct and indirect) economic impact of these activities on the regional economy in term of new business sales, GGP and employment, the University of Fort Hare and its interface structures are having an economic impact on the Province:

- Direct job creation through the establishment of Fort Hare Solutions and its 2 subsidiary companies (6 direct jobs).
- Direct job creation through the Telkom Centre of Excellence (3 direct jobs).
- 2 research chairs are being funded by NRF/DST
- Development of highly skilled researchers and professionals in the ICT field
- Provision of infrastructure, products and services and skills development in the field of ICT in two rural communities in the Eastern Cape. Roughly 200 individuals make use of the Siyakhula Living Labs.

It is important to note that the linkages between the University of Fort Hare and the town of Alice are weak and as a result the university is not having a significant economic impact on the town of Alice. (As opposed to the significant impact that Rhodes University is having on Grahamstown). Most of the economic impact presented in this chapter will likely be felt in the Eastern Cape, but further a field in East London, King Williams Town or Nelson Mandela Bay.

Section 6 IMPACT OF WALTER SISULU UNIVERSITY

6.1 INTRODUCTION

This section quantifies the economic impact of Walter Sisulu University in terms of 1) operational expenditure of the university as a business entity, 2) student spend by registered students at Walter Sisulu University (WSU) and 3) the research, technology transfer and innovation related initiatives. The conclusion of this section presents the overall economic impact of WSU.

It must be noted that very limited information was received from WSU at the time this report was written and so assumptions have been made (based on industry standards) to determine the operational and student spent impact of the university. The information contained in this section is based on secondary research and is the best information that was available at the time.

6.2 ECONOMIC IMPACT OF OPERATIONAL EXPENDITURE BY WALTER SISULU UNIVERSITY

Walter Sisulu University was formed in July 2005 with the merging of Border Technikon, Eastern Cape Technikon and University of Transkei and has campuses in Mthatha, Butterworth, East London and Queenstown. The university is the largest university in the province and had 24,497 registered students in 2007. The permanent staff totalled 1,262 in 2007 of which 41% were research and instructional staff and 50% were administrative staff.

Table 6.1 presents the direct and indirect impact of the annual operational expenditure of WSU on the regional economy from 2006-2008.[1]

Table 6.1 Walter Sisulu University Operational Investment Impacts

Indicator	2006	2007	2008
Direct Impact			
New Business Sales	R1,017,224,000	R1,123,771,000	R1,271,137,000
GGP	R228,278,000	R252,189,000	R285,260,000
Employment	2,617	2,891	3,270
Indirect Impact			
New Business Sales	R1,643,046,000	R1,815,143,000	R2,053,172,000
GGP	R266,548,000	R294,467,000	R333,082,000
Employment	2,875	3,176	3,593
Total Impact			
New Business Sales	**R2,660,270,000**	**R2,938,914,000**	**R3,324,309,000**
GGP	**R494,826,000**	**R546,656,000**	**R618,342,000**
Employment	**5,492**	**6,067**	**6,863**

[1] At the time of writing this report the capital investment data for WSU was unavailable and therefore could not be included in the analysis.

The expenditure by Walter Sisulu University in 2008 resulted in the direct creation of nearly 3,300 employment opportunities and a further 3,593 indirect/induced employment opportunities in the regional economy. WSU contributed over **R3.3 billion** to additional demand for goods and services in the regional economy because of its operation and contributed **R618 million** to GGP (total impact). These are significant ongoing and sustainable impacts, which increase each year in line with inflation.

6.3 Economic Impact of Registered Students at Walter Sisulu University

The university had 24,497 registered students in 2007 and Table 6.2 presents a brief profile of these students.

Table 6.2 Walter Sisulu University Profile of Registered Students, 2007

		% of Students
Field of Study	Science, Engineering & Technology	26%
	Business & Management	30%
	Education	19%
	All Other Humanities & Social Sciences	23%
	Total	**100%**
Major Qualification	Occasional Students	2%
	Undergraduate Certificates & Diplomas	63%
	Undergraduate Degrees	31%
	Postgraduate, Below Master's Level	2%
	Postgraduate, Master's Degrees	1.5%
	Doctoral Degrees	0.5%
	Total	**100%**

Source: DoE, 2009

The University is predominantly an undergraduate or teaching university; with only 2% of the students registered for a Masters or Doctoral degree. Over 60% of students are studying towards an Undergraduate Certificate or Diploma which is significantly more than one would find at the other three universities in the Province. The university's academic focus includes Education, Science and Technology and Rural Development. At the time of writing this report there was no information available about the origin of students at WSU, but it is likely that the majority will be from the Eastern Cape Province.

The students attending WSU create an economic impact on the regional economy through their expenditure on food, rent (those staying in accommodation off-campus), entertainment, clothing, etc. Table 6.3 presents the impact of WSU students' spend on the regional economy in 2006, 2007 and 2008

Table 6.3 Walter Sisulu Student Expenditure Impacts

Indicator	2006	2007	2008
Direct Impact			
New Business Sales	R355,857,000	R399,121,000	R465,601,000
GGP	R79,859,000	R89,568,000	R104,487,000
Employment	915	1,027	1,198

Indirect Impact			
New Business Sales	R574,789,000	R644,671,000	R752,051,000
GGP	R93,247,000	R104,584,000	R122,004,000
Employment	1,006	1,128	1,316
Total Impact			
New Business Sales	**R930,646,000**	**R1,043,792,000**	**R1,217,652,000**
GGP	**R173,106,000**	**R194,152,000**	**R226,491,000**
Employment	**1,921**	**2,155**	**2,514**

The student expenditure impact is a sustainable impact, which increases slightly from year to year in line with inflation. In 2008 the +/-24,500 students at WSU created a total demand for new goods and services of just over **R1.2 billion**. The expenditure of students attending WSU also contributed R227 million to GGP and created 2,514 employment opportunities in the regional economy in 2008.

It is interesting to note that although Walter Sisulu University has almost 2,000 students more than NMMU, the economic impact of the WSU students is less than those of NMMU. This is because of the demographic profile of students attending the two universities; on average WSU students have less income to spend than NMMU students.

6.4 Research, Innovation Support and Technology Transfer Impacts of Walter Sisulu University

The Walter Sisulu University research function is administered through the Directorate for Research Development. In addition to this Directorate, WSU has one internal interface structure that links together industry and WSU namely the Institute for Advanced Tooling (IAT), which also acts as a Technology Transfer Office for WSU.

6.4.1 The Institute for Advanced Tooling (IAT)

The Institute for Advanced Tooling (IAT) was established in 2006 as a part of the Technology Station Programme funded by the Tshumisano Trust at the Department of Science and Technology. The IAT was established with the purpose to serve the tooling industry and support emerging SME's in the Tool and Die Making (TDM) Industry to be internationally competitive through technology transfer, innovation and applied research and development.

The internship programme at IAT-WSU assisted and trained eight interns in tooling design and project management in 2008. After their internship at the IAT-WSU they all secured employment in industry. Training of WSU staff also took place, where three AutoCAD training courses were provided in 2008 for the Mechanical and Civil Engineering Departments. (Tshumisano Trust Annual Report, 2009)

The following tooling/products were designed by IAT-WSU in 2008:

1. Degamo cylinder tool
2. Baby bottle concept tooling
3. Chess set tooling
4. Design of a new plastic curtain rail bracket

5. Heat plug prototype tool
6. Design for hawker stands
7. Bumper punching tool

(Tshumisano Trust Annual Report, 2009)

The IAT-WSU provided tool design (CAD/CAM and FEA) services to the following stakeholder's tool rooms: Supreme Mouldings, Prism Products, Red 7, FirstPro Engineering, Intelligent Fluid Solutions, M.N.M Injection Moulding and the Buffalo City Municipality. (Tshumisano Trust Annual Report, 2009)

The Red 7 surf ski footplate that IAT-WSU assisted with was sold nationally and internationally and a baby bottle product that the IAT-WSU was involved with will be marketed worldwide by the client. This provides an indication of the benefits of IAT-WSU to some of its clients.

Table 6.4 presents the total expenditure of the IAT-WSU for the financial year ending 2009.

Table 6.4 IAT Expenditure for 2008/09

Major Projects	Major Equipment	Operational Costs	Total Expenditure
R291,298	R0	R2,255,177	R2,601,733

Source: Tshumisano Trust Annual Report, 2009

6.4.2 East London IDZ Science and Technology Park

Supported by studies commissioned by COFISA, Walter Sisulu University is working in collaboration with NMMU, the University of Fort Hare, Rhodes University and the East London Industrial Development Zone (ELIDZ) to establish a Science and Technology Park (STP) in the ELIDZ. WSU is leading on the project on the part of the universities by planning to establish an Engineering Faculty at the STP. It is understood that the STP would be the main vehicle for collaboration with industry for WSU.

Key market sectors that have been investigated for inclusion in the STP are:

- ICT – STP to provide incubation and rural linkages
- Aqua-culture
- Bio-technology
- Manufacturing R&D
- Pharmaceuticals
- Agro-processing
- Social innovation for service delivery
- ICT/ laboratory facilities

The ELIDZ STP is still in the pre-establishment phase as the partnership must still develop a business plan, identify a suitable site, establish a company to take forward the concept and begin with construction and implementation. (ELIDZ, 2009)

6.5 CONCLUSION

Just by virtue of operating in the Eastern Cape Province Walter Sisulu University has a significant and sustainable economic impact on the regional economy as summarised in Table 6.5. WSU contributed R4.5 billion to demand for new products and services in 2008 and almost R845 million to regional GGP. Almost 9,400 employment opportunities are created in the regional economy because of WSU. This is a substantial especially when one considers that the unemployment rate in the Eastern Cape is one of the highest in the country.

