Higher Education in Regional and City Development

The Free State, South Africa

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OECD

Higher Education in Regional and City Development: The Free State, South Africa 2012

ISBN 978-92-64-16914-2 (PDF)

Series: Higher Education in Regional and City Development
ISSN 2218-3140 (online)

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Foreword

Universities and other higher education institutions can play a key role in human capital development and innovation systems in their cities and regions. Reviews of Higher Education in Regional and City Development are the OECD's vehicle to mobilise higher education for economic, social and cultural development of cities and regions. The reviews analyse how the higher education system impacts local and regional development and help improve this impact. They examine higher education institution's contribution to human capital and skills development; technology transfer and business innovation; social, cultural and environmental development; and regional capacity building. The review process facilitates partnership building in regions by drawing together higher education institutions and public and private agencies to identify strategic goals and work together towards them. To know more about the OECD review process and requirements, visit Higher Education and Regions' website at *www.oecd.org/edu/imhe/regionaldevelopment.*

These reviews are part of a wider multi-annum work of higher education in cities and regions co-ordinated by the OECD Programme on Institutional Management of Higher Education (IMHE). In 2004-07, the OECD/IMHE conducted an extensive study with 14 regional reviews across 12 countries. This resulted in the OECD flagship publication *Higher Education and Regions: Globally Competitive, Locally Engaged* (OECD, 2007) with recommendations to benefit both higher education institutions and national and regional governments. In 2008, the OECD/IMHE launched a second series of OECD Reviews of Higher Education in Regional and City Development to address the demand by national, regional and local governments for more responsive and active higher education institutions. As a result, 14 regions in 11 countries participated in the OECD review process in 2008-11. The third round of reviews was launched simultaneously to respond to the OECD's global strategy and increasing demand on the ground. The reviews were carried out by the OECD/IMHE in collaboration with international organisations and associations, and other OECD programmes and directorates. This work supports the OECD Innovation Strategy, Skills Strategy and Green Growth Strategy.

This OECD review of the Free State, was the first of the third round of OECD reviews of Higher Education in Regional and City Development and the first of its kind in South Africa and Africa.

Acknowledgements

Numerous national and regional stakeholders and representatives of higher education institutions provided valuable insights during the review visit and in the form of comments. The OECD would like to thank in particular the leadership of the University of the Free State, the Central University of Technology and the Free State Education and Training Trust, who participated in the review process and opened the doors of their institutions for the OECD review team; the regional co-ordinator Lochner Marais and his University of the Free State task team as well as other active counterparts for this review in the national ministries and agencies, provincial and local governments, business and the third sector. The OECD is grateful for the generous support from the Free State Education and Training Trust and the University of the Free State for the funding of the self-evaluation process as well as the Flanders government who made this review possible by funding the OECD-led peer review. Finally, the OECD would like to thank Lumina Foundation for its support in the review team.

This publication draws on interviews carried out during a week-long review visit in 3-9 October 2010, on the findings of the Free State's Self-evaluation Report and using additional information provided to the review team as well as OECD report on South African Education, *OECD Reviews of National Policies for Education - South Africa* (OECD, 2008). The OECD review team had a productive programme and were received openly by a wide range of stakeholders.

The peer review visit was led by Jaana Puukka (OECD/IMHE). This publication was co-ordinated and edited by Jaana Puukka with the support from Oscar Valiente and Austin Delaney (OECD/IMHE). Peer reviewers were Patrick Dubarle (former OECD Secretariat), Holly McKiernan, (Lumina Foundation); Jairam Reddy (former Vice-Chancellor of the University of Durban Westville) and Philip Wade (former OECD Secretariat). In addition, Akilagpa Sawyerr (former Secretary-General of the Association of African Universities) participated in the review visit. Further details about the review team can be found in Annex 1 of this report.). Freya

Damrell and Carola Miras provided assistance in the final editing phase and Rachel Linden supervised the publication process.

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Acronyms

AARG	AIDS Action and Research Group
ANC	African National Congress
AsgiSA	Accelerated and Shared Growth Initiative of South Africa
BEE	Black Economic Empowerment
BERD	Business expenditure on research and development
CDS	Centre for Development Support
CENSARD	Centre of Sustainable Agriculture and Rural Development of the Faculty of Natural and Agricultural Sciences
CHET	Centre for Higher Education Transformation
CRPM	Centre of Rapid Prototyping and Manufacture
CUT	Central University of Technology
DHET	Department of Higher Education and Training
DIUE	Catalan Ministry of Innovation, Universities, and Enterprise (Spain)
DST	Department of Science and Technology
ECHEA	Eastern Cape Higher Education Association
esATI	Eastern Seaboard Association of Tertiary Institutions
EUR	Euro
FET	Further Education and Training Colleges
FOTIM	Foundation of the Tertiary Institutions of the northern Metropolis
FSGDS	Free State Growth and Development Strategy
FSETT	Free State Education and Training Trust
FSTA	Free State Tourism Authority
HERD	Higher education expenditure on research and development
GDP	Gross domestic product
GERD	Gross domestic expenditure on research and development
GVA	Gross Value Added
HBU	Historically black university
HE	Higher education

HEI	Higher education institution
HIV/AIDS	Human Immunodeficiency virus/ Acquired immune deficiency syndrome
ICREA	Catalan Institution for Research and Advanced Studies (Spain)
ICT	Information and communication technology
IRDP	Institutional Research Development Programme
IMHE	OECD Programme on Institutional Management in Higher Education
LED	Local economic development
MA	Master's degree
MHET	Ministry of Education and Training
MOHE	Minnesota Office of Higher Education (United States)
MTSF	Medium Term Strategic Framework
NFR	National Research Foundation
NSEP	Needle and syringe exchange programme
NSFAS	National Student Financial Aid Scheme
NSDP	National Spatial Development Perspective
OECD	Organisation for Economic Co-operation and Development
PSDC	The Penang Skill Development Centre (Malaysia)
PDTS	Product Development Technology Station
RDI	Research, development and Innovation
RET	Renewable Energy Technology
RIC	Regional Innovation Centre
RMI	Robert Mondavi Institute for Wine and Food Science (United States)
RNA	Research niche area
RPL	Recognition of Prior Learning
SADC	South African Development Community
SEDA	Small Enterprise Development Agency
SES	Socio-economic status
SETAS	Skills Education Training Authorities
SHEEO	State Higher Education Executive Officers (Ohio, United Stats)
SME	Small and medium-sized enterprises
SMMEs	Small, medium and micro enterprises
SPV	Special purpose vehicles
TAFE	Technical and further education (Australia)
TB	Tuberculosis
TBVC states	Transkei, Bophuthatswana, Venda and Ciskei

THRIP	Technology and Human Resource for Industry Programme
TIA	Technology Innovation Agency
SER	Self-evaluation report
UE	Unit for Entrepreneurship
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UFS	University of the Free State
UK	United Kingdom
US	United States
USD	United States Dollar
USM	Universiti Sains Malaysia
UTEP	University of Texas at El Paso (United States)
ZAF	South African Rand

Assessment and recommendations

The Free State: from missed opportunities to inclusive growth

South Africa is Africa's largest economy, accounting for 40% of the Gross National Income (GNI) in sub-Saharan Africa. Although dependent on natural resources, it has one of the most diversified economies in Africa. Since the end of apartheid, South Africa has experienced a profound process of political democratisation and macro-economic stabilisation. Central government has implemented social and educational reforms to address long standing disparities. However, economic growth has not translated into adequate job creation and the economy remains vulnerable to external shocks.

With a population of over 48 million, South Africa continues to struggle to overcome the social and economic legacy of apartheid. A large part of the black working class continues to be excluded from the labour market. About 2.8 million young people are out of employment, training or education. The lack of skills is related to the failure of educational system that features deep disparities between population groups, low enrolments and high dropouts. Poverty, criminality and the impacts of HIV/AIDS are major national concerns. The persistent racial stratification and differences in social, economic and health outcomes between population groups are partly due to the apartheid education system, which served blacks and coloureds poorly.

The Free State Province is the third largest of South Africa's nine provinces, representing nearly 10.6% of the land area, but only 5.7% of the population (approximately 2.9 million). The Free State is losing ground to most other provinces due to outmigration and poor health outcomes, and has in fact lost prime members of its working force. There are high rates of unemployment and poverty that exceed national averages. Only one-third of the working age adults are employed. Long term unemployment rates are above national averages with deep diversities between population groups. It is estimated that there are at least 150 000 unemployed youth who are neither in training or education in the Free State.

Centrally located and landlocked, the Free State lacks obvious regional assets and features a declining economy. It is the second lowest contributor to the South African Gross Domestic Product after Northern Cape. Historically based on agriculture and mining, the regional economy is on the decline as there has not been sufficient growth in industry or services. Except for the petrochemical industrial base in Sasolburg, the province has struggled to substitute its resource dependence or to build on linkages between the primary and secondary sectors. The shift from primary sector employment has reduced the employment possibilities for the low skilled population and resulted in exodus from rural areas and townships.

The Free State lags behind the national averages in key education indicators, which in turn are significantly below the OECD average. The Free State educational attainment rates at all levels are mostly below the national averages and participation levels to higher education are particularly low. The economic structure and the underinvestment in human capital development have resulted in low income levels, high poverty rates, underdevelopment and general social strife. In the South African context, although not the weakest performer, the Free State is a lagging and under-performing region.

In the context of the gaps in both economic development and education outcomes, the key challenges for the Free State and its higher education and training institutions (including colleges) are:

- How to develop a more inclusive labour market and education system?
- How to create an economy that can absorb both highly skilled and low skilled population?
- How to address long-term challenges of poverty, inequity and poor health?
- How to turn the potential of HE sector into an active asset for the regional development?

To address these challenges, the Free State needs joint efforts in regional development including a human capital and innovation strategy, with a vision, measurable goals, milestones, co-ordination measures and a robust evidence base. Long-term investments in education are necessary to lift up significant numbers of population from poverty. National and provincial authorities, higher education and training institutions (including vocational and FET colleges) and the private sector need to join efforts to improve access and success in education by providing stronger academic, social and financial support for students and engaging in long-term collaboration with colleges and schools. Higher education provision needs to be better aligned

with the needs of the Free State, by building stronger links between institutions and industries in the region, taking steps to create new enterprises and facilitating transition from informal to formal economy. Research, development and innovation efforts need to build on the existing and emerging challenges and advantages of the Free State. Universities should make job creation a key goal for innovation and human capital development and make the region a laboratory for education, research & innovation, particularly in the fields of health, learning outcomes, agriculture, water management and rural development. Universities in collaboration with regional stakeholders should rediscover and develop regional assets and use project approach and potential of flagship events to mobilise sustainable regional collaboration. Finally, the existing good practices in school/college collaboration, rural development, recognition of prior learning and industry engagement should be scaled up into a system within and between institutions.

Human capital and skills development in the Free State

Higher education and training in South Africa and the Free State has experienced expansion and transformation over the past two decades. Despite progress made, the human capital capacity remains low.

Since the end of apartheid, the South African higher education and training system has experienced expansion and widening access to a more diverse student population. The number of South African higher education institutions has been reduced from 36 to 23, largely by merging *technikons* and apartheid homeland universities as well as clustering 300 technical college campuses into 50 FET colleges. The university sector as a whole has expanded dramatically, with the number of students rising from 473 000 in 1993 to 761 000 by 2007. The rate of faculty growth has been slower and the student-faculty ratio has risen from 21:1 to 23:1 over four years. University faculty numbers grew from 20 500 in 2000 to 21 800 in 2003, an increase of 6%, compared with an increase of 22% (18% in full-time equivalents) in the size of the student body.

While the number of higher education and training students has increased, higher education (excluding training) attainment levels remain low, 4.3%, (OECD Education at Glance 2011) and the gaps between population groups significant. During the period of 2004-07, the overall higher education (excluding training) participation rate stagnated around

16%, with African and Coloureds featuring about 40-30 percentage points lower participation rates (both 12%) than White (54%) and Indian (43%) students. The proportion of African students in South African universities increased from 49% in 1995 to 63% in 2007 and is presently about two-thirds of the total number of university students. African students have a higher likelihood of dropping out: while 63% of all enrolled students are African in public universities, they make up only 57% of the graduates.

As a result of mergers and institutional transformation, the Free State is endowed with two public universities based in Bloemfontein, each with diverse missions, student enrolment and resources: the University of the Free State is a research-based university with over 30 000 students whereas the Central University of Technology enrols 11 500 students in vocational orientated education programmes. These two universities enrol altogether approximately 41 500 students. Vocational skills development is the responsibility of the further education and training (FET) sector which has less than 23 000 students (2010) and is in transition as a result of a merger into four diverse multi-site colleges and transfer under the national Department of Higher Education and Training (DHET).

Despite the fact that university students represent 2.4% of the regional population, the key education indicators in the Free State remain below the national averages with low higher education and training participation and attainment rates. In 2008, the Free State higher education and training attendance rate was only 9.2% among the 20 to 24-year-olds compared to 9.9% in the whole country. Enrolment in post graduate studies had dropped from 40% to 26% revealing a lack of capacity to train highly-specialised personnel for the regional economy.

Challenges in the higher education and training sector and economic development are linked to the underperforming school system and a massive school failure. Long term collaborative efforts are needed to improve the quality and learning outcomes of the education system.

Challenges in higher education and training in the Free State and South Africa in general are linked to the underperforming school system which features high dropout rates and poor learning outcomes. The efficiency of the primary and secondary education system is low and many youth leave schools without adequate skills to enter the labour market or higher education. The Free State school enrolment rate is declining. Massive school

failure undermines the efforts to enhance higher education and training systems participation and economic development.

Due to the insufficient preparation, early family responsibilities imposed on school age children (due to unemployment alcoholism, HIV/AIDS) and a lack of adequate student support, there is a high level of educational failure in higher education and training in the Free State and South Africa in general. The drop-out rate is estimated at 40% among the first year students in South African universities while only 15% of students complete their studies in the allotted time. The Free State higher education and training system demonstrates a low level of efficiency in graduate production. From 2000 to 2008, both universities underperformed in terms of students' success rates (72% for the University of the Free State and 74% for the Central University of Technology against the national target of 80%) but where still among the best performing South African universities. The four further education and training colleges have very low pass rates, below the South African average.

National, provincial and municipal (local) authorities need to address the quality and equity challenges in general and FET school/college education and training in a comprehensive manner, by improving the quality of the education offered and mobilising appropriate levels of financial resources. Universities and further education and training colleges should strengthen these efforts by engaging in long-term collaboration with schools in order to improve learning outcomes of students and the quality of teaching.

In the Free State, the two universities have each developed their own initiatives to improve access and success in education whereas wider collaborative action remains limited. Good practices include the University Preparation Programme of the University of the Free State which is based on a partnership with the further education and training colleges. The university is in the process of shifting its community engagement and service focus on closer collaboration with schools. It has launched innovative approaches such as long term collaboration with 20 most dysfunctional schools in the Free State and projects such as "Every Child Reads". In addition, to the Saturday and Winder Schools in mathematics, science, English and accounting, the Central University of Technology is launching in collaboration with Telcom (South African telecommunications company) a primary school teacher development and mentoring programme in STEM fields. What is missing is a system-wide long term public-private partnership to improve access and success in education. Inspiration could be drawn from the El Paso Collaborative for Academic Excellence that encompasses all schools and higher education and training institutions, as well as public and private sector in long term collaborative action and has achieved measurable improvements in the learning outcomes of the low

income population. New innovative learning models are needed in science and technology fields (see Chapter 2).

The education system needs to become better aligned with the needs of the region, its labour market and population. The Free State has a dual economy, dual labour markets and skill requirements. The modern sector must enhance its competitiveness on global markets while the traditional, mostly rural sector, requires anti-poverty programmes focused on job creation and the development of skills that can support rural livelihoods.

There is a mismatch between labour market demand and higher education and training supply that is undermining the Free State's growth and innovation potential, and has resulted not only in high unemployment but also skills shortages. The unemployment rate in the Free State reached 28% in the second quarter of 2010 (South Africa 26.5%), youth unemployment being at least double this rate (no robust data is available for the Free State, but for SA as a whole the rate was 47% in 2007). At the same time there is a dire shortage of technicians and low proportion of science and technology graduates from the universities. Youth unemployment, poor graduate employment outcomes, labour market mismatch and brain drain are challenges that the provincial government and the higher education and training system need to address.

Currently, education provision is biased towards humanities and social sciences. The University of the Free State is relatively strong in agriculture and natural sciences (15.4 %) reflecting the dominant place of the primary sector in the regional economy. At the same time, the needs of the health sector are not well covered and there are manpower shortages for certain professions (paramedical, pharmacist). Engineering as well as law, accounting and health professions are areas of scarce skills. The proportion of STEM students of the Central University of Technology stood at 45% of the total student headcounts in 2010 who are mainly in engineering, IT, the build environment, health and environmental science and education.

There is a lack of robust data about student progress, graduate performance, employment outcomes and graduate destinations (where students find work) at the national, provincial and institutional levels. The provincial government does not have a mechanism to provide an adequate vision of graduate employment. The universities themselves have not yet

established methods to track graduates as a way of informing curriculum development and better understanding how education meets the needs of society and the economy.

Universities in the Free State are primarily focused on national labour markets. There is a need to move towards a demand-led education provision, and the Central University of Technology has taken steps to this direction (STEPS process and nine new study programmes). There is also a need to strengthen the development of skills and competencies of the students, and to build stronger links between institutions and labour market. This could be achieved through a wide range of measures, including enhanced and better targeted academic, social and financial support for the first generation students, high quality work-based learning for all students that currently benefits only a small portion of students. For example, only 15% of students of Central University of Technology are involved in some type of work-based learning. While the small proportion is partly explained by the fact that the work-integrated learning takes places at the third year and embraces a much smaller cohort of students, there is a need for closer collaboration with the industry and other employers, participation of employers in the curriculum and course design, and tracking of student progress, achievement and labour market outcomes.

As a legacy of apartheid that discouraged entrepreneurship among African population, the Free State has low levels of self-employed and a low rate of knowledge-based business creation. Finding ways of increasing entrepreneurship could be an effective strategy to facilitate graduate retention and job creation. There is scope to improve universities' contribution to entrepreneurship. The focus could be on the one hand on growth-oriented technology-based entrepreneurship, and on the other hand on social entrepreneurship and strategies that facilitate transition from the informal to formal economy.

The high levels of unemployment and a large number of the population with low skills necessitate effective lifelong learning provision. Skills upgrading, re-skilling and other forms of lifelong learning are becoming increasingly important in many regions. In the Free State where the adult population has had limited opportunities for education, they are a matter of urgency.

Public work programmes that support practical skills development are provided by the provincial government in health services, construction, maintenance and environmental projects (Operation Hlasela). Current skills development efforts could be strengthened through partnerships with local further education and training colleges, and universities.

While the focus on practical skills development is commendable, too narrow skills development schemes and short-term employment contracts will not serve the regional population in the long run. Stronger emphasis should be placed on general competencies allow people to gain the capacity for lifelong learning and to enter and to adjust to the changes in the labour market.

In the Free State, there is an overall lack of focus in the lifelong learning and limited co-ordination. To date, the universities in the Free State are geared more towards meeting the needs of traditional students than those of adult learners. The current mechanisms to recognise prior informal or non-formal learning remain project-based and do not satisfy the needs of the population. While the universities are aware of adults' needs, they target their continuing education narrowly to adult learners with university degrees. Not enough robust data is available to understand the needs of this population or the efficacy of higher education and training in meeting them.

To improve the synergy of the post-school education, the national authorities have transferred the further education and training sector to the National Department of Education and Training (DHET) from 2010, paving the way for a transformation that can make these colleges more responsive to the socio-economic needs of their regions. Universities could support the restructuring, expansion and quality improvement of the further education and training colleges in collaboration with the DHET and the provincial and municipal (local) governments by: *i*) training FET teachers; *ii*) establishing transparent articulation mechanisms and pathways between different levels of education; and *iii*) undertaking research to better understand the FET sector and providing labour market information to align programmes with the labour market needs.

One of the main factors impeding human capital development is the absence of mechanisms to articulate a long-term vision and implement an integrated development strategy for all educational institutions in the province.

One of the main factors impeding human capital development in the Free State is the absence of mechanisms to articulate a long-term vision and implement an integrated development strategy for all educational institutions in the province. The advantages of a system-wide governance model is the ability to plan more effectively for the higher education and training needs of the region, to co-ordinate missions and programmes, to encourage an appropriate division of labour among institutions and to provide transparent pathways for students through the education system. An important dimension of good governance consists of putting in place an adequate information system to monitor the performance of higher education and training in the Free State and benchmark its progress with appropriate comparators in South Africa and emerging economies.

The following measures would promote human capital development in the Free State:

Recommendations for national government

- Improve affordability of education in order not to price higher education attainment beyond the reach of students from low socio-economic backgrounds. The national government should develop the forms of cost sharing in higher education through means-tested scholarships, income contingent loans or other funding packages to complement the existing loan and grant schemes.