Table 6.5 Total Economic Impact of WSU, 2008

Indicator	Direct	Indirect	TOTAL
New Business Sales	R1,736,738,000	R2,805,223,000	**R4,541,961,000**
GGP	R389,747,000	R455,086,000	**R844,833,000**
Employment	4,468	4,909	**9,377**

The impact presented above *excludes* any research, innovation and technology transfer initiatives that Walter Sisulu University is involved with. The main vehicle through which Walter Sisulu University is involved in innovation and technology transfer is through the Institute for Advanced Tooling (IAT), which is benefiting the regional economy.

Although it is not possible to quantify the specific (direct and indirect) economic impact of these activities on the regional economy in term of new business sales, GGP and employment, Walter Sisulu and its interface structure is having an economic impact on the Province. According to IAT-WSU the primary benefit to the regional economy from the IAT has occurred as a result of tooling design, development and the provision of support as well as additional funding available through the IAT-WSU for tooling-related work. IAT-WSU estimates that employment amongst its clients has not decreased, but has been sustained (and in some cases possibly increased) as a result increases in product sales both nationally and internationally. (Tshumisano Trust Annual Report, 2009)

Section 7 CONCLUSION

7.1 Economic Impact of HEI's in The Eastern Cape Province

This section quantifies the overall sustainable economic impact of the four HEIs located in the Eastern Cape Province in 2008 based on the operational spend of the universities combined with the spend of registered students at each university.

Table 7.1 presents the economic impact per university as well as the total combined economic impact on the regional economy in 2008.

Table 7.1 Economic Impact of EIAs on the Regional Economy, 2008

Indicator	Direct	Indirect	TOTAL
Nelson Mandela Metropolitan University			
New Business Sales	R 1,742,168,000	R 2,813,994,000	R 4,556,162,000
GGP	R 390,965,000	R 456,509,000	R 847,474,000
Employment	4,481	4,923	9,404
Rhodes University			
New Business Sales	R 857,609,000	R 1,385,231,000	R 2,242,840,000
GGP	R 192,459,000	R 224,723,000	R 417,182,000
Employment	2,206	2,424	4,630
University of Fort Hare			
New Business Sales	R 1,155,309,000	R 1,866,085,000	R 3,021,394,000
GGP	R 259,267,000	R 302,731,000	R 561,998,000
Employment	2,972	3,265	6,237
Walter Sisulu University			
New Business Sales	R 1,736,738,000.00	R 2,805,223,000.00	R 4,541,961,000.00
GGP	R 389,747,000.00	R 455,086,000.00	R 844,833,000.00
Employment	4,468	4,909	9,377
Total Economic Impact			
New Business Sales	**R 5,491,824,000**	**R 8,870,533,000**	**R 14,362,357,000**
GGP	**R 1,232,438,000**	**R 1,439,049,000**	**R 2,671,487,000**
Employment	**14,127**	**15,521**	**29,648**

It should be noted that the impact presented in the table above is a sustainable impact, which will increase slightly from year to year in line with inflation, as long as the HEIs are operational and student numbers do not decrease significantly.

In 2008, the HEIs in the Province contributed almost R5.5 billion directly to new demand for goods and services and R1.2 billion to GGP in the regional economy. Just over 14,000 jobs in the regional economy can be attributed to the operation of the 4 HEIs in the Province. These are significant impacts and illustrate that the universities in the Province are important economic role-players and stakeholders.

7.2 Research, Innovation Support and Technology Transfer at HEIs in the Eastern Cape Province

Each of the four universities in the Province contributes to research, innovation and technology transfer in their own way. Their approach is generally shaped by their historical development, location in the province, academic focus and impact of the merger process which was completed in the mid-2000s. No matter what their approach to research, innovation and technology transfer, it is evident that these initiatives are having an economic impact on the Province and are contributing to skills and knowledge development, often in high-tech industries.

The following table illustrates the systems through universities have structured their research, innovation and technology transfer efforts.

Table 7.1 Research, Innovation and Technology Transfer Systems

University	Internal/External Structures
NMMU	1. Department of Innovation Support & Technology Transfer – Technology Transfer Office 2. Telkom Centre of Excellence 3. Automotive Components Technology Station 4. InnoVenton & Downstream Chemicals Technology Station 5. NMMU Innovations (external) 6. Afrepell Technologies (external) 7. African Floralush (external)
Rhodes University	1. Centre for Entrepreneurship 2. Telkom Centre of Excellence 3. DST/Mintek Nanotechnology Innovation Centre
University of Fort Hare	1. Govan Mbeki Research and Development Centre 2. Projects Office 3. Telkom Centre of Excellence 4. Fort Hare Solutions (external) 5. Fort Hare Blue Pty Ltd (external) 6. Fort Hare Multi-Media Pty Ltd (external)
WSU	1. Institute for Advanced Tooling

The internal interface structures that are most effective in promoting industry-university linkages are *collaborative initiatives* between government, the universities and the private sector (e.g. Technology Stations, Centres of Excellence, Innovation Centres). This illustrates the important role that each of these stakeholder groups plays in the provincial innovation system.

Some of the economic impacts that have been created directly through the establishment of the above structures, and which could be quantified, are summarised in Table 7.2.

Table 7.2 Economic Impact of Research, Innovation and Technology Transfer at HEIs

Indicator		Performance
Job Creation	Technology Stations & IAT	27
	Telkom Centres of Excellence	4
	Spin-off Companies	21
	TOTAL	**52**
Research Chairs	DST/NRF Funded	4
Number of Spin-Off Companies		9
Number of Spin-Off Companies where HEIs own Shares		5
SMEs Assisted (2008)		+150
Number of Industry/Students Trained (2008)		204
Interns Involved (2008)	Technology Stations	245
	IAT	8
	TOTAL	**253**

In addition to the above, HEIs through their collaboration with industry in the Province have achieved the following:

- Introducing South African companies to international technology that they previously did not have access to at foreign universities
- Development of new degrees that are not available anywhere else in South Africa
- Making infrastructure and resources available to industry, that they would not otherwise have access to, e.g. Kilo-Lab at InnoVenton DCTS is the only one of its kind at a HEI in the whole of South Africa
- Development of highly skilled researchers and professionals in the engineering, chemicals, ICT and nanotechnology fields
- Initiatives in rural communities that make new technology available to many people
- Development of networks and partnerships with other universities, both nationally and internationally which promotes knowledge transfer

While is has been proven very difficult to quantify the economic impact that HEIs have had on the businesses that they partner with on projects, through anecdotal evidence the universities are having a significant impact on these businesses by improving their productivity, expanding their export markets, developing new products and processes and retaining employment.

7.3 CONCLUSION

Universities have been proven to have a significant economic impact on the Eastern Cape Province and are important economic role-players that should be engaged with actively. HEIs are making significant contributions to research; innovation and technology transfer in the province, primarily through collaborative initiatives with government (and business). HEIs are important role players in the Innovation System; however this project has also illustrated that HEIs could become much more involved in promoting research; innovation and technology transfer in the province with the support of other role-players in the Innovation System, most notably government.

Section 8 REFERENCES

Barnett, J, L.., Lee, D and Wait, C, 2007. COFISA, 2007. **Provincial Baseline Study in the Eastern Cape Province 2007.**

Centre of Excellence Fort Hare University, 2009. Centre of Excellence in Developmental E-Commerce and E-Learning. Available [Online] http://cs.ufh.ac.za/coe/

Centre of Excellence Rhodes University, 2009. Centre of Excellence in Distributed Multi-Media. Available [Online] http://coe.ru.ac.za/about/#Rhodes

CSIR, 2009. Interview with Anton Botha, CSIR on 09/09/09.

Department of Education, 2007. Available [online] http://www.education.gov.za/emis/emisweb/07stats/Education%20Statistics%20in%2 0South%20Africa%202007.pdf

Department of Education, 2009. Available [online] http://www.education.gov.za/emis/emisweb/07stats/Education%20Statistics%20in%2 0South%20Africa%202007.pdf

East London IDZ, 2009. Presentation by Thando Gwinsta at Innovation Systems: Unlocking Potential Workshop. East London IDZ Science and Technology Park. February 2009. Available [Online] http://sakaza.com/cofisaworkshop/images/stories/present/COFISA%20Presentation%2028%20January%2009-07%20version.ppt#256,2,Innovation Systems; Unlocking Potential Workshop -28th & 29th January 2009

European Network of Living Labs, 2009. Open Living Labs: What is a Living Lab? Available [Online] http://www.openlivinglabs.eu/

Govan Mbeki Research and Development Centre. **Quarterly Report**, December, 2008

InnoVenton DSTS Annual Reports, 2006, 2007 & 2008

Lawson,J., Minnie,G and Hattingh, D. 2009. **ACTS RALIS Final Report, 2009**. Findings of the Rapid Appraisal of the Nelson Mandela Bay Automotive Sector Innovation System.