Recommendations for sub-national (provincial) entities

- In the interest of sustained regional development, make every effort to establish a co-operative culture among the post-school educational institutions, the governments and other public and private stakeholders in the region. To this end a post-school educational co-ordinating body should be constituted with representatives of all the relevant stakeholders including the Ministry of Higher Education and Training (MHET), business and industry. It would articulate a vision for the socio-economic development of the region, foster co-operative projects between institutions and other partners in the region. Among its goals should be the following:

  i) Lead the skills component of the regional strategy for development. Articulate a vision for the socio-economic development of the region. Jointly plan the offering of new programmes with the help of market

research indicators. Plan for the provision of high level skills provision for the socio-economic development of the entire Free State.

ii) Mobilise public and private stakeholders around educational projects for the region. Share strategies in mobilising private funding in addition to state funding for education projects. Foster co-operative education projects between institutions. Prioritise efforts and funds in accordance with long term educational goals.

iii) Co-ordinate the provision of education and training from a coherent lifelong learning perspective. Develop a comprehensive long-term strategy to increase completion rates in secondary education and the preparation of both youth and adult population for further education and the labour marker. Avoid duplication and overlap of educational programmes. Facilitate the joint provision by different stakeholders of training for continuing professional development. Articulate the FET and university offer through educational pathways and the accreditation of prior learning. Establish a management information system for post-school and higher education institutions of the region.

- Recognise the increasing relevance and importance of the further education and training sector for the long term development of the Free State, and support and encourage its restructuring and rejuvenation through collaboration with the higher education institutions. The development of the FET sector can make a crucial contribution to middle levels skills development by absorbing large numbers of out of school unemployed youth.

- In collaboration with higher education and training institutions, take steps to significantly expand educational opportunities for working age adults. These steps should create clear and transparent pathways to advanced education for adults, including the ability to attend multiple institutions, obtain short-term education and training that can later be applied to degrees, and re-skilling and up-skilling courses and programmes designed around the particular needs of adults who combine work and study or may lack entry level skills to education and the labour market. In addition to skills development, place emphasis on general competencies that will allow people to adjust to rapid changes in the labour market and develop the capacity for lifelong learning. In collaboration with the two universities and the Services Sector Education and Training Authority establish a provincial continuing education centre, for example by developing the Free State Development Training Institute.

- In collaboration with higher education and training institutions, develop and improve robust data on the regional context and on the situation of individual universities and further education and training colleges, particularly on labour market needs and trends and student access and progress, in order to support evidence-based decision making at the regional and institutional basis. The most effective region-wide graduate labour market systems are based on comprehensive labour market intelligence, on-line publication of the data in a single place to improve students' ability to make rational choices about their studies and to help graduates and employers to come together and increase students' chances of moving into employment. Finally, the data should be strategically used to identify regional priorities and to develop the provision of course offerings and employer-specific skills.
- Improve connectivity and mobility between the urban centre of Bloemfontein and the rural areas. Accessible public transport and high speed internet connections should be developed to enhance access to education and labour market in remote communities.

Recommendations for institutions

- Expand efforts to increase the enrolment of students from low socio-economic backgrounds as well as the efforts to improve their completion rates. These efforts should build upon international best practices of effective academic, social and financial support for students, long-term collaboration with schools and further education colleges to improve students' learning outcomes. To improve quality of teaching take a lead in designing induction and professional development programmes for new school teachers and leaders. Ease the financial burden of attending higher education and make bursaries and loans available to students.
- Provide comprehensive professional development programmes for university teachers, many of whom were educated during the segregated education system, in order to help them to address a larger and more diversified student population. The provision of regular short courses to improve teaching skills, assessment and feedback from students, attending seminars and workshops to improve teaching and learning, inclusion of state of the art information technology, and a provision of a teaching portfolio at the time of promotion would be important contributions to this direction.
- Work together with public and private sectors to improve the quality and labour market relevance of university education, and alignment with the regional needs in a systematic way. Focus on strengthening the regional

employability and entrepreneurial skills of all graduates providing them with the skills and competencies needed in the globalised knowledge economy. Create ties between students and regional employers in fields of critical importance to the region through internships and co-op programmes. Ensure that all students have access to well organised high quality work- and problem-based learning opportunities to help improve graduate retention in the region. Monitor student progress, as well as students' labour market outcomes and graduate destinations.

- In collaboration with other institutions enhance lifelong learning provision to address in particular the needs of large numbers of unemployed, out of school youth and to ensure that courses are offered in the different geographical areas of the province, mobilise the outlying campuses in Qwaqwa and Welkom for lifelong learning. Use intellectual and physical resources in partnership with the Ministry of Higher Education and Training (MHET) and the provincial and municipal (local) governments to train FET college lecturers, establish articulation mechanisms between different levels of education and undertake research to provide labour market information in order to align FET programme offerings with the regional needs.
- Make stronger efforts to internationalise the region, through talent attraction and development programmes supporting key areas of development of the Free State, integration of international students and faculty in the academic and social life of their universities and the region by training them to become "ambassadors for the Free State".

Innovation in the Free State

Although adjacent to the Gauteng Province and its large urban areas, the Free State does not sufficiently prioritise R&D investment and innovation. The Free State is a vast rural state whose economic framework conditions are uneven. The higher education and training sector has an important role to play in inducing changes and should be mobilised not only to better serve the needs of the regional labour market, but also to strengthen the regional research base and improve its contribution to the knowledge economy.

As in the rest of South Africa, the Free State research and development (R&D) is relatively low, below 1%, as a share of GDP. R&D investment is mostly financed by the private sector. This high business expenditure on R&D (BERD) / Gross Domestic Expenditure on R&D (GERD) rate increases the opportunities for research to be translated into new products and processes. Higher Education Research and Development (HERD) remains modest in the Free State, but the share of university research funded by the private sector is important according to world standards. The two universities form a knowledge infrastructure which is a strength for the regional economy, albeit small in relation to the size of its population.

The Free State university system needs to improve its performance on several dimensions. Firstly, higher education institutions are educating a relatively low proportion of science and technology graduates. More focus on science and technology would increase the innovation capacity in the academic sector and subsequently in the medium term in the regional economy. Secondly, Masters and PhD graduates are limited in number in all disciplines. In the Central University of Technology, they only account for 2.6% of the students. In the University of the Free State, the figure is considerably higher, but still modest for a research-intensive university. There is a need to change this situation if productivity rates are to be upgraded. Thirdly, the supply of graduates is poorly aligned with provincial needs, particularly in the health, engineering, and law and accounting sectors. Technicians are said to be in high demand but the further education and training colleges have failed to deliver the intermediary skills that are being sought in the labour market. Bridging the gaps would help to reduce labour costs.

In internationalisation, both universities have room for improvement to boost their R&D capabilities. The Scimago classification, for example, places the University of the Free State as 1864th in rank for research output. The quality of its research has not yet reached international reputation in terms of the citation index. While the University of the Free State is not yet fully engaged in international co-operation, it is well-positioned in clinical medicine and animal science research. The younger and smaller Central University of Technology has more limited resources and does not appear in the rankings.

National policies do not yet sufficiently support regional innovation systems or clusters and innovation resources remain concentrated in Gauteng. This slows down the capacity building at the sub-national (provincial) and municipal levels and affects provinces such as the Free State.

The universities in the Free State HEIs have to face a number of challenges linked to their weak internationalisation, modest R&D performance and technology transfer initiatives which are at early stages of development. Co-operation with local firms also remains a challenge. There is also a need for a more pro-active strategy to inject dynamism and entrepreneurialism in the regional economy.

South Africa, and notably the Free State, have been isolated for a long period due to the apartheid and continue to lack strong engagement in international research and education networks. Both the University of the Free State and the Central University of Technology are making efforts to catch up. The University of the Free State has established a new directorate for international affairs which has a strong focus on research collaboration. It has established a number of co-operative links with European and US universities, notably in the agricultural sector to strengthen its research base and has also engaged in attracting top academics. This innovative approach could be targeted to support the Free State's regional development needs. The Central University of Technology has a wider portfolio of partnerships mainly with African countries but fewer students are involved in these collaborations.

Another objective pursued by the universities in the Free State need to upgrade and expand R&D activities. Efforts have been made to increase the number of accredited publications. For the University of the Free State, 2009 has seen an increase of nearly 20% in the number of articles published compared to the previous year. R&D investment continues to be supported by the central government with more than ZAR 50 million (South African rand) in 2009, while the Central University of Technology was relatively less favoured, receiving about ZAR 15 million. Opportunities for rapid development in this domain are limited due to the lack of involvement of the provincial government, its weak resources and a lack of guidance.

Despite this mitigated perspective, the transfer of research results to the innovation stage has been relatively well organised, but stronger efforts are needed to enhance the local impact of innovation activities. The Central University of Technology has built several units for this purpose including a Rapid Prototyping Centre, a Product Development Technology Station (focused on materials application) and a fabrication laboratory FabLab aiming at fostering medical development. The University of the Free State's technology transfer of office is endowed with a staff of three and has a portfolio of 16 patents. While it has been successful with a number of start-

ups, these do not generate royalties nor create jobs in the region. Furthermore, there is no venture capital or access to patenting advice from the law faculty.

The Free State universities have a significant record of co-operative agreements. The University of the Free State, for example, partners with a number of multinationals and large firms. Within the framework of the THRIP (Technology and Human Resource for Industry Programme), it has been engaged with 12 large companies, including Telkom, Xstrata, ARM Gold and Southern Sun. Collaboration may take the form of internships, which is a relatively widespread practice with banks and local government services companies. In the Central University of Technology, work-based learning has diffused to hospitals, the tourism industry and ICT but comparatively less to engineering and material sectors.

Collaboration with small firms remains a challenge and the interactions with new business limited. The Free State, and South Africa as a whole, lacks dynamic entrepreneurship (as shown by Global Entrepreneurship Monitor Studies). The Free State universities have taken steps to introduce entrepreneurship modules in a growing number of curricula. For example, the Central University of Technology has launched a flagship programme aiming at fostering African entrepreneurship. It also envisages setting up an entrepreneurship hub at the Welkom campus to facilitate practical entrepreneurship exposure of students. The University of the Free State is becoming committed to developing entrepreneurship-based curricula. At the same time, it is concerned with the need to address long term unemployment and aims to assist job creation in all population groups. It has a small unit in charge of specialised courses, training of entrepreneurs and business plan services. Both universities have programmes for new venture creation.

The Free State economy has a number of weaknesses and numerous gaps, with the most dynamic segments concentrated in a few large cities. Innovation infrastructure remains fragmented and underdeveloped. The higher education sector is not producing sufficient numbers of graduates particularly in science and technology fields, and has difficulties in responding to the labour market demand. As a whole, the economy is underperforming and the Free State productivity rate is lower than the national average. Of particular concern is the decline of educational attainment of the young age cohorts, especially within the 25-29 age group in the last decade.

There is an urgent need to strengthen the Regional Innovation System, the capabilities of the universities to generate jobs and skills, and the need to consolidate R&D policies, including better exploitation of the Free State's comparative advantages in a number of niches, including water

management, agriculture, nanotechnologies and advanced molecular research. Furthermore, the Free State universities should make job creation a key goal for innovation and human capital development and make the region a laboratory for education, research & innovation, particularly in the fields of health, learning outcomes, agriculture, water management and rural development.

The following measures would promote regional innovation in the Free State:

Recommendations for the national level

- Enhance the regional contribution of higher education institutions. Given the financial constraints, it is important to build on existing strengths and align research programmes with regional priorities to ensure future sustainability.
- Strengthen the Regional Innovation Systems by launching new initiatives at the national and local to help universities forge stronger links with the business sector. First, policy measures should be taken to improve university services to firms and to develop communication policies about research results. Second, an incentive system should be established to favour the development of contract research. Voucher systems (such as those operating in Netherlands or Italy) could be a way to link small and medium-sized enterprises and the R&D units in the universities. Third, public grants to research programmes should be extended to priority sectors.
- In collaborative research, research awards and research collaboration, move away from direct allocations to competitive mechanisms in order to enhance outcomes and to increase overall productivity.
- To upgrade existing industry and to improve graduate retention, consider establishing specific people-based mobility programmes to link the students, graduates and post-graduates with the local business and industry in a more systematic way. Models for linking postgraduate students with the local industry include the Knowledge Transfer Partnership Scheme in the United Kingdom that has improved the competitiveness of the companies through introduction of innovation or new technology and helped retain 75% of the postgraduate associates which participate in the projects.
- Provide opportunities for provincial governments to build innovation programmes involving the higher education sector and in particular to

support these programmes in collaboration with neighbouring provinces. In South Africa, provinces have limited margin of manoeuvre and resources. In the case of the Free State, an overwhelming share of funds comes from the central government and is earmarked to national priorities, whereas only 3% *i.e.* ZAR 600 million go to regional development promotion. At the same time, The Free State Provincial Government is endowed with a growth and development strategy and the capacity to co-ordinate initiatives at regional level and agencies and state-owned corporations (*e.g.* the Free State Development Corporation to attract investment and the industrial and small enterprise development corporations to assist the business sector) have been established to translate the provincial strategy into action and to conduct the innovation policy. There is a need to link academia with state agencies, public corporations and special purpose vehicles in order to take advantage of the social capital in the regions and focus on collaboration in science, technology and innovation. University faculty could also participate on the board of agencies and public corporations and assist in soft co-ordination and evaluation of their activities in close collaboration with the private sector. The Free State would also benefit from joint efforts with neighbouring provinces to pool resources and to fund joint research programmes in areas of common interest. This would not only help to reach the critical mass in technological niches but would also encourage the international networking of universities.

- Enhance the co-operation between the universities at the local and regional level. Although industry co-operation seems central to the Central University of Technology's policy (business and industry are considered as primary partners for building strategic partnerships for broader societal development) as well as the University of the Free State policy (cluster initiative), there is very little evidence of research collaboration between the two universities which have embarked on numerous overlapping research areas. For example, the Central University of Technology has strengths in applied food science and biotechnology and nearly half of University of the Free State's research output is in natural and agricultural science. Moreover, there are few interactions between the University of the Free State and the SMMEs sector. Forming a consortium with the Central University of Technology would help the University of the Free State to take advantage of the CUT experience. The Regional Innovation Centre (RIC) offers an opportunity to depart from the legacy of the past and to overcome the traditional barriers to co-operation. While incentives could come from R&D national funding agencies such as the Technology Innovation Agency or the National Research Foundation, the provincial government would be best placed to act as a mediator. It is necessary to change the

status quo in order to better harness the research assets of the two institutions.

- Promote a research culture within universities and increase universities' R&D. The expansion of innovative activities throughout the South African economy requires considerable expansion of university research in order to provide the necessary research capable human resources at all levels of qualifications. This is particularly important in the Free State where the government and science council spending in R&D is relatively low (12% of provincial R&D, compared to 20% for the whole country). At the same time, the researcher population is ageing and mainly composed of white males, calling for more racially balanced replacement cohorts. Greater efforts are needed to make research activities more attractive, to reduce dropout rates and to encourage student intake of the most comprehensive curricula. The restructuring of R&D programmes along those lines imply a new funding approach with two focuses: concentration of funds and innovative project selection. Firstly, it is important that the central government and its agencies channel sufficient research money to university R&D programmes and avoid stretching resources too thinly over too many priorities. So far, among the 93 research niche areas identified by the National Research Fund, the region has accessed 12 and received ZAR 15 million. On average, this is about ZAR 1.25 million or EUR 125 000 per niche, which is a relatively low figure. Secondly, the focus should increasingly be on interdisciplinary R&D and the co-operation between art and design, and science, engineering and technology, or between health and environment and agriculture.

Recommendations for the sub-national (provincial) level

- Encourage more systematic and institutional collaboration between higher education and training institutions and local firms. This collaboration should focus on areas where the Free State has a real or potential comparative advantage, rather than on a narrow sector specialisation. Technologies with cross-sector fertilisation potential should be promoted. Universities should work to ensure that local firms are aware of the benefits of hiring graduates.

Recommendations for institutions

- Focus concerted university efforts on challenge-driven innovation on the key issues in the region, such as water, health and poverty reduction, and use the region as a "laboratory" for research, knowledge transfer

and outreach to reach global levels of excellence. Job creation should be seen as the goal of innovation activities. Combining community outreach into training and challenge-driven research can generate improvements in life quality and low tech innovations.

- Broaden the understanding of knowledge transfer, knowledge utilisation and exploitation and place less emphasis on immediate and direct financial return to the university. By focusing on how the university research can support jobs, industry productivity and innovation in the region, the university technology transfer offices could move towards a system that is based on continuous collaboration with industry, government and other partners. Interventions with low revenue potential but high potential to yield societal returns in order to build support among broader segments within universities and within non-profit sectors in the region.

- Widen the innovation focus to low tech sectors and to organisational and social innovation, and align with regional priorities. The further education and training sector has an important role to play because it trains the technicians and middle management officers that are important to nurture the incremental innovation of a number of locally based industries. These industries – retail, transport and logistics, tourism, distribution – underpin the growth dynamics of the province. It is important to enhance the synergies between this sector and the universities, particularly the Central University of Technology, that provides part of the teaching staff for the further education and training colleges. Improving the information base about private FET sector is also necessary if the efficiency of the catch up strategy is to be improved.

- Strengthen and clearly articulate a demand-oriented technology transfer strategy in both universities. In its 2005-10 R&D Plan, the Central University of Technology has taken steps to cluster together academic research leading to qualifications, research outputs and commercialisation of R&D. Although the research cycle concept has merits, care needs to be taken not to overemphasise the technology push approach which involves risk of maladjustment to demand and may reduce the chances of success of R&D commercialisation. Bottom-up demand can be promoted through intermediary organisations such as CRPM or Fablab in the Central University of Technology. These structures respond to service demand for testing, prototyping and technical assistance, and provide a good vehicle for innovation development, but would benefit for a stronger SMME customer base that would enhance the university's brokerage role. This would be

facilitated if the technology transfer office could act as a forum for clusters and local firms and be an intermediary in building supply chain. More attention should be devoted to the incubation process which in both universities is generating few firms. Recourse to coaching and mentoring initiatives could be implemented to trigger off more significant outflows of new firms. Finally, the technology transfer strategy in both the University of the Free State and the Central University of Technology need to be conceived in a long term perspective integrating entrepreneurship teaching for students and linking it with incubation activities.

- Align skills development and higher education with regional needs. Teaching and education play an important role in innovation. Governments often focus on R&D conducted by academia, the development of university spinoffs and HEI patenting, whereas there is too little emphasis on skills development. Because undergraduates and graduates are the primary source of innovation in the organisations they join, it is crucial to consider the broader significance of labour market processes for the technological and organisational dynamisms of regions. In the Free State, this is all the more important as the skill potential is limited and seemingly not significantly expanding. The Central University of Technology provides dedicated degrees and certification courses to suit the needs of the local and regional markets as do most polytechnics and universities of applied sciences in the world. However, its yearly production of graduates is low: in 2010 only 198 Masters Degrees and 65 PhDs were awarded. While figures are ten times higher in the University of the Free State, a significant share of these graduates find jobs outside the Free State. The Central University of Technology has strengthened its co-operation with companies and engaged in placement arrangements but internships remain limited to a small number of sectors. These arrangements need to be expanded and organised on a more systematic basis. Both universities also need to build a strategic intelligence capacity in anticipating needs. The focus on regional engagement is fully compatible with both universities' focus on internationalisation. These two policies of regional and international engagement are in fact mutually reinforcing as a better understanding of labour market demand helps to identify the skills gaps and to focus international collaboration on foreign institutions supplying them.

Capacity building for regional development

While South Africa has made progress in developing place-based policies, the regional development policy and regional economic agenda remain largely defined and implemented in a top-down fashion, leaving limited leeway for regional initiative and capacity building.

The most notable policy instrument in the regional development of South Africa is the National Spatial Development Perspective (NSDP), drawn up in 2003 as an initiative from the Presidency. While it requires provincial governments to define and implement Provincial Growth and Development Strategies that follow the priorities and guidelines of the NSDP, no special national funding has been set aside for these strategies. Furthermore, higher education and training institutions do not have a clear role in the development and implementation of these strategies. Other policies, such as the science and technology policy, have a focus of supporting the development of the current growth centres in the country.

In the case of the Free State, critical framework conditions must be developed to move towards more inclusive regional development. These include: *i*) an inclusive labour market and an educational system that generates skilled workers; *ii*) a regional innovation system that matches the needs of the regional firms and is able to absorb the new skills; *iii*) public transportation and communication that help eliminate spatial and social mismatches; and *iv*) an improved environmental conditions that enhance the region's capacity to attract and retain talent and direct investments.

Higher education and training policy in South Africa lacks regional dimension. Regional engagement of universities could be fostered through quality assurance, funding allocation, and criteria and processes for faculty appointment, promotion and tenure.

Higher education and training policy in South Africa lacks regional dimension at the national, provincial and local contexts. The experience in the OECD countries indicates that it is a challenge for universities and other higher education institutions to be engaged with the regions unless polices at

the institutional and national levels are aligned with this objective. Without policies and corresponding incentives universities and other higher education and training institutions are driven to satisfying their own self interest.

The current South African higher education and training policies do not recognise or reinforce initiatives by universities and further education and training institutions to relate their missions to regional issues. While there is an obligation for community engagement and some aspects of national policies may support regional engagement, regional development is left to the initiative of the individual institutions. Incentives for mobilising universities and further education and training colleges for regional and city development are limited.

Regional engagement of universities' core activities can be effectively fostered through quality assurance, funding allocation, as well as criteria and processes for faculty appointment, promotion and tenure. Funding policy is the most influential policy tool that governments can use to impact the behaviour of higher education institutions and their faculty. National and provincial governments in South Africa could consider the establishment of regional public-private investment funds to provide funding for building capacity within higher education institutions for regional engagement and for incentivising the institutions and individual faculty members for regional initiatives. In the United Kingdom, the Higher Education Innovation Fund contributed to a significant increase in the locally relevant activities of universities. Another source of funding for universities' regionally relevant work could come from charitable donations, trusts, persons of wealth and alumni. The universities in the Free State could make stronger efforts in this domain, for example, by engaging with their alumni and developing other systematic mechanisms that support voluntary giving.