Living Labs Institute of South Africa (LLiSA), Homepage of LLiSA. Available [Online] http://llisa.meraka.org.za/index.php/Living_Labs_in_Southern_Africa

Nanotechnology Innovation Centre, 2009. DST/Mintek Nanotechnology Innovation Centre. Available [Online] http://www.nic.ac.za/general_aboutNic.html#

Nanotechnology Innovation Centre, 2009. Available [Online] http://www.nic.ac.za/general_aboutNic.html

National Research Foundation, 2009. Available [Online] http://evaluation.nrf.ac.za/Content/Facts/display_all.asp

Nelson Mandela Metropolitan University, 2009. Available [Online] http://www.nmmu.ac.za/default.asp?id=164&bhcp=1

NMMU, 2009. Statistics provided by NMMU

NMMU, 2008. NMMU Self Evaluation Report

NRF, 2009. Facts and Figures. Available [Online] http://evaluation.nrf.ac.za/Content/Facts/display_all.asp

Rhodes University, 2007. Rhodes University Research Report 2006. Available [Online] www.rhodes.ru.ac.za

Rhodes University, 2008. Rhodes University Research Report 2007. Available [Online] www.Rhodes.ru.ac.za

Rhodes University, 2009. Available [Online] http://www.ru.ac.za/home/introducingrhodes/historyofrhodes

Rhodes University, 2009a. Information from Rhodes University Research Office

Rhodes University 2009b. Research: Philosophy. Available [Online] http://www.ru.ac.za/research/research/philosophy

Siyakhula Living Lab, 2009. Website of Siyakhula Living Labs. Available [Online] http://www.dwesa.org/

Tshumisano Trust, 2009. Tshumisano Trust Annual Report 2008/09

Institute for Advance Tooling, 2009. About the WSU Institute for Advanced Tooling. Available [Online] http://www.iat.co.za/index.html

Tshumisano Trust, 2009. Tshumisano Trust Annual Report 2008/09. Secondary Manufacturing Cluster: ACTS. 2009

University of Fort Hare, 2009. Statistics supplied by UFH.

University of Fort Hare, 2009. Available [Online] http://www.ufh.ac.za/history.html

Wikipedia, 2009. Available [Online] http://en.wikipedia.org/wiki/University_of_Fort_Hare

Walter Sisulu University, 2009. Available [Online] http://www.wsu.ac.za/aboutus/visionmission.htm

Annexure A HEI PROFILES

4.1 INTRODUCTION

This section provides an overview of the four Higher Education Institutions (HEIs) located in the Eastern Cape. Each of the four universities in the province is profiled according to set indicators which are critical determinants of their innovation and development related functions.

4.2. UNIVERSITY OF FORT HARE

Location of Main Branch	Alice
Satellite Branches (if applicable)	Bhisho & East London
Brief History of University	Fort Hare came into existence in 1916 and is the oldest historically black university in Southern Africa.[1] The University was a key institution in higher education for black Africans from 1916 to 1959. Fort Hare alumni were part of many subsequent independence movements and governments of newly independent African countries. Following a decision by the Department of Education, the university has, since January 2004, been incorporating and integrating a new campus in the city of East London, formerly of Rhodes University, into the UFH.[2]
Strategic Vision of University	*The University of Fort Hare is a vibrant, equitable and sustainable African University, committed to teaching and research excellence at the service of its students, scholars and wider community.* Some relevant themes related to the new vision include: 1. The affirmation of the universities **historical role** as the training ground for leaders is important 2. The university seeks to **broaden its historical mission** to include politics, industry, commerce, agriculture and moral leadership; 3. Fort Hare is committed to excellence in providing high quality teaching and **research** at the service of students, scholars and the public; 4. The university plans to take advantage of its predominantly rural location to focus on programmes responding to **local and regional development needs**

Academic Focus

1. African and Democracy Studies
2. Agriculture and Environment
3. Science and Technology
4. Management and Development
5. Industry and Commerce[3]

Faculties

1. Education
2. Law
3. Management and Commerce
4. Science and Agriculture
5. Social Sciences and Humanities

Total Registered and Graduated Students[i]

	2006	2007	2008	2009
Total Number of Registered Students	8540	8864	9341	10019
Total Number of Graduates	1906	1575	1616	-

Registered Students by Faculty for 2006 and 2007[i]

Field of Study	2006		2007	
	Student No's	% of Registered	Student No's	%of Registered
Science, Engineering & Technology	1548	18.13	1977	22.30
Business & Management	2179	25.52	826	9.32
Education	1999	23.41	2861	32.28
Humanities & Social Sciences	2814	32.95	3200	36.10
Total	**8540**	**100**	**8864**	**100**

Registered Students by Faculty for 2008 and 2009[i]

Field of Study	2008		2009	
	Student No's	% of Registered	Student No's	%of Registered
Science, Engineering & Technology	2189	23.43	2371	23.67
Business & Management	677	7.25	788	7.87
Education	3130	33.51	3261	32.55
Humanities & Social Sciences	3345	35.81	3599	35.92
Total	**9341**	**100**	**10019**	**100**

Graduated Students by Faculty for 2006 and 2007[i]

Field of Study	2006		2007	
	Student No's	% of Graduated	Student No's	%of Graduated
Science, Engineering & Technology	224	12%	300	20%
Business & Management	881	46%	382	24%
Education	331	17%	415	26%
Humanities & Social Sciences	470	25%	478	30%
Total	**1906**	**100**	**1575**	**100**

Graduated Students by Faculty for 2008[i]

Faculty	Student No's	% of Graduated
Science, Engineering & Technology	331	20%
Education	172	11%
Business and Management	542	34%
Humanities & Social Sciences	571	35%
Total	**1616**	**100%**

Registered Students by Major Qualification for 2006 and 2007[i]

Qualification	2006		2007	
	Student No's	% of Registered	Student No's	%of Registered
Occasional Students	8	0.01%	22	0,2%
Undergraduate Certificates & Diplomas	693	8.17%	466	5,2%
Undergraduate Degrees	6729	78.48%	7 084	80,0%
Postgraduate, Below Master's Level	615	7.17%	577	6,5%
Postgraduate, Master's Degrees	432	5.04%	553	6,0%
Doctoral Degrees	97	1.13%	155	1,8%
Total	**8,574**	**100**	**8,857**	**100**

Registered Students by Major Qualification for 2008 and 2009[i]

Qualification	2008		2009	
	Student No's	% of Registered	Student No's	%of Registered
Occasional Students	18	0 %	30	0.01%
Undergraduate Certificates & Diplomas	637	7%	611	6.05%
Undergraduate Degrees	7291	78%	7937	78.59%
Postgraduate, Below Master's Level	596	6%	691	6.84%
Postgraduate, Master's Degrees	573	6%	601	5.95%
Doctoral Degrees	217	2 %	229	2.56%
Total	**9332**	**100**	**10099**	**100**

Graduated Students by Major Qualification for 2006 and 2007[i]

Qualification	2006		2007	
	Grad No's	% of Graduated	Grad No's	%of Graduated
Occasional Students	-	-	-	-
Undergraduate Certificates & Diplomas	423	21%	13	0.8%
Undergraduate Degrees	1171	59%	1170	72%
Postgraduate, Below Master's Level	344	17%	325	20%
Postgraduate, Master's Degrees	52	2.5%	107	6.5%
Doctoral Degrees	9	0.5	11	0.7%
Total	**1999**	**100**	**1626**	**100**

Graduated Students by Major Qualification for 2008[i]

Qualification	Student No's	% of Graduated
Occasional Students	-	-
Undergraduate Certificates & Diplomas	82	5%
Undergraduate Degrees	1090	67%
Postgraduate, Below Master's Level	345	21.3%
Postgraduate, Master's Degrees	98	6%
Doctoral Degrees	11	0.7%
Total	**1626**	**100**

Origins of Students for 2006 and 2007[i]

Origin	2006		2007	
Year	No of Students	%of Students	No of Students	%of Students
Eastern Cape	6519	75.97	6734	75.85
Other RSA Provinces	900	10.53	831	9.36
African Countries	1145	13.38	1307	14.72
Overseas	10	0.12	6	0.07
Total	**8574**	**100**	**8878**	**100**

Origins of Students for 2008 and 2009[i]

Origin	2008		2009	
Year	No of Students	%of Students	No of Students	%of Students
Eastern Cape	7050	75.55	7631	75.36
Other RSA Provinces	820	8.79	938	9.26
African Countries	1447	15.51	1517	14.98
Overseas	15	0.16	13	0.13
Total	**9332**	**100**	**10099**	**100**

<table>
<tr><td>Permanent staff by category from 2006 to 2007[i]</td><td>
<table>
<tr><th>Category</th><th colspan="2">2006</th><th colspan="2">2007[6]</th></tr>
<tr><th>Year</th><th>No of Staff</th><th>%of Staff</th><th>No of Staff</th><th>%of Staff</th></tr>
<tr><td>Instruction & Research Staff</td><td>-</td><td>-</td><td>292</td><td>38,0%</td></tr>
<tr><td>Administrative Staff</td><td>-</td><td>-</td><td>446</td><td>58,0%</td></tr>
<tr><td>Service Staff</td><td>-</td><td>-</td><td>31</td><td>4,0%</td></tr>
<tr><td>Total</td><td>-</td><td>100</td><td>769</td><td>100</td></tr>
</table>
</td></tr>
<tr><td>Permanent staff by category from 2008 to 2009</td><td>Information unavailable at time of final report</td></tr>
<tr><td>Research Strategic Mission</td><td>The research strategy of Fort Hare recognises the need for research to address local, regional and national needs. It seeks ways to engage in a critical dialogue with partners to build research in areas which complement the University's historical niche as an African university while ensuring internationally recognised excellence.</td></tr>
<tr><td>Research Focus Areas[i]</td><td>Approved research programmes:

1. Water Resource Management
2. Sustainable Agriculture
3. Land Use Strategies

New programmes under review:

1. Culture
2. Heritage
3. Social Transformation
4. Rural Household Economics
NB: These Research Focus Areas were under revision at time of conducting the research</td></tr>
<tr><td>Research Niche Areas</td><td>1. Unlocking the Potential of Indigenous Plants for Sustainable Livelihoods
2. Culture, heritage and Social Transformation
3. Sustainable Agricultural and Land Use Strategies
4. Water Resources for Sustainable Development [b]</td></tr>
<tr><td>Types of Research Conducted</td><td>Information unavailable at time of final report</td></tr>
<tr><td>Internal Interface Structures</td><td>Research at the faculty level is overseen by the Faculty Research Committees which coordinate and promote research among staff and post graduate students.</td></tr>
</table>

	1. **Govan Mbeki Research & Development Centre (GMRDC) -** The GMRDC was founded in the honour of Govan Mbeki and was traditionally a research and resource centre. It now incorporates the office of the Dean of Research. The Centre acts as a service to staff on all research and R&D related matters across all campuses and administers the University's research budget. It stimulates, promotes and builds research capacity among staff and post graduate students and works in collaboration with donors and national/international research bodies. The Centre also oversees the University's research and ethical policies. 2. **Fort Hare Institute of Social and Economic Research (FHISER)** is a multi-disciplinary research institute located within the Govan Mbeki Research & Development Centre. 3. **Agricultural & Rural Development Research Institute (ARDRI) -** The ARDRI was established in 1977 by the Faculty of Agriculture at the University of Fort Hare. The Institute was established to assist less developed areas in the country in the form of specialist advice and research into the wide range of socio-economic and technical problems which affect the livelihoods of rural households and communities at large.[4] 4. **Telkom Centre of Excellence -** The Centre of Excellence in Electronic Commerce is a research centre in the department of Computer Science at University of Fort Hare. The Centre started in 1997 as a unit of the Telkom Centre of Excellence in Distributed Multimedia at Rhodes University, becoming independent and moving to the University of Fort Hare in 2002. 5. **Centre for Leadership Ethics in Africa (CLEA)**[c] 6. National Heritage and Cultural Studies Centre (NAHECS)[a] 7. University of Fort Hare Press [a] 8. Institute of Technology [a] 9. The School of Public Management and Development [b]
External Interface Structures[i]	1. Fort Hare Solutions: Section 21 Company
Number of Researchers per Faculty for 2006 and 2007	

Faculty	2006		2007	
	Unrated	Rated*	Unrated	Rated*
Education				
Law				
Management and Commerce				
Science and Agriculture				
Social Sciences and Humanities				
Total		**6**[5]		

**NRF rated researchers*

Number of Researchers per Faculty for 2008 and 2009

Faculty	2008		2009	
	Unrated	Rated*	Unrated	Rated*
Education				
Law				
Management and Commerce				
Science and Agriculture		7		
Social Sciences and Humanities		2		
Undefined		1		
Total		**10**[a]		**10****

**NRF rated researchers*

***6 applications outstanding at time of reporting*

Number of NRF Grants

Value of NRF Grants

Information unavailable at time of final report

Number of Innovation Fund Grants

Value of Innovation Fund Grants

Information unavailable at time of final report

Number of THRIP Grants

Value of THRIP Grants

Information unavailable at time of final report

Sources of Other Funding

Information unavailable at time of final report

Value of Other Funding[i]

Faculty	2006	2007	2008	2009
Education				
Law	R394,857	R515,645		
Management & Commerce				
Science and Agriculture				
Social Sciences and Humanities	R1,430,411	R3,954,083	R3,315,063	R893,283
Total	**R**	**R**	**R**	**R**

Total Value of Research Funding Received	*Information unavailable at time of final report*
Total Operational Budget of University	*Information unavailable at time of final report*
Number of Non-Accredited Publications	*Information unavailable at time of final report*

Number of Accredited Journal Publications[i]

Faculty	2006		2007		2008		2009	
	No	Units	No	Units	No	Units	No	Units
Education	2	2	13	8.666	11	8.18		
GMRDC			1	0.5	2	1.5		
Law	6	6	9	8	9	8		
Management &Commerce	3	3	3	2.333	3	2.34		
Science and Agriculture	53	36.16	113	38.12	54	34.97		
Social Science & Humanities	15	14.50	8	7	8	7.5		
FHISER	2	1.5						
Total	81	63.16		64.619	87	62.49		

Number and Units of Books and Conference Proceedings[i]

Faculty	2006		2007		2008		2009	
	No	Units	No	Units	No	Units	No	Units
Education			2	1				
Law								
Management &Commerce			11	2.25				
Science and Agriculture			32	3.7	17	3.45		
Social Sciences & Humanities			8	4.55	7	4.55		
Undefined			1		1			
Total			54	11.5	25	8		

Number of Research Chairs[i]	<table><tr><th></th><th>2006</th><th>2007</th><th>2008</th><th>2009</th></tr><tr><td>**Social Sciences & Humanities**</td><td></td><td></td><td></td><td>1</td></tr><tr><td>**Science and Agriculture**</td><td></td><td></td><td></td><td>1</td></tr><tr><td>**Total**</td><td></td><td></td><td></td><td>**2**</td></tr></table> *Source: Interview with UFH Research Dept*
Patents	*Information unavailable at time of final report*
Number of Other Research Outputs	*Information unavailable at time of final report*
Value of Projects	*Information unavailable at time of final report*

4.3 NELSON MANDELA METROPOLITAN UNIVERSITY

Location of Main Branch	**Port Elizabeth** - 5 campuses: 1. Summerstrand Campus South 2. Summerstrand Campus North 3. 2nd Ave Campus (Summerstrand) 4. Bird Street Campus (Central) 5. Missionvale Campus
Satellite Branches (if applicable)	**George** - Saasveld Campus & York Street Campus
Brief History of University	Nelson Mandela Metropolitan University (NMMU) was constituted on 1 January 2005, after the merger of the PE Technikon, the University of Port Elizabeth (UPE) and the Port Elizabeth campus of Vista University (Vista PE)[7]
Strategic Vision of University	*To be the leader in optimising the potential of our communities towards sustainable development in Africa* Through achieving this vision the NMMU aims to: 1. Contribute to the transformation and development of communities in terms of the full spectrum of their needs 2. Empower the institution, staff, graduates and communities to contribute and compete, both locally and internationally 3. Continue to make a major contribution to sustainable development in Africa

<table>
<tr><td>Academic Focus[ii]</td><td>1. Health & wellness
2. Economic & business development
3. Materials, infrastructure & process development for industry & manufacturing
4. Emerging information & communication technology (ICT) for development
5. Environmental & natural resource management
6. Culture, communication & language
7. Leadership, governance & democracy
8. Educational development to support excellence in teaching, learning, curricula</td></tr>
<tr><td>Faculties</td><td>1. Arts
2. Business & Economic Sciences
3. Education
4. Health Sciences
5. Law
6. Science
7. Engineering, the Built Environment & Information Technology</td></tr>
<tr><td>Total Registered and Graduated Students[ii]</td><td>
<table>
<tr><th></th><th>2006</th><th>2007[8]</th><th>2008</th><th>2009</th></tr>
<tr><td>Total Number of Registered Students</td><td>24245</td><td>23718</td><td>22661</td><td>25071</td></tr>
<tr><td>Total Number of Graduates</td><td>4894</td><td>5988</td><td>4464</td><td>-</td></tr>
</table>
</td></tr>
<tr><td>Registered Students by Major field of Study for 2006 and 2007[ii]</td><td>
<table>
<tr><th rowspan="2">Field of Study</th><th colspan="2">2006</th><th colspan="2">2007</th></tr>
<tr><th>Student No’s</th><th>% of Registered</th><th>Student No’s</th><th>%of Registered</th></tr>
<tr><td>Science, Engineering & Technology</td><td>7301</td><td>30%</td><td>7,360</td><td>31</td></tr>
<tr><td>Business & Management</td><td>5868</td><td>24%</td><td>5,896</td><td>24</td></tr>
<tr><td>Education</td><td>5750</td><td>24%</td><td>5,267</td><td>22</td></tr>
<tr><td>Humanities & Social Sciences</td><td>5327</td><td>22%</td><td>5,195</td><td>21</td></tr>
<tr><td>Total</td><td>24245</td><td>100</td><td>23,718</td><td>100</td></tr>
</table>
</td></tr>
</table>

Registered Students by Major field of Study for 2008 and 2009[ii]

Field of Study	2008		2009	
	Student No's	% of Registered	Student No's	%of Registered
Science, Engineering & Technology	7784	34%	8197	33%
Business & Management	6102	27%	6503	26%
Education	3596	16%	4854	19%
Humanities & Social Sciences	5179	23%	5517	22%
Total	**22661**	**100**	**25071**	**100**

Graduated Students by Major field of Study for 2006 and 2007[ii]