Universities that want to mobilise their staff in support of the regional agenda need to ensure that the regional agenda is taken into consideration in the recruitment, hiring and reward systems as well as human resource development. Tangible rewards and incentives make it possible to change behaviours and ultimately attitudes and values. Employment and human resource management practices need to allow greater segregations of roles among university staff, with different kinds of workloads and reward systems. Universities in the Free State could find inspiration in the work of the University Rovira i Virgili (Spain), which has not only created incentives to encourage faculty contributions beyond the conventional arenas of research and teaching, but also created methods to evaluate those contributions.

Partnerships in the Free State between higher education and training institutions and the regional and local partners, acting in concert with each other, are key to addressing the regional challenges, attracting talent and investments, and partnering with other regions and tertiary education institutions globally.

The challenges in the Free State are complicated, ranging from poverty, illiteracy, low educational attainment levels, unemployment, poor health outcomes and brain drain. No single university, FET-college, provincial government, organisation or agency has the capacity to address these issues alone. Broad-based collaboration among provincial and local governments, business and industry, universities or other higher education institutions is required. By working together these regional stakeholders could generate a greater dynamism and create change in the local economy and society.

Higher education and training institutions in the Free State are engaged in diverse collaboration with regional, local and industry partners. Much of this collaboration is at an *ad hoc* basis without long-term planning, adequate resources and monitoring of the results. Permanent long-term collaboration is needed to address the challenges and opportunities of the Free State. Some pioneering collaborative institutions have been established, such as the Provincial Planning Commission and the Provincial Skills Development Forum. There is a need to build on the experiences of these efforts, to learn from these experiences in order to build a permanent partnership structure that co-ordinates strategic collaboration between universities, industry and the provincial and municipal governments. Collaborative work should be supported by a detailed knowledge of the needs and opportunities in the province and the knowledge of the higher education institutions' research and education portfolio.

A regional plan for action would facilitate stakeholder mobilisation and increase citizen participation. Focusing collaboration on key issues such as environmental, educational, and health challenges in the region could help bring local and regional leaders together. They would also benefit from challenge-driven research and development conducted by universities which seek to increase the economic and social impact of universities.

The following measures would promote regional capacity building in the Free State:

Recommendations for the national level

- Consider launching stronger regional development strategies and to enhance capacity building in regions. International experience shows that increased decision-making power at sub-national (Provincial) levels of government combined with co-ordination mechanisms can unleash the potential in the regions. As regional capacities are built through "learning by doing", increased responsibilities at the regional level are necessary to build skills and develop problem solving approach.

- Strengthen the links between the regional development and higher education and R&D to unleash the potential of South Africa's diverse regional assets and characteristics. Achieving this goal would require: *i*) human capital policies that are sensitive to the characteristics of the regional environment; *ii*) greater participation of education institutions in regional development matters; and *iii*) stronger collaboration and links among higher education institutions, research centres, regional and local authorities, local businesses and regional development agencies. The goal should be to raise the quality and relevance of education, training and R&D, making them relevant to the local and regional economic and social needs of the Free State and oriented towards achieving the region's potential.

- Make explicit in higher education and training legislation and policy, the regional and local engagement and, more specifically, its wide agenda for economic, social and cultural development. Regional engagement should be encouraged through strengthening the funding policies and incentives. Community engagement should be redefined to promote civic university that provides opportunities for the region, actively engages with the region, partners with other universities and FET-colleges in the region and operates on a global scale while using its location to form its unique identity.

- Provide incentives for higher education and training institutions' regional engagement in the form of long-term core funding and strategic incentive-based funding schemes on a competitive basis. Consider following incentives*: i)* formulae for block grant funding that could include higher weights for enrolment of students from within the region, or for enrolments in academic programmes related to regional labour market needs; *ii)* policies governing tuition fees that could provide for lower fees for students from the region and policies for financial aid to

students that could provide higher amounts for students from the region and special populations; *iii)* eligibility for special or "categorical" funding that could be contingent on evidence of regional engagement and focus; *iv)* requirements that institutions collaborate in order to obtain funding; *v)* special funding that could be established to provide matching of funding obtained by universities and FET colleges from contracts with regional employers for education and training services; *vi)* public-private regional investment fund that could help build capacity for regional engagement and provide incentive funds to institutions and individual faculty members for regional initiatives; and *vii)* competitive funding schemes that could boost challenge-driven research projects.

- Strengthen universities' accountability to society by developing indicators and monitoring outcomes to assess the impact of the university on regional performance. Include the contribution of the universities to local and regional development in their annual evaluations.

- Ensure that the universities' programme review and approval process is streamlined to allow for responsiveness to regional needs. The process should be adapted to emphasise regional engagement through efforts to seek the advice of regional leaders (employers, community leaders, regional economic development officials) in the review process. Criteria emphasising regional engagement and responsiveness should be included in the review and approval process, for example: *i)* data documenting the gaps in access and opportunity for the population and important sub-groups; *ii)* data documenting relevant regional labour market needs and potential future needs arising from regional economic development plans; *iii)* evidence of the engagement of regional stakeholders (employers, community representatives and representatives of under-served sub-populations) in programme planning and design; and *iv)* emphasis on regional engagement (internships, community service, student research on regional issues) within the curricula and student experience.

Recommendations for the sub-national (provincial) level

- Establish a high level forum bringing together university leaders and regional stakeholders to foster co-operative projects in regional development and to facilitate closer co-operation between the public and private sector and academia by presenting a holistic regional development approach in which key stakeholders would be called to co-

operate. Develop a regional strategy platform to complement the current project-based approaches with a more system-based approach.

- Analyse regional engagement opportunities within universities and further education and training colleges on the basis of the Free State Development Growth Strategy (FSGDS) priorities. Consider drafting a regional development sub-strategy within the FSGDS harnessing higher education and training institutions potential to help in achieving its goals. Mobilise the joint resources of the universities for the preparation and implementation of regional and urban strategies and substantive collaborative projects and programmes that address regional needs and opportunities.
- Improve the capacity for regional engagement among key public and private stakeholders, universities and further education and training colleges through forums for communication where good practices can be fostered and through targeted training programmes with focus on practical problem solving.
- Invest jointly with universities in programmes which bring benefit to regional businesses and community, for example translational research facilities which are aligned with the needs and opportunities of the region, advisory services for SMEs, professional development programmes, capacity building programmes for public and third sector employees, graduate retention and talent attraction programmes.
- Strengthen evidence-based decision making in the province by focusing on a dashboard of key indicators that the key regional stakeholders can monitor over time. This can result in a shared local knowledge base, which could galvanise the development of a strong local strategy for change.

Recommendations for institutions

- Review recruitment, hiring and reward systems to include regional development agenda. In order to strengthen the research base, to make universities more relevant for the region and to provide stronger incentives for regional engagement, criteria for faculty promotion and tenure could emphasise: *i)* research on issues relevant to the region, giving more emphasis on application, synthesis and integration than to discovery of new knowledge; *ii*) service to community, while requiring evidence that contributions to the community and the region are documented and externally validated; and *iii*) collaboration between the institutions in the Free State. Create mechanisms to monitor and evaluate the activities in this area, to share good practice within their

institution and benchmark this experience with other organisations and localities.

- Building on existing links and initiatives that align higher education and training institutions with the regional needs, develop a common vision of local and regional development among the higher education and training system in the Free State, support this vision with a strategy and milestones and funding in order to ensure that regional and local engagement is part of institutional activities and reflected in the development plans.
- Develop senior management teams to deliver the corporate response expected by regional and local stakeholders without disincentivising entrepreneurial academic. Establish modern administration with human resources system and financial resources management system.

Chapter 1.

The Free State in context

This chapter presents the profile of the Free State with its main economic activities and its socio-economic characteristics in the South African context. It examines the expansion of higher education in South Africa and the Free State, and highlights the key features of the university and further education and training (FET) colleges.

The chapter identifies the main strengths and weaknesses of the Free State so that the major challenges it faces can be analysed in the context of efforts to increase the regional engagement of its universities and FET colleges.

Introduction: origins of spatial, social and economic inequalities

Free State history, like that of the whole of South Africa, is traversed by power and land struggles, forced removals and exclusion leading to battles between the indigenous inhabitants, black Africans, white settlers and the British Empire. In 1854, after a range of battles, mainly between white trek farmers and the Basotho people, the Republic of the Orange Free State was established. Annexed in 1900 by Britain as the Orange River Colony during the Anglo-Boer war, it was renamed the Orange Free State after the Peace of Vereeniging in 1902. Self-government was restored in 1907 and in 1910 it became the Orange Free State Province, within the Union of South Africa, itself comprising four provinces: two former British colonies, the Cape Colony and Natal Colony; and two former Boer republics, the Orange Free State and the Transvaal Republic. In all of these regimes, democratic rights were enjoyed only by white males. The turbulent and contradictory history of South Africa is well reflected in that of the Free State. In 1912, Bloemfontein saw the founding of what was to become South Africa's largest liberation movement, the African National Congress (ANC), and in 1914, of the white supremacist National Party, that later established apartheid.

Displacement in South Africa started as early as 1658, when the Khoi people were pushed north by the first Dutch settlers, soon followed in the 1800s by formal relocation and segregation when the first reserves were proclaimed by the British and the Boer governments. The Glen Grey Act of 1894 assigned exclusive areas for the development of Blacks and followed by the Native Land Act in 1913, which restricted the area of land for lawful black occupation, thus replacing sharecropping and rent-tenant contracts with labour tenancy. The act resulted in 90% of the land being reserved for whites although they represented less than 20% of the population. In parallel, pass laws were enacted as a crucial control mechanism for limiting the residency of the Black, Indian and Coloured population, with women exempt from systematic pass control in certain areas.

In the Free State, the pass laws were applicable to the entire black population, male and female, Indians and Coloured. On this basis, residence and place of work were strictly assigned and Indians were even forbidden residence in the Free State. At the national level, the principle of separate residential areas in urban locations was established in 1923, while the Native Laws Amendment Act of 1937 prohibited Blacks from buying land in urban areas. Various measures were also decided at the national and regional levels, particularly in the Free State, to separate rural and grazing areas from

urban areas, such as fencing, creation of resettlement camps separate from white commercial farms where Africans were employed. Following its ascendance to power in 1948, the National Party introduced apartheid as an official policy and reinforced racist legislation with the Group Areas Act in 1950, racially segregating areas in terms of residence, business and property.