Field of Study	2006		2007	
	Student No's	% of Graduated	Student No's	%of Graduated
Science, Engineering & Technology	1304	27%	1307	22%
Business & Management	1000	20%	1018	17%
Education	1562	32%	2679	45%
Humanities & Social Sciences	1028	21%	983	16%
Total	**4894**	**100**	**5988**	**100**

Graduated Students by Major field of Study for 2008[ii]

Field of Study	Student No's	% of Graduated
Science, Engineering & Technology	1415	32%
Business & Management	1092	24%
Education	972	22%
Humanities & Social Sciences	986	22%
Total	**4464**	**100**

Registered Students by Major Qualification for 2006 and 2007[ii]

Qualification	2006		2007	
	Student No's	% of Registered	Student No's	%of Registered
Occasional Students	1139	5%	482	2
Undergraduate Certificates & Diplomas	10906	45%	11,384	47
Undergraduate Degrees	9520	39%	9,253	39
Postgraduate, Below Master's Level	984	4%	940	3
Postgraduate, Master's Degrees	1400	6%	1,332	5
Doctoral Degrees	296	1%	327	1
Total	**24245**	**100%**	**23,718**	**100**

Registered Students by Major Qualification for 2008 and 2009[ii]

Qualification	2008		2009	
	Student No's	% of Registered	Student No's	%of Registered
Occasional Students	605	3%	510	2%
Undergraduate Certificates & Diplomas	9905	44%	11446	46%
Undergraduate Degrees	9237	41%	9683	39%
Postgraduate, Below Master's Level	1239	5%	1587	6%
Postgraduate, Master's Degrees	1338	6%	1464	6%
Doctoral Degrees	337	1%	381	2%
Total	**22661**	**100%**	**25071**	**100%**

Graduated Students by Major Qualification for 2006 and 2007[ii]

Qualification	2006		2007	
	Grad No's	% of Graduated	Grad No's	%of Graduated
Occasional Students	-	-	-	-
Undergraduate Certificates & Diplomas	2079	42%	3275	55%
Undergraduate Degrees	1956	40%	1990	33%
Postgraduate, Below Master's Level	543	11%	427	7%
Postgraduate, Master's Degrees	291	6%	261	4%
Doctoral Degrees	25	1%	35	1%
Total	**4894**	**100%**	**5988**	**100%**

Graduated Students by Major Qualification for 2008[ii]

Qualification	Grad No's	% of Graduated
Occasional Students	-	-
Undergraduate Certificates & Diplomas	1703	38%
Undergraduate Degrees	1879	42%
Postgraduate, Below Master's Level	556	12%
Postgraduate, Master's Degrees	279	6%
Doctoral Degrees	47	1%
Total	**4464**	**100%**

Origins of Students for 2006 and 2007[ii]

Origin	2006		2007	
Year	No of Students	%of Students	No of Students	%of Students
Eastern Cape	17256	71%	16820	71%
Other RSA Provinces	5012	21%	4910	21%
African Countries	-	-	-	-
Overseas	1977	8%	1988	8%
Total	**24245**	**100%**	**23718**	**100%**

Origins of Students for 2008 and 2009[ii]

Origin	2008		2009	
Year	No of Students	%of Students	No of Students	%of Students
Eastern Cape	17404	77%	17328	69%
Other RSA Provinces	3237	14%	6003	24%
African Countries	-	-	-	-
Overseas	2020	9%	1740	7%
Total	**22661**	**100%**	**25071**	**100%**

Permanent staff by category from 2006 to 2007[ii]

Category	2006		2007	
Year	No of Staff	%of Staff	No of Staff	%of Staff
Instruction & Research Staff	514	39%	528	35%
Administrative Staff	658	50%	875	58%
Service Staff	131	10%	86	5%
Total	**1303**	**100**	**1489**	**100**

Permanent staff by category from 2008 to 2009[ii]

Category	2008		2009	
Year	No of Staff	%of Staff	No of Staff	%of Staff
Instruction & Research Staff	531	35%	563	37%
Administrative Staff	900	59%	887	58%
Service Staff	93	6%	88	6%
Total	**1524**	**100**	**1538**	**100**

Research Strategic Mission

The research vision of NMMU is the same as the vision of the university:

To be the leader in optimising the potential of our communities towards sustainable development in Africa.

The NMMU research strategy is based on 3 principles:

1. The development of a critical mass of academic and student researchers in a limited number of focus areas;
2. The creation of an environment that encourages the development of a research culture and research ethos;
3. The role of the university in promoting transformation and a diversity of experience in terms of race, gender and age to achieve social justice.

<table>
<tr><td></td><td>The main components of the research strategy are:

1. Developing research and innovation themes that address national, regional and local imperatives underpinning the eight academic focus areas;
2. Ensuring that research strategies are spearheaded by research entities – structures established by faculties to pursue research in a focused, multidisciplinary manner;
3. Nurturing human resources for research;
4. Allocating the majority of research resources to research and innovation themes, with incentives to encourage research collaboration and quality;
5. Developing a strong culture of value-adding research support.</td></tr>
<tr><td>Research Focus Areas[ii]</td><td>1. Curriculum development for all faculties across the university
2. Social cohesion: trans-cultural, intercultural, xenophobia
3. Natural resource management and Energy
4. IOD in motor vehicle industry
5. Regional economic development (incl. SMMEs and entrepreneurship)
6. Ethics, governance and leadership</td></tr>
<tr><td>Types of Research Conducted for 2006 and 2007[ii]</td><td>
<table>
<tr><th rowspan="2">Type of Research</th><th colspan="2">2006</th><th colspan="2">2007</th></tr>
<tr><th></th><th>% of Basic</th><th></th><th>% of Applied</th></tr>
<tr><td>Basic</td><td>R12,502,294</td><td>49%</td><td>R12,624,013</td><td>45%</td></tr>
<tr><td>Applied</td><td>R13,119,153</td><td>51%</td><td>R15,180,478</td><td>55%</td></tr>
<tr><td>Total</td><td>R25,621,447</td><td>100</td><td>R27,804,491</td><td>100</td></tr>
</table>
</td></tr>
<tr><td>Types of Research Conducted for 2008 and 2009[ii]</td><td>
<table>
<tr><th rowspan="2">Type of Research</th><th colspan="2">2008</th><th colspan="2">2009</th></tr>
<tr><th></th><th>% of Basic</th><th></th><th>% of Applied</th></tr>
<tr><td>Basic</td><td>R21,579,744</td><td>49%</td><td>R5,315,200</td><td>22%</td></tr>
<tr><td>Applied</td><td>R22,738,839</td><td>51%</td><td>R18,747,298</td><td>78%</td></tr>
<tr><td>Total</td><td>R 44,318,583</td><td>100</td><td>R 24,062,498</td><td>100</td></tr>
</table>
</td></tr>
<tr><td>Internal Interface Structures[ii]</td><td>The following 3 faculties are classified as research insitutes, which are the highest level of research entities, these make up the research office of NMMU, where they provide the supporting structures for research to take place but do not conduct the research themselves:

1. **InnoVenton: Institute for Chemical Technology and Downstream Chemical Technology Station and its sub-entities– InnoVenton is located in the faculty of Science - 3 units of the former PE Technikon, namely the 1) PE Technikon Catalysis Research Unit (PETCRU), 2) ChemQuest (semi-commercial analytical laboratory of the PE Technikon's Chemistry Department), and 3) the Materials Resource Centre, amalgamated to form one operating entity called InnoVenton.</td></tr>
</table>

2. **Institute for Information & Communication Technology Advancement (IICTA) -** Linked to the Faculty of Engineering, the Built Environment and Information Technology
3. **Institute for Friction Stir Processing**

The following 5 entities make up the research centres at the university:

1. **Telkom Centre of Excellence (COE) -** The Centres of Excellence (CoE) program was developed by Telkom SA to research various aspects of telecommunications. A number of corporate sponsors have joined Telkom SA to finance this program. The CoEs are scientific and engineering research entities at South African universities and technikons. Each CoE consist of one or more units, each specialising in a research area[10]
2. **Centre for African Conservation Ecology (ACE) -** began operating in 1992, within the Zoology Department of the then UPE, in 1997 it received Council recognition as a research unit within the Faculty of Science. In 2005, TERU was registered as a Centre within the Faculty of Science of the NMMU.
3. **Centre for Energy Research (CER) -** The CER comprises energy research activities from the Faculty of Science, Faculty of Engineering, the Built Environment and Information Technology, and the Faculty of Business and Economic Sciences at the NMMU.
4. **Centre for Educational Research, Technology and Innovation (CERTI)**
5. **Centre for the Advancement of Non-Racialism and Democracy**

The following 14 entities make up the research units at the university, which constitute the lowest level of research entities:

1. **Cyclic Peptide Research Unit (CPRU)–** This unit aims to foster inter-departmental as well as inter-institutional collaboration.
2. **Drug Utilisation Research Unit (DURU) –** The Unit educates and informs all interested parties about the rational and cost-effective use of health care resources with specific emphasis on the management of medicines.
3. **HIV and Aids Unit -** The HIV/AIDS Unit strives to prevent HIV transmission and to mitigate the impact of HIV/AIDS on students, staff and the community. Intersectoral engagement and community participation creates the environment to develop relevant academic programmes, initiate research and facilitate community service delivery.
4. **Labour and Social Security Law Unit (LSSLU)**
5. **Labour Relations and Human Resources Unit**
6. **Raymond Mhlaba Research Unit for Public Administration and Leadership**
7. **Tourism Research Unit (TRU)**
8. ***Integrated Environmental and Coastal Management (IECM) -** IECM provides information and expert advice on all aspects of environmental

management in the coastal zone of Africa. This is achieved by conducting relevant research, environmental assessments, specialist reports, environmental reviews and management plans.

9. **Unit for Applied Management Sciences (UAMS) -** the Unit acts as the consulting and research arm for the Department of Business Management.
10. **Unit for Building Research & Support (UBRS) –** aims to assist with the development of small contractors, who are involved in all types of building related activities
11. **Unit for the Study of Construction Processes (USCP) -** The purpose of the unit is to develop research capacity, facilitate research, and disseminate research findings.[9]
12. **Unit for the Study and Resolution of Conflict (USRC)**
13. **Unit for Professional Ethics (UPE)**
14. **Sustainable Research Unit (SRU)**

External Interface Structures[ii]

NMMU Innovations is the only external interface, but it is a dormant company.

Number of Researchers per Faculty for 2006 and 2007[ii]

Faculty	2006		2007	
	Unrated	Rated*	Unrated	Rated*
Total	**464**	**50**[11]	**473**	**55**[16]

**NRF rated researchers*

Number of Researchers per Faculty for 2008 and 2009[ii]

Faculty	2008		2009	
	Unrated	Rated*	Unrated	Rated*
Total	**462**	**54**	**501**	**57**

**NRF rated researchers*

Number of NRF Grants[ii]

Faculty	2006	2007	2008	2009
Science, Engineering & Technology	63	54	83	48
Business & Management	12	6	9	8
Education	7	2	2	4
Humanities & Social Sciences	10	7	10	6
Total	**92**	**69**	**104**	**66**

Value of NRF Grants[ii]

Faculty	2006	2007[12]	2008	2009
Science, Engineering Technology	R11,481, 656	R12,187, 513	R20,759, 180	R4,705, 200
Business & Manage-ment	R588,047	R110,500	R303,110	R325, 000
Education	R91,047	R43,000	R103,700	R115, 000
Humanities & Social Sciences	R341,544	R283,000	R413,754	R170, 000
Total	**R12,502, 294**	**R12,624, 013**	**R21,579, 744**	**R5,315, 200**

Number of Innovation Fund Grants

Value of Innovation Fund Grants

Information unavailable at time of final report

Number of THRIP Grants[ii]

Faculty	2006	2007	2008	2009
Science, Engineering & Technology	7	8	9	9
Business & Management	-	-	-	-
Education	-	-	-	-
Humanities & Social Sciences	-	-	-	-
Total	7	8	9	9

Value of THRIP Grants[ii]

Faculty	2006	2007	2008	2009
Science, Engineering & Technology	R2,640,284	R2,869, 193	R7,648, 437	R6,665, 360
Business & Management	-	-	-	-
Education	-	-	-	-
Humanities & Social Sciences	-	-	-	-
Total	**R2,640, 284**	**R2,869, 193**	**R7,648, 437**	**R6,665, 360**

Sources of Other Funding[ii]

Source	2006	2007	2008	2009
South African Gov. Funding		R390,933	R338,000	R26,310,306
Development Agency		R10,000	R282,900	-
International donor		-	-	R101,790
Foundation		R292,804	R1,582, 645	R1,100, 000
NGO		R4,340, 863	R170,000	R175,860
South African Private Company		R1,275, 473	R1,066, 949	R6,340, 206
Parastatal		R1,293, 900	R1,017, 995	R250,336
Science Council	R1,989, 600	R2,170, 020	R2,268, 232	R1,245, 174
Total	**R1,989, 600**	**R9,773, 994**	**R6,726, 721**	**R35,523,672**

Value of Other Funding[ii]

Faculty	2006	2007	2008	2009
Science, Engineering & Technology	R949,600	R9,512, 744	R5,129, 181	R35,462,035
Business & Management	R1,040, 000	R261,250	R1,597, 540	R61,636
Education				
Humanities & Social Sciences				
Total	**R1,989, 600**	**R9,773, 994**	**R6,726, 721**	**R35,523,672**

Total Value of Research Funding Received[ii]

	2006	2007	2008	2009
Total	R25,621,447	R27,804,491	R44,318,583	R54,250,612

Total Operational Budget of University

Information unavailable at time of final report

Number and Units of Accredited Publications[ii]

Faculty	2006		2007		2008	
	No	Units	No	Units	No	Units
Science, Engineering & Technology	187		127		169	
Business & Management	34		23		31	
Education	4		19		30	
Humanities & Social Sciences	82		71		56	
Total	**307**		**240**		**286**	

Number and Units of Non-Accredited Publications

Information unavailable at time of final report

Number and Units of Conference Proceedings[ii]

Faculty	2006		2007		2008	
	No	Units	No	Units	No	Units
Business & Economics	12	4.336	7	3.78	11	-
Education	-	-	2	0.8	1	-
Science, Engineering & Technology	44	4.065	27	8.4	28	-
Science	24	4.607	6	1	26	-
Total						

Number and Units of Books[ii]

Faculty	2006		2007		2008	
	No	Units	No	Units	No	Units
Arts	2	0.57	2	0.09	2	-
Business & Economics	1	0,285	-	-	1	-
Education	-	-	-	-	13	
Health Sciences	6	0.285	1	0.05	-	-
Law	9	0.285	-	-	-	-
Science	3	0.09	8	-	-	-
Total						

Number and Units of Accredited Journals[ii]

Faculty	2006		2007		2008	
	No	Units	No	Units	No	Units
Arts	38	36.5	46	43	33	31.45
Business & Economics	21	17.48	16	13.16	19	14.995
Education	4	2.66	17	14.82	16	13.42
Science, Engineering & Technology	16	11.83	10	8.32	20	18.4
Health Sciences	6	16.08	10	5.77	12	6.96
Law	23	23.5	18	16	21	19.5
Science	86	64.5	68	62.	68	47.996
Total						

Patents[ii]

	2006	2007	2008	2009
Provisional	2	0	6	1
PCT (patent Co-operation Treaty)	0	2	0	5
Complete	-	-	-	-

Number of Research Chairs[ii]

	2006	2007	2008	2009
Total				**2**

Number of Other Research Outputs[ii]

Research Outputs	2006	2007	2008	2009
Services	-	-	-	
Products e.g. Software	-	1	1	1
Industrial Design Processes	-	-	-	-
Businesses Established	-	1	3	2
Number of PhD Theses	-	-	-	-
Commercializa-tion Income	0	0	R1,305,000	R1,060,000
Shares in Companies	0	0	3	1
Terms of Technology Agreements	-	-	-	-
Memorandums of Understanding	-	2	5	6
Consultancies	-	-	-	R4,000,000

Value of Projects

Information unavailable at time of final report

4.4 RHODES UNIVERSITY

<table>
<tr><td>Location of Main Branch</td><td>Grahamstown</td></tr>
<tr><td>Satellite Branches (if applicable)</td><td>NA</td></tr>
<tr><td>Brief History of University</td><td>Rhodes University College was founded by Act of Parliament on May 31, 1904. Fort Hare was affiliated with Rhodes until 1959 and the Port Elizabeth Division of Rhodes University was linked to Rhodes from 1961-1964, when the University of Port Elizabeth was formed in its place. The East London Campus of Rhodes was incorporated with the University of Fort Hare on 1 Jan. 2004.[13]</td></tr>
<tr><td>Strategic Vision of University</td><td>Rhodes University's vision is to be an outstanding internationally-respected academic institution which proudly affirms its African identity and which is committed to democratic ideals, academic freedom, rigorous scholarship, sound moral values and social responsibility.[14]</td></tr>
<tr><td>Academic Focus</td><td>Information unavailable at time of final report</td></tr>
<tr><td>Faculties</td><td>1. Education
2. Commerce
3. Humanities
4. Law
5. Pharmacy
6. Science</td></tr>
<tr><td>Total Registered Students[iii]</td><td>
<table>
<tr><th></th><th>2006</th><th>2007[15]</th><th>2008</th><th>2009</th></tr>
<tr><td>Total Number of Registered Students</td><td>5,922</td><td>6,075</td><td>6,327</td><td>6980</td></tr>
</table>
</td></tr>
<tr><td>Total Graduated Students[iii]</td><td>
<table>
<tr><th></th><th>2006</th><th>2007</th><th>2008</th><th>2009</th></tr>
<tr><td>Total Number of Graduates</td><td>1,872</td><td>1,852</td><td>1,787</td><td>-</td></tr>
</table>
</td></tr>
<tr><td>Registered Students by Major field of Study for 2006 and 2007[iii]</td><td>
<table>
<tr><th rowspan="2">Field of Study</th><th colspan="2">2006</th><th colspan="2">2007</th></tr>
<tr><th>Student No's</th><th>% of Registered</th><th>Student No's</th><th>%of Registered</th></tr>
<tr><td>Science, Engineering & Technology</td><td>1361</td><td>23%</td><td>1,396</td><td>22</td></tr>
<tr><td>Business & Management</td><td>913</td><td>15%</td><td>936</td><td>15</td></tr>
<tr><td>Education</td><td>637</td><td>11%</td><td>535</td><td>8</td></tr>
<tr><td>Humanities & Social Sciences</td><td>3010</td><td>51%</td><td>3,208</td><td>52</td></tr>
<tr><td>Total</td><td>5922</td><td>100</td><td>6,075</td><td>100</td></tr>
</table>
</td></tr>
</table>