Education was also segregated by means of the 1953 Bantu Education Act, which created a separate system for black students to prepare them for lives as a labouring class. In 1959, separate universities were created for Black, Coloured and Indian people, while existing universities were not permitted to enrol new black students. The Afrikaans Medium Decree of 1974 required the use of Afrikaans and English on an equal basis in high schools outside of tribal areas, and became one of the factors leading to the student uprising in 1976[1]. In a move to ensure that urban black South Africans seeking higher education would be accommodated within the townships rather than on campuses reserved for other population groups, Vista University was established in 1981, and eventually established eight campuses throughout the country, two of them located in the Free State, one in Bloemfontein and the other in Welkom.

Apartheid thus permeated all aspects of everyday life. As in the deep south of the United States before de-segregation, "petty-apartheid" led to racially separate public facilities, amenities and services, not only schools and universities, but also buses, trains, toilets etc, and "white only" access to bars and restaurants and restricted entry to retail stores.

Spatial planning during the apartheid era

Apartheid had a deep impact on the spatial planning in South Africa, with Bantustans as a key element of this strategy. Continuing the trend of separate and unequal development, the Bantu Authorities Act was passed in 1951, allowing the establishment of tribal, regional and territorial authorities. In 1959, the Promotion of Bantu Self Government Act was enacted, establishing Bantustans as the separate political homelands of black South Africans. In the early 1960s, the first relocation camps were established so as to remove displaced labour tenants, unwanted farm workers, and squatters and unemployed urban people from certain areas.

These different acts and related land laws, combined with settlement planning and forced removals contributed to overcrowding in the Bantustans.[2] More than 3.5 million Africans are estimated to have been forcibly removed and relocated to the homelands and black townships built on urban peripheries between 1960 and 1980. In the 1980s, 88.0% of all whites but only 39.0% of black South Africans lived in urban areas. Apartheid also segregated urban residential areas in terms of race and

sometimes ethnicity, with white suburbs enjoying much higher levels of development compared to townships. Spatial planning separated the townships from white residential neighbourhoods by green belts and/or industrial areas, as the present day lay-out of Bloemfontein, the key city of the Free State, still clearly shows.

The creation of Bantustans made Blacks involuntary citizens of the homelands (13% of the South Africa's land), thereby losing their original South African citizenship and voting rights, which enabled the white minority to remain in control of the country. Between 1976 and 1981, four homelands were declared "independent" states by the Republic of South Africa, namely Transkei, Bophuthatswana, Venda and Ciskei, whilst the other six homelands remained dependent but self-governing areas, namely Gazankulu, KaNgwane, KwaNdebele, KwaZulu, Lebowa and Qwaqwa.

Two of these homelands were located within the present-day Free State: Thaba Nchu, which is to the East of Bloemfontein and had an estimated population of 80 000 people in 2001; and Qwaqwa, which is in the east of the Free State, bordering Lesotho, and has an estimated population of more than 300 000 Sesotho-speaking people in 2001.Today, Qwaqwa is one of the most densely populated areas in the Free State (Marais & Pelser, 2006). In the process, black urbanisation was directed to these homelands, away from core urban areas in the Free State. Also, in line with this policy, Botshabelo, which means "place of refuge", was established in 1979, 55 km east of Bloemfontein. It played a dual role in apartheid planning: it was a resettlement area for the Sesotho-speaking population of Thaba Nchu as well as a catchment area for the redirection of black urbanisation away from Bloemfontein (Krige, 1991). In order for this plan to work, significant subsidies were invested in creating small industries in Botshabelo while a subsidised bus system was implemented to transport daily commuters to and from Bloemfontein.

The demise of the apartheid regime in 1994 resulted in the dismantling of homelands system and their reincorporation into a democratic South Africa and the Orange Free State, where Thaba-Nchu and Qwaqwa were incorporated into a reconstituted province renamed Free State. However, the race-based planning and educational systems have left the country with inequalities and artificial spatial imbalances that present day policies are seeking to remediate. In the case of the Free State, where a declining primary sector (mining and agriculture) still represents a higher share in employment than in most other regions of South Africa, specific measures are also required to promote diversified economic growth beneficial to all citizens. The apartheid past also means that concept of regional planning and development has remained relatively invisible in South Africa's public policies (see Chapter 4).

1.1 Geography and sub-regional features

With an area of 129 480 km² and a population of nearly 2.9 million, the Free State is the third largest of the nine provinces in South Africa in terms of land area. Roughly the size of Nicaragua, it represents 10.6% of the country's surface, but only 5.7% of its population. Centrally located and land-locked, the Free State, the traditional "bread basket" of South Africa, consists mainly of grasslands with semi-arid vegetation in the south and mountainous areas to the East.[3] It borders on Lesotho and on six other provinces: Northern Cape, North West, Gauteng, Mpumalanga, Eastern Cape and KwaZulu-Natal. In contrast to other provinces in South Africa, two-thirds of the population (64%) speak Sesotho, the language of neighbouring Lesotho, followed by Afrikaans (11.9%) and isiXhosa (9.1%).[4]

Centrality remains an unutilised asset for the Free State. While relatively well connected to the three growth poles of South Africa – Johannesburg, Cape Town and Durban, the Free State features a declining economy compared to other regions, and lacks obvious and strong assets enabling it to overcome its land-locked position.[5] The University of the Free State's Centre for Development and Enterprise (2005) describes the Free State as "located midway on the axis between Gauteng and Cape Town, traversed daily by national political and business leaders... halfway to everywhere". It further argues that the claim of the Free State to being the national "heartland" in the 20th century implies a status has now faded: "as they fly over the province, national elites lack the visual reminders of it, which their predecessors enjoyed as they travelled through it by rail or road". Hence, "being 'halfway to everywhere' is no help at all".

The Free State features intraregional diversities in economic and social development among the five districts (see Box 1.1). The Free State economy is concentrated in two districts – Motheo and Fezile Dabi – representing each around one-third of the regional GDP. Motheo features the regional capital (32.7%) and Fezile Dabi is the major industrial pole in the province (32.2%). Lejweleputswa, a mining area, amounts to around 20% of regional GDP, while the last two regions of Thabo Mofutsanyana and Xhariep correspond to slightly over 10% and less than 3% of regional GDP, respectively (see Figure, 1.1).

In terms of GDP per capita, Fezile Dabi is the economic engine of the region, while Thabo Mofutsanyana, representing a quarter of the regional population, offers the lowest ratio (District data above from Statistics South Africa, 2003). The highest household poverty levels were registered in the Thabo Mofutsanyana district (65.5%) (Table 1.2). These strong sub-regional

disparities, alongside poverty levels closely associated to low GDP per capita ratios constitute challenges for regional development.

Box 1.1. Sub-regional diversity in the Free State

The Free State consists of five districts with diverse opportunities and challenges:

The Xhariep District, located in the south-west of the province, is a semi-arid area of open grasslands with extensive farming, mainly of sheep, and small rural towns. The southern border is the Orange River, called the Gariep by the indigenous Khoi-khoi people, the Gariep Dam being an important tourism and leisure attraction. The district hosted 5% of the Free State population in 2001, 135 245 inhabitants, and contributed that year to 2.8% of its Gross Domestic Product (GDP).

The Motheo District, located in the central Free State comprises mostly open grassland, with mountains in the most eastern parts. The main urban centre is Bloemfontein, the regional capital, which has around 400 000 inhabitants and is known as the "City of Roses". The city is also the seat of the Appeal Court of South Africa. To the east lie Botshabelo and Thaba Nchu. Motheo represented 26.9% of the Free State's population in 2001 (728 262 inhabitants) and contributed to 32.7% of regional GDP.

The Thabo Mofutsanyana District, forming the eastern part of the province borders on the Republic of Lesotho and KwaZulu-Natal. Farms in the area grow fruit, mostly cherries. It is also a major tourism destination in the Free State and known for its scenic beauty of the Drakensberg and Maluti mountain ranges, Golden Gate Highland National Park, and quaint villages, such as Clarens, with its numerous art galleries. This district, where the urban agglomeration of Qwaqwa is located, represented 26.8% of the population in the Free State in 2001, with 725 939 inhabitants, and contributed to 11.7% of regional GDP.

The Fezile Dabi District is an important agricultural production area, particularly for maize, and is known as the grain basket of South Africa. The main tourism attractions are the Vaal Dam, the main source of water for Gauteng, with sports and leisure facilities; and the Vredefort Dome, the third largest meteorite site in the world and a UNESCO Heritage Site. The most important towns are Sasolburg, known for its chemical industry, and Kroonstad, an important agricultural centre. Fezile Dabi had 17% of the Free State population in 2001, with 460 315 inhabitants, but contributed to 32.2% of the regional GDP.

The Lejweleputswa District contains the Free State Goldfields, which were discovered in the early 1940s, and is also a major agricultural area in maize production. Welkom is the main town in the area, a recent urban development linked to mining, followed by Bothaville, a maize centre. The district represented 24.3% of the Free State population in 2001, with 657 010 inhabitants, and contributed to 20.6% of regional GDP.

Figure 1.1 Free State District Municipalities

Source: FSRSC (2010), "Free State, Self Evaluation Report", *OECD Reviews of Higher Education in Regional and City Development*, IMHE, *www.oecd.org/edu/imhe/regionaldevelopment.*

Note: This map is for illustrative purposes and is without prejudice to the status of or sovereignty over any territory covered by this map.

1.2 Governance

South Africa is a unitary state with federal tendencies and specific governance arrangements, based on a system of co-operative governance. Government comprises three spheres that are distinct but interrelated and interdependent: national, provincial and local. The national government's executive branch, comprised of the Presidency, cabinet and departments or ministries, is located in Pretoria, while the seat of Parliament is in Cape Town and that of the Judiciary, the Court of Appeals, in Bloemfontein.

Divided in four regions under the apartheid regime, South Africa now comprises nine provinces, each with its own provincial legislature, provincial cabinet, administration and functions as stipulated in the Constitution. At the local government sphere, there are 283 municipalities. The roles and functions of national government, the provinces and the municipalities are outlined in the Constitution (Table 1.1.).

A local municipality, as a typical medium sized urban agglomeration, exercises most local government attributes in service delivery such as primary and secondary schooling, health and social services, basic infrastructure, on the basis of funding allocated from the national level by reference to formulas such as head counts, sources and levels of household revenues, which are under control of the provincial level. If the province considers that a local municipality does not have adequate human resources to exercise its powers in a given sphere of competence, such responsibility can be exercised directly by the province. District municipalities cover by definition wider areas than the local municipalities that are within their territories. Their powers are exercised directly in favour of the small rural municipalities that do not possess the human resources required to deliver most services. The Intergovernmental Fiscal Relations System establishes the rules for revenue-sharing between the three government spheres.

These governance arrangements require well-coordinated planning, budgeting, implementation and reporting, particularly in the case of education, higher education and regional development. National level competencies include university education and since recently also Further Education and Training (FET) colleges (previously a provincial competence). Spatial planning is also a national prerogative, but within its guidelines each province is required to design and implement a Provincial Growth and Development Strategy of its own (see Chapter 4). In this context, bringing together the university and FET sectors constitutes a major challenge for the provincial government, while respecting the principle of university autonomy, and regional development, with national aims not directly referring to the role of universities and FET colleges.

In the Free State, in addition to the five district municipalities, there are 20 local municipalities in the region, meaning that an average district municipality in the Free State comprises between three and five local municipalities. The major local municipalities are: Mangaung, with a population of 650 000 and encompassing Bloemfontein, Thaba Nchu and Botshabelo; and Metsimaholo, Matjhabeng, Welkom, Sasolburg, Kroonstadt and Qwaqwa.

The local municipalities can present both urban and rural features. Mangaung thus comprises a core urban area with administrative, business

and residential functions, namely Bloemfontein; as well as outlying urban settlements, formerly homelands, namely Thaba Nchu and Botshabelo, which retain rural characteristics. This heterogeneity requires an integrated approach to deal with complex issues in terms of housing and transportation while addressing the different needs of urban and rural inhabitants.

Table 1.1 Co-operative governance of South Africa: The Free State Province

South African Government	South Africa has a three-tier system of government and an independent judiciary. The national, provincial and local levels of government all have legislative and executive authority in their own spheres and are "distinctive, interdependent and interrelated". **Legislative** (in Cape Town): Bi-cameral Parliament with two houses, the National Assembly (400 members) and the National Council of Provinces (NCOP), which aligns national and provincial interests. Each province sends 10 representatives to the NCOP headed by the provincial premier. Local government representatives may participate in the NCOP but not vote. **Executive** (in Pretoria): Presidency, cabinet (President, the Deputy President and 25 Ministers), and departments and ministries. The President is the executive head of State and the head of government. **Judiciary** (in Bloemfontein): the Court of Appeals. The sub-national government consists of 9 provinces and 283 municipalities. Each province has its own provincial government, with legislative and executive powers. The nine provinces are: Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo Province, Mpumalanga, Northern Cape, North West and Western Cape. Municipalities are divided into three categories: category A municipalities (metropolitan municipalities); category B (local municipalities); and category C (district municipalities). Distinctions are based on local administrative and fiscal capacity as well as size, *e.g.* Johannesburg, Cape Town and Durban are metropolitan municipalities.
The Province of Free State	• Premier: The premier is elected by the legislature (limited to two five-year terms). The premier appoints other members of the executive council (MECs) • Executive Council: provincial level cabinet, led by the premier. In addition to the Office of the Premier, there are 10 departments (Agriculture & Rural Development; Cooperative Governance; Traditional Affairs & Human Settlement; Education; Health; Police, Roads & Transport; Public Works; Social Development; Sports, Arts, Culture & Recreation; Economic Development, Tourism & Environmental Affairs; Treasury) • Legislature: members elected for a five-year term • Province can pass legislation within its functional areas. National legislation may prevail over provincial legislation in cases where they conflict (national security, economic unity, protection of the environment, or matters prejudicial to the interests of another province).

Table 1.1 Co-operative governance of South Africa: The Free State Province (continued)

District municipalities (5) and municipalities (20)	**District and local councils** are interdependent and involve a division of powers. A district council has municipal executive and legislative authority over a large area, and is responsible for district-wide planning and capacity-building. Within a district council's area are individual local councils that share their municipal authority with the district council under which they fall. **Main functions**: Provision of local public services *e.g.* primary and secondary schooling, health and social services, basic infrastructure

1.3 Demography and urbanisation

The Free State is losing ground in terms of population development in South Africa. The population of the Free State increased from 2.63 million inhabitants in 1996 to 2.70 million in 2001 and to 2.77 million in 2007 (Statistics South Africa, 2007). In its most recent estimates, (Statistics South Africa 2010a) numbers the province's population at nearly 2.9 million in mid 2010, thus representing 5.7% of the national population, as compared with 6.4% in 1996. Between 1996 and 2008, the Free State population grew at a low rate of 0.6% per annum, compared to a national average of 1.6% per annum. Taking into account factors such as fertility, morbidity, mortality and out-migration demographic patterns show the Free State is losing ground to most other provinces.

Growth between four population groups – African, Coloured, White and Indian – remains uneven with Africans demonstrating the biggest growth and Whites decreasing both in number and in proportion. Between 1996 and 2007, the African majority in the Free State continued growing with its proportion rising from 84.4% in 1996 to 87.1% in 2007. Whilst the proportion of the Coloured and Asian populations stabilised around 3.0% and 0.2% respectively, the white population declined, both proportionately and in real terms.

21. The population of the Free State is generally young, but has lost the prime members of its work force. The proportion of the population aged 0-14 years has steadily declined from 31.5% in 1996 to 28.8% in 2007. During the same period, the proportion of the population aged between 15 and 65 has increased from 63.9% to 65.7%. In relative terms, this represents a steadily growing labour force. However, the share of the population aged 25 to 39 has steadily declined from 24.7% in 1996 to 22.0% in 2008

(Statistics South Africa, 2009). As a result of outmigration and HIV/AIDS, the region lost prime members of its labour force.

The Free State is experiencing rapid urbanisation. The province's rate of urbanisation has risen from 68.6% in 1996, to 72.8% in 2001 and 79.2% in 2008 (Statistics South Africa, 2007; Global Insight, 2009), putting it at the third position of South African regions. However, the definition of urban is problematic in the Free State since significant portions of its population reside in small and medium sized towns, which could well be viewed as rural. In fact, the Free State Provincial Growth and Development Strategy (Free State Provincial Government, 2005) distinguishes between different types of settlements, reflecting the legacy of apartheid.[6]

Existing research highlights the different characteristics and consequences of rural out-migration in the Free State (Centre for Development and Enterprise, 2005; Marais and Pelser, 2006). First, population growth in former homeland areas has virtually ground to a halt and there are indications of out-migration from these areas. Second, large numbers of farm workers have left the farms because of increased exposure to international markets, the subsequent mechanisation of the farming sector and also post-1994 legislation, which, together, have prompted commercial farmers not to make on-farming housing available (see also Atkinson, 2007). Third, these ex-farm workers have caused increased urbanisation in the nearest small towns and, consequently, placed pressure on the existing infrastructure of such towns. Fourth, there are indications of a second wave of urbanisation now taking place from these small towns to larger urban settlements such as Bloemfontein, Welkom and Sasolburg and, in certain cases, from these to other parts of the country. Fifth, significant growth has occurred in towns located next to the Lesotho-Free State border (Ladybrand and Ficksburg).

1.4 Health, poverty and welfare

The Self-evaluation Report states that one of the most perplexing paradoxes of modern South Africa is the "persistently poor health outputs and outcomes despite high health expenditures and many supportive policies" (Chopra *et al.*, 2009). It also clearly indicates that "in the Free State, health outcomes and outputs are often even more dismal than in the rest of South Africa", which is in line with the region's low economic performance, low GDP per capita and high levels of poverty.

On the one hand, the Free State, as the rest of South Africa, has registered since the end of apartheid notable progress in many realms of society on the basis of deep reform and economic growth. This is

undeniably the case for literacy: the Free State adult literacy index increased by 4% to 90% between 1996 and 2003, with the provincial ranking unchanged at fourth place. This is also the case for access to basic public services such as housing, electricity, sanitation and water.

On the other hand, the Human Development Index (HDI) of the United Nations Development Programme (UNDP) decreased by 7.0% to 67.0% in the Free State between 1996 and 2003[7], a trend comparable to that of the National HDI, while its ranking, as compared to other provinces slipped from third to fifth over this period (United Nations Development Programme, 2003).

Health

The Free State features poorer health outcomes than South Africa in general. Between 1996 and 2008, life expectancy at birth in the Free State declined by six years, to 47 years while that of South Africa declined to 51 years. Life expectancy in the Free State was the lowest of all provinces in 1996 and the second lowest in 2008. The Free State child mortality rate (number of deaths of children aged 1-4 per live births) increased by two deaths per 1 000 live births to 21 between 1998 and 2003, the highest rate in the country, while the Free State infant mortality rate (number of deaths of infants aged less than 1 year per 1 000 live births) decreased by five deaths per 1 000 live births to 48, which is still six deaths per 1 000 live births higher than the national average, and third highest of all provinces. The infant mortality rate for 2008 was even expected to increase (to 54.1 deaths per 1 000 live births), ten deaths higher than the predicted national average (Day and Gray, 2008).

According to Statistics South Africa (2009), the three leading natural causes of death in the Free State in 2007 were influenza and pneumonia, tuberculoses and intestinal infectious diseases, with 13.9%, 12.0% and 7.7% of all registered natural deaths, respectively. The 2007 Free State mortality profile is similar to the national one, with tuberculosis the leading natural cause of death in South Africa (12.8%), followed by influenza/pneumonia and intestinal infectious diseases (8.3% and 6.2%). HIV/AIDS[8] are not listed as a leading cause of death in the Death Notifications Register of the Department of Home Affairs since tuberculosis and influenza are qualified as "opportunistic" infections, often contracted by HIV/AIDS infected people and considered the cause of death rather than HIV/AIDS itself. Between 2000/01 and 2007/08 real per capita non-hospital primary health care expenditure increased by 66.0% in the Free State, compared to 27.0% in South Africa, but expenditure on primary health care was still the lowest of all provinces. (Statistics South Africa, 2008).

Welfare, poverty and access to public services

While South Africa features high poverty in general, in the Free State the trends show even higher and increasing poverty levels. About 42.5% of the Free State, population lived below the poverty level as compared to a national average of 40.7% (FSRSC, 2010), with variation across districts. On the basis of the United Nations' poverty indicator (USD 1 or less per day),[9] 37.4% of South African households in 1996 and 49.4% in 2001 were below the poverty level, whereas the situation for the Free State was considerably worse: 45.8% and 57.1% respectively. Across the Free State, in 2001, the lowest household poverty levels were registered in the Motheo District, 51.5%, and the highest in Thabo Mofutsanyana, 65.5% (Table 1.2).