Registered Students by Major field of Study for 2008 and 2009[iii]

Field of Study	2008		2009	
	Student No's	% of Registered	Student No's	%of Registered
Science, Engineering & Technology	1380	22%		
Business & Management	977	15%		
Education	634	10%		
Humanities & Social Sciences	3334	53%		
Total	**6327**	**100**	**6980**	

Graduated Students by Major field of Study for 2006 and 2007[iii]

Field of Study	2006		2007	
	Student No's	% of Graduated	Student No's	%of Graduated
Science, Engineering & Technology	402	21%	464	25%
Business & Management	247	13%	253	14%
Education	314	17%	194	10%
Humanities & Social Sciences	908	49%	939	51%
Total	**1872**	**100**	**1852**	**100**

Graduated Students by Major field of Study for 2008[iii]

Field of Study	Student No's	% of Graduated
Science, Engineering & Technology	413	23%
Business & Management	236	13%
Education	254	14%
Humanities & Social Sciences	884	50%
Total	**1787**	**100**

Registered Students by Major Qualification for 2006 and 2007[iii]

Qualification	2006		2007	
	Student No's	% of Registered	Student No's	%of Registered
Occasional Students	34	0.6%	35	0
Undergraduate Certificates & Diplomas	252	4%	149	2
Undergraduate Degrees	4408	74%	4379	72
Postgraduate, Below Master's Level	374	6%	632	10
Postgraduate, Master's Degrees	609	10%	642	10
Doctoral Degrees	245	4%	238	3
Total	**5922**	**100**	**6,075**	**100**

Registered Students by Major Qualification for 2008 and 2009[iii]

Qualification	2008		2009	
	Student No's	% of Registered	Student No's	%of Registered
Occasional Students	35	0.6%		
Undergraduate Certificates & Diplomas	323	5%		
Undergraduate Degrees	4668	74%		
Postgraduate, Below Master's Level	400	6%		
Postgraduate, Master's Degrees	656	10%		
Doctoral Degrees	245	4%		
Total	**6327**	**100**	**6980**	

Graduated Students by Major Qualification for 2006 and 2007[iii]

Qualification	2006		2007	
	Grad No's	% of Graduated	Grad No's	%of Graduated
Occasional Students	0	0%	0	0%
Undergraduate Certificates & Diplomas	162	8%	31	2%
Undergraduate Degrees	1174	63%	1241	67%
Postgraduate, Below Master's Level	319	17%	356	19%
Postgraduate, Master's Degrees	171	9%	176	10%
Doctoral Degrees	46	3%	48	2%
Total	**1872**	**100**	**1852**	**100**

Graduated Students by Major Qualification for 2008[iii]

Qualification	Grad No's	% of Graduated
Occasional Students	0	0%
Undergraduate Certificates & Diplomas	84	5%
Undergraduate Degrees	1134	63%
Postgraduate, Below Master's Level	360	20%
Postgraduate, Master's Degrees	182	10%
Doctoral Degrees	27	2%
Total	**1787**	**100**

Origins of Students for 2006 and 2007[iii]

Origin	2006		2007	
	No of Students	%of Students	No of Students	%of Students
South Africa	4490	76%	4663	77%
African Countries	1259	21%	1256	21%
Overseas	165	3%	150	2%
Total	**5914**	**100**	**6069**	**100**

Origins of Students for 2008 and 2009[iii]

Origin	2008		2009	
	No of Students	%of Students	No of Students	%of Students
South Africa	4977	79%	5614	80%
African Countries	1204	19%	1241	18%
Overseas	139	2%	125	2%
Total	**6320**	**100**	**6980**	**100**

Permanent staff by category from 2006 to 2007[iii]

Category	2006		2007[17]	
	No of Staff	%of Staff	No of Staff	%of Staff
Instruction & Research Staff	-	-	320	24
Administrative Staff	-	-	564	43
Service Staff	-	-	407	31
Total	**-**	**-**	**1,291**	**100**

Permanent staff by category from 2008 to 2009[iii]

Category	2008		2009	
	No of Staff	%of Staff	No of Staff	%of Staff
Instruction & Research Staff	-	-	377[1]	26.4%
Administrative Staff	-	-	580	40.6%
Service Staff	-	-	471	33%
Total	**-**	**-**	**1428**	**100**

Research Strategic Mission[iii]

To encourage research at the highest level of excellence and to ensure that our research programmes are internationally recognised for their excellence.

Research Focus Areas

- Humanities
- Social Sciences
- Environmental sciences
- Biological Sciences
- Pharmacy
- Information, Computer and Communication Technologies
- Chemical Sciences
- Agricultural Sciences

[1] Additional 43 contract researchers and 10 admin staff, therefore total Research and Instruction staff both permanent and contract is 420, admin staff is 590.

Types of Research Conducted[iii]

Type of Research	% of Total Research Expenditure
Basic	92
Applied	8
Total	**100**

Internal Interface Structures

1. Biopharmaceutics Research Unit (BRU)
2. Centre for Applied Social Research and Action (CASRA)
3. Catchment Research Centre
4. Centre for Entrepreneurship
5. Centre for Social Development
6. Dictionary Unit for South African English (DSAE)
7. Electron Microscope Unit (EMU)
8. Environmental Biotechnology Research Unit (EBRU)
9. First Physical Theatre Company
10. Environmental Education and Sustainability Unit
11. Hermann Ohlthaver Institute for Aeronomy (HOIA)
12. Institute for Social and Economic Research (ISER)
13. International Library of African Music (ILAM)
14. Institute for the Study of English in Africa (ISEA)
15. Institute for Water Research, including the Unilever Centre for Environmental Water Quality (IWR)
16. Mathematics - Information Technology - Science - Technology Education Centre (MiST)
17. Public Service Accountability Monitor (PSAM)
18. Rhodes University Mathematics Education Project (RUMEP)
19. Sol Plaatjie Media Leadership Institute
20. Southern Ocean Group (SOG)
21. Telkom Centre of Excellence (in Distributed Media)[16]

Locality of Research[iii]

Locality of Research	Percentage (%)
Eastern Cape	58%
Free State	3%
Gauteng	10%
KwaZulu-Natal	9%
Limpopo	1%
Mpumalanga	0%
Northern Cape	3%
North-West	2%
Western Cape	14%
Total	**100%**

Number of Rated* Researchers per Faculty for 2006-2009[iii]

	2006	2007	2008	2009
Commerce	-	1	1	1
Humanities	-	7	4	5
Law	-	1	-	-
Pharmacy	-	2	2	1
Science	-	30	36	34
Total	**-**	**41**	**43**	**41**

**NRF rated researchers*

Number of NRF Grants[iii]

	2006	2007	2008	2009
Total	64	43	275	**-**

Value of NRF Grants[iii]

	2006	2007	2008	2009
Total	R20,018,831	R3,361,835	R90,000	-

Number of Innovation Fund Grants[iii]

	2006	2007	2008	2009
Total	1	1	2	1

Value of Innovation Fund Grants[iii]

	2006	2007	2008	2009
Total	R1,075,749	R100,000	R350,000	R66,000

Number of THRIP Grants[iii]

	2006	2007	2008	2009
Total	-	3	6	8

Value of THRIP Grants[iii]

	2006	2007	2008	2009
Total	-	R1,335,000	R1,139,767	R1,345,578

Sources of Other Funding[iii]

Source	2006	2007	2008	2009
South African Government	R796,207	R2,347,958		
Government Research Institutes	R2,466,301	R6,421,404		
Agency Funding	R10,610,872	R13,341,919		
Science Council Funding	R720,863	R275,439		
Domestic Business	R7,182,631	R10,274,439		
Other SA HEI's	R40,719	R267,254		
SA Non-profit Organisations	R845,554	R1,674,343		
Donations	R238,750	R105,738		
Foreign Income	R6,073,268	R17,757,149		
University Funds	R59,166,955	R59,788,389		
Total	**R88,142,124**	**R112,254,033**		

Value of Other Funding[iii]

Faculty	2006	2007	2008	2009
Commerce	R5,597,219	R4,786,363		
Education	R3,393,806	R4,571,456		
Humanities	R25,311,247	R40,087,623		
Law	R1,772,456	R1,590,549		
Pharmacy	R6,572,059	R7,844,939		
Science	R45,495,337	R53,373,104		
Total	**R88,142,124**	**R112,254,033**		

Total Value of Research Funding Received[iii]

	2006	2007	2008	2009
Total	R135,680,000	R147,266,000	-	-

Total Operational Budget of University

Information unavailable at time of final report

Number and Units of Accredited Publications[iii]

	2006		2007		2008		2009	
	No	Units	No	Units	No	Units	No	Units
Total	-	232.6	-	248.7	-	264.2	-	291.7

Number and Units of Non-Accredited Publications[iii]

	2006		2007		2008		2009	
	No	Units	No	Units	No	Units	No	Units
Total	51	-	-	-	-	-	-	-

Number and Units of Conference Proceedings[iii]

	2006		2007		2008		2009	
	No	Units	No	Units	No	Units	No	Units
Total	-	-	-	-	36	-	82	75.63

Number and Units of Books[iii]

	2006		2007		2008		2009	
	No	Units	No	Units	No	Units	No	Units
Total	-	-	-	-	21	-	57	50.61

Patents

Information unavailable at time of final report

Number of Research Chairs[iii]

	2006	2007	2008	2009
Total	-	1	2	2

Number of Other Research Outputs[iii]

Research Outputs	2006	2007	2008	2009
Services				
Products e.g. Software				
Industrial Design Processes				
Businesses Established				
Number of PhD Theses	46	48	27	-
Commercialization Income				
Shares in Companies				
Terms of Technology Agreements				
Memorandums of Understanding				
Consultancies				

Value of Projects

Information unavailable at time of final report

4.5 WALTER SISULU UNIVERSITY OF TECHNOLOGY

<table>
<tr><td>Location of Main Branch</td><td>Mthatha</td></tr>
<tr><td>Satellite Branches (if applicable)</td><td>1. Buffalo City
2. Butterworth
3. Queenstown</td></tr>
<tr><td>Brief History of University</td><td>Walter Sisulu University was formed in July 2005 with the merging of Border Technikon, Eastern Cape Technikon and University of Transkei.</td></tr>
<tr><td>Strategic Vision of University</td><td>Walter Sisulu University (WSU) will be a leading African comprehensive university focusing on innovative educational, research and community partnership programmes that are responsive to local, regional, national development priorities, and cognisant of continental and international imperatives.[18]</td></tr>
<tr><td>Academic Focus</td><td>Research, teaching and learning process, focusing more on Science and Technology and Rural Development.[19]</td></tr>
<tr><td>Faculties</td><td>1. Education
2. Health Sciences
3. Science, Engineering and Technology
4. Business, Management Sciences & Law</td></tr>
<tr><td>Total Registered and Graduated Students</td><td>
<table>
<tr><th></th><th>2006</th><th>2007[20]</th><th>2008</th><th>2009</th></tr>
<tr><td>Total Number of Registered Students</td><td></td><td>24,497</td><td></td><td></td></tr>
<tr><td>Total Number of Graduates</td><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>Registered and Graduated Students by Major field of Study for 2006</td><td>Information unavailable at time of final report</td></tr>
<tr><td>Registered and Graduated Students by Major field of Study for 2007</td><td>
<table>
<tr><th>Field of Study</th><th>Student No's[21]</th><th>% of Registered</th><th>Grad No's</th><th>%of Registered</th></tr>
<tr><td>Science, Engineering & Technology</td><td>6,471</td><td>26</td><td></td><td></td></tr>
<tr><td>Business & Management</td><td>7,555</td><td>30</td><td></td><td></td></tr>
<tr><td>Education</td><td>4,766</td><td>19</td><td></td><td></td></tr>
<tr><td>Humanities & Social Sciences</td><td>5,705</td><td>23</td><td></td><td></td></tr>
<tr><td>Total</td><td>24,497</td><td>100</td><td></td><td></td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td>Registered and Graduated Students by Major field of Study for 2008</td><td rowspan="2">Information unavailable at time of final report</td></tr>
<tr><td>Registered Students by Major field of Study for 2009</td></tr>
<tr><td>Registered and Graduated Students by Major Qualification for 2006</td><td>Information unavailable at time of final report</td></tr>
<tr><td>Registered and Graduated Students by Major Qualification for 2007</td><td>
<table>
<tr><th>Qualification</th><th>Student No's[22]</th><th>% of Registered</th><th>Grad No's</th><th>%of Registered</th></tr>
<tr><td>Occasional Students</td><td>590</td><td>2</td><td></td><td></td></tr>
<tr><td>Undergraduate Certificates & Diplomas</td><td>15 609</td><td>63</td><td></td><td></td></tr>
<tr><td>Undergraduate Degrees</td><td>7 626</td><td>31</td><td></td><td></td></tr>
<tr><td>Postgraduate, Below Master's Level</td><td>506</td><td>2</td><td></td><td></td></tr>
<tr><td>Postgraduate, Master's Degrees</td><td>153</td><td>1.5</td><td></td><td></td></tr>
<tr><td>Doctoral Degrees</td><td>13</td><td>0.5</td><td></td><td></td></tr>
<tr><td>Total</td><td>24,497</td><td>100</td><td></td><td>100</td></tr>
</table>
</td></tr>
<tr><td>Registered and Graduated Students by Major Qualification for 2008</td><td rowspan="2">Information unavailable at time of final report</td></tr>
<tr><td>Registered Students by Major Qualification for 2009</td></tr>
<tr><td>Origins of Students for 2006- 2009</td><td>Information unavailable at time of final report</td></tr>
</table>

Permanent staff by category from 2006 to 2007

Category	2006		2007[23]	
	No of Staff	%of Staff	No of Staff	%of Staff
Instruction & Research Staff			526	41
Administrative Staff			634	50
Service Staff			102	9
Total			**1,262**	**100**

Permanent staff by category from 2008 to 2009

Information unavailable at time of final report

Research Strategic Mission

Information unavailable at time of final report

Research Focus Areas

Information unavailable at time of final report

Types of Research Conducted

Information unavailable at time of final report

Internal Interface Structures

Information unavailable at time of final report

External Interface Structures

1. **The Netherlands Programme for the Institutional Strengthening of Post-secondary Education and Training Capacity (NPT) -** This partnership exists between Rijksuniversiteit Groningen (University of Groningen) in the Netherlands, Erasmus Universiteit Rotterdam and Walter Sisulu University; it is a multimillion Rand capacity building project spanning 1 January 2008 – 31 December 2011 to strengthen the Centre for Learning and Teaching Development of the Science Education and Technology Faculty of Walter Sisulu.

Number of Researchers per Faculty for 2006 and 2007

	2006		2007	
	Unrated	Rated*	Unrated	Rated*
Total		2[24]		

**NRF rated researchers*

Number of Researchers per Faculty for 2008 and 2009

Information unavailable at time of final report

Number of NRF Grants

Value of NRF Grants

Information unavailable at time of final report

Number of Innovation Fund Grants

Information unavailable at time of final report

Value of Innovation Fund Grants	
Number of THRIP Grants	*Information unavailable at time of final report*
Value of THRIP Grants	
Sources of Other Funding	*Information unavailable at time of final report*
Value of Other Funding	
Total Value of Research Funding Received	*Information unavailable at time of final report*
Total Operational Budget of University	*Information unavailable at time of final report*
Number and Units of Accredited Publications	*Information unavailable at time of final report*
Number and Units of Non-Accredited Publications	
Number and Units of Conference Proceedings	*Information unavailable at time of final report*
Number and Units of Books	
Number and Units of Accredited Journals	
Patents	*Information unavailable at time of final report*
Number of Research Chairs	
Number of Other Research Outputs	*Information unavailable at time of final report*
Value of Projects	*Information unavailable at time of final report*

4.6 REFERENCES

FORT HARE

1 http://www.ufh.ac.za/history.html
2 http://en.wikipedia.org/wiki/University_of_Fort_Hare
3 http://www.ufh.ac.za//downloads/UFHSP2000.doc, pg9
4 http://www.ufh.ac.za/centres/gmrdc.htm
5 http://www.ufh.ac.za/centres/ardri.htm
6 http://www.education.gov.za/emis/emisweb/07stats/Education%20Statistics%20in%20South%20Africa%202007.pdf
a Govan Mbeki Research and Development Centre, Quarterly Report, Dec 2008
b Govan Mbeki Research and Development Centre, Quarterly Report, April 2008
i Interview conducted with UFH Projects and Research offices

NMMU

7 http://www.nmmu.ac.za/default.asp?id=164&bhcp=1
8 http://www.nmmu.ac.za/default.asp?id=164&bhcp=1
9 http://www.education.gov.za/emis/emisweb/07stats/Education%20Statistics%20in%20South%20Africa%202007.pdf
10 http://www.upe.ac.za/default.asp?id=2748&sid=&aq=&qc=&fc=&mc=&dm=&tm=&qgrpid=&cf=&bhcp=1
11 http://www.nmmu.ac.za/default.asp?id=6971&bhcp=1
12 http://evaluation.nrf.ac.za/Content/Facts/display_all.asp
ii Interview with Innovation Support and Technology Transfer Office

RHODES

13 http://www.ru.ac.za/home/introducingrhodes/historyofrhodes
14 http://www.ru.ac.za/home/introducingrhodes/visionandmission
15 http://evaluation.nrf.ac.za/Content/Facts/display_all.asp
16 http://www.ru.ac.za/research/research/affiliatesandinstitutes
17 http://www.education.gov.za/emis/emisweb/07stats/Education%20Statistics%20in%20South%20Africa%202007.pdf
iii Interview with Rhodes Research department

WSU

18 http://www.wsu.ac.za/aboutus/visionmission.htm
19 http://en.wikiversity.org/wiki/Walter_Sisulu_Univers ity_for_Technology_and_Science
20 http://www.education.gov.za/emis/emisweb/07stats/Education%20Statistics%20in%20South%20Africa%202007.pdf
21 http://www.education.gov.za/emis/emisweb/07stats/Education%20Statistics%20in%20South%20Africa%202007.pdf
22 http://www.education.gov.za/emis/emisweb/07stats/Education%20Statistics%20in%20South%20Africa%202007.pdf
23 http://www.education.gov.za/emis/emisweb/07stats/Education%20Statistics%20in%20South%20Africa%202007.pdf
24 http://evaluation.nrf.ac.za/Content/Facts/display_all.asp