Table 1.1. Household poverty levels in the Free State and its districts

Area	% of households earning less than ZAR 800 per month (1996) - 2001 prices	Number of households earning less than ZAR 800 per month (1996) - 2001 prices	% of households earning less than ZAR 800 per month (2001)	Number of households earning less than ZAR 800 per month (2001)	% of Free State households earning less than ZAR 800 per month (2001)	% of Free State population (2001)
South Africa	37.4	3 770 723	49.4	5 810 058		
Free State	45.8	286 731	57.1	432 579		
Xhariep District Municipality	56.1	175 578	64.7	25 367	5.9	5.0
Motheo District Municipality	38.1	65 178	51.5	108 446	25.1	26.9
Lejweleputswa District Municipality	44.1	71 156	56.2	110 468	25.5	24.3
Thabo Mafutsanyanna District Municipality	55.7	87 364	65.5	121 859	28.2	26.8
Fezile Dabi District Municipality	43.1	45 455	53.2	66 439	15.4	17.0

Source: Statistics South Africa, 2003

The unequal distribution of income between population groups in South Africa is also more pronounced in the Free State. In 2000, 30.0% of the Free State (compared to 31% of South African) households earned less than ZAR 48 850[10] per year (ZAR 4 071 per month at constant 2006 prices), with

startling interracial inequalities: while 62.0% of African households in the Free State reported earning less than ZAR 4 071 monthly only about 6.0% of white households reported their household income to be less than ZAR 4 071 per month. For Coloured and Indian/Asian households, these proportions were 36% and 14%, respectively. By 2005/2006, there had been a moderate decrease in income inequality: 24% of Free State (18% South African) households reported that their household income was less than ZAR 53 249 per year (or about ZAR 4 437.42 per month) (constant 2006 prices). Racial inequalities in the distribution of household income also persist: in the Free State, while 50% of African households reported to be below the previous level, only 5% of white households, 9% of coloured households, and no Indian/Asian households, reported likewise (Statistics South Africa, 2000 and 2005).

Since 1994, substantial progress has been made regarding the access that South Africans and the population in the Free State, especially Africans, have to a number of basic services or amenities such as electricity, water and sanitation. In the Free State, by 2008, there was a marked increase in the access rates to municipal basic services, far exceeding national averages (Table 1.3). This is indicative of the great strides that the Free State local governments and also the provincial government have made in terms of basic service delivery or of providing access to electricity, proper sanitation and water facilities. While the increase in access rates was mainly driven by rapid growth in the access that African, and to a lesser extent, Coloured, households have to these services glaring inequalities persist.[11]

Between 1996 and 2008, a significant improvement occurred in respect of the type of dwelling in which Free State and South African households reside. In the Free State, an almost 20% increase was recorded in the proportion of households residing in formal dwellings[12]: 80% by 2008, which is 5% higher than the national average, while the proportion of households residing in informal and traditional dwellings decreased by 11% and 7% (to 15% and 3%), respectively. Similar, yet much less pronounced trends were observed on the national level.

Table 1.2. Public service access in South Africa and the Free State

Service	1996		2003		2008	
	South Africa	Free State	South Africa	Free State	South Africa	Free State
Piped water in dwelling/on site	60.4	70.2	68.3	84.3	70.5	92.5
Connected to electricity grid			78.3	84.1	82.3	90.7
Electricity as cooking energy source	47.1	41.9	59.1	57.5	68.2	77.9
Electricity as lighting energy source	57.6	57.3	78.7	85.9	82.9	90.9
Electricity as heating energy source	44.5	39	51.9	56.3	52.2	41.9
Flush/chemical toiled in dwelling/on site	50.2	45.1	57.1	59.2	58.6	66.9

Source: Statistics South Africa (1996, 2003, 2008)

1.5 The regional economy

Economic performance and sector contribution

The Free State economy is historically based on the primary sectors of agriculture and mining, the decline of which has not been sufficiently compensated by industry or services. In 2008, the primary sector of the Free State contributed 18.5% to Free State Gross Value Added (GVA), while the manufacturing sector contributed 17.8% and the services sector 63.7%; all three of which have not experienced any radical change since 1995. The largest sectors of the Free State economy were: finance, insurance, real estate and business services (18.4% of GVA); general government (14.5%); mining and quarrying (13.6%) and manufacturing (12.7%). (Quantec database, 2009; Statistics South Africa, 2010b).

In 2008, the Free State province was the second lowest contributor to national output, ahead of the North Cape, respectively 5.04% and 2.05%, with a Gross Value Added (GVA) output level of ZAR 81 642 billion. At the other end of the scale, the first and second contributors are Gauteng (34.87%) and Kwazulu-Natal (16.33%), drivers of the South African economy (Quantec database, 2009). The relatively weak position of the Free State economy is reflected in the per capita GVA level of ZAR 28 371, which is far lower than that of Gauteng, which is the top performer with per capita GVA at ZAR 54 078, the national average of ZAR 33 276 or

(Quantec, 2008 and 2010). The contribution of the Free State to the national GVA has also declined. The average annual economic growth for the Free State between 1995 and 2007 was 3.9%, compared to the national average of 4.2%, while in 2007 it was only 3.3%, compared to the national average of 5.2%, indicating a further decline.

Unemployment and labour market

South Africa features high unemployment with large numbers of "discouraged" workers and youth outside the labour market and education, as well as persisting disparities between population groups. The unemployment rate has been above 20% ever since the late 1990s, reaching 23% in 2008. Discouraged workers, those having abandoned the job search, are estimated to account for some 5% of the working age population so the broad measure of unemployment actually exceeds 30%. Youth unemployment reached 47% in 2007, compared to around 20% in middle income emerging market economies such as Chile and Brazil. The situation by population groups shows great disparities: in 2009, 28.6% of Black South Africans were unemployed as compared with only 4.9% of Whites. Such disparities are even more pronounced in the case of the 15 to 24 year old age group: 53.8% of Black youth were unemployed versus 14.5% of their White counterparts. (OECD, 2010; Statistics South Africa, 2010a).

The unemployment figures for the Free State have generally remained above national averages. In 2009, 1.86 million inhabitants of the Free State out of about 2.9 million were of working age, but only one-third of the labour force were able to find formal employment. In March 2005, the respective percentages were 30.6% in the Free State and 26.5% nationally. On the basis of the latest figures available from Statistics South Africa (second quarter of 2010) the unemployment rate in the Free State (28%) is higher than the national average (25.3%), putting the province in the fourth highest position behind the North Cape (30.1%), Mpumalanga and the Northwest (both 28.1%). The Free State also suffers from long-term unemployment, the acuity of which is reflected by the high rate of discouraged workers at 7.8% of the labour force in 2009.

Despite government efforts, unemployment is also unequally distributed amongst population groups and between the genders. In the Free State, unemployment is mostly prevalent among Africans (32.4% in 2009) and followed by Coloureds (27.8%). The lowest unemployment rate is recorded amongst Whites (9.9%), 22.5 percentage points lower than for Africans. Despite corrective governmental policy interventions, such as the Black Economic Empowerment, and the strategic policy aim of halving unemployment by 2014 through the Accelerated and Shared Growth

Initiative for South Africa, known as AsgiSA, the situation has not substantially improved over the years (Box 1.2). The same unequal distributions exist between sexes. The official unemployment rate for Free State males in 2009 was 25.6% (22.9% nationally) and that of females was 32.0% (26.5% nationally) (Statistics South Africa, 2010a).

Box 1.2. Two major post apartheid policies: Black Economic Empowerment and Accelerated and Shared Growth Initiative

After 1994, different policies aimed at progressively unwinding the disadvantaged position of the majority Black population by implicitly or explicitly seeking to ensure fair employment practises, transfer a share of economic power to the Black population and facilitate Black entrepreneurship. The 1994 Reconstruction and Development Programme sought to de-racialise business ownership by "focused policies of Black economic empowerment". New laws also restored rights to land tenure and introduced reverse discrimination measures for employers (Employment Equity Act of 1998) concerning recruitment of Blacks but also women and disabled persons in firms with over 50 employees. By 1997, the government began to award procurement contracts on a preferential basis to Black owned businesses, formalising this in law in the year 2000 (Preferential Procurement Act).

In 2003, these different laws and policies were brought together under one single umbrella under the responsibility of the Department of Trade and Industry: a "Strategy for Broad Based Black Economic Empowerment" (BEE), in conjunction with a formal legislation. This framework enabled the minister to establish codes of good practice and transformation charters, with a BEE Advisory Council to act as a watchdog. Among the major goals of BEE were the promotion of investment programmes and access to finance leading to meaningful participation of Black people in the economy. A weighted "scorecard" system was defined to establish the degree of BEE compliance in firms on the basis of ownership, management control, employment equity and skills development in particular, with 65% as the overall level retained to have an enterprise considered as a "good contributor". BEE scorecard results are taken into consideration by the government whenever it grants a license for a regulated activity (mining, gambling), grants a concession to a private enterprise, sells an asset or a state-owned enterprise, engages into a public-private partnership or in any economic activity. Since the system only fully came into effect in 2007, it is too early to arrive at firm conclusions. Nonetheless, a group from the University of Pretoria commissioned by the Presidency (Consulta Research) in 2007 reported that compliance was still low (only 20% of the panel of firms reviewed reported full compliance and many had no scorecard in place). One of the observations made is that BEE focused on employment equity in existing firms and not enough on the creation of new ones.

Box 1.2. Two major post apartheid policies: Black Economic Empowerment and Accelerated and Shared Growth Initiative (continued)

Accelerated and Shared Growth Initiative for South Africa (AsgiSA) was launched in 2006 by the Presidency with the aim of reaching different goals in view of halving of poverty and unemployment by 2014 by lifting of a number of constraints: *i)* currency volatility and the cost and efficiency of the national logistics system and of infrastructure; *ii*) skilled labour shortages amplified by apartheid spatial patterns (*e.g.* distance from work-place); *iii*) barriers to competition in certain sectors, the regulatory environment and the burden on SMEs; and *iv*) deficiencies in state organisation, capacity and strategic leadership.

Progress has been made in a number of areas impacting directly on macro-economic performance, explaining the rather sustained growth patterns of the economy until the world crisis. On the other hand the impact of HIV/AIDS is not directly addressed by the strategy while within education and training the focus seems too narrow, underlining the need to "raise the quality of education for the one million or so students coming out of the schooling system each year".

Source: OECD (2008), *Economic Review of South Africa*, OECD Publishing.

A major change in the Free State labour market is the progressive shift away from primary sector employment to manufacturing and services sector employment, which has reduced the availability of employment opportunities, particularly for the less or non-qualified job-seekers. The employment share of the primary sector decreased from 30.0% in 2000 to only 15.0% in 2009. In 2000, the Free State mining sector employed a total of 13.2% of employees in the provincial labour market, compared to only 3.6% in 2009, while agricultural employment resisted better, decreasing from 16.8% in 2000, to 11.4% in 2009 (Quantec database, 2010). In 2009, the four largest employers in the Free State economy were the wholesale and retail trade sector that employed 21.5% of the total in the Free State, followed by the community, social and personal services sector (21.3%), the agriculture sector (11.4%) and the manufacturing sector (9.6%).

Traditionally, the bread-basket of South Africa, with its extensive commercial farms born of the Boer tradition, agricultural employment in the Free State has significantly dropped. This has resulted in continuous rural exodus, particularly because of the downturn in gold mining in the province that hitherto offered many jobs. Likewise, small manufacturing towns, such

as Thaba Nchu and Bothshabelo, have seriously declined, accelerated by low wage competition from Lesotho. Sasolburg is the only significant industrial pole in the region, home to the chemical giant Sasol, and is located on the north western periphery, with limited spatial impact on the rest of the Free State economy.

Economic transformation

Long before the end of apartheid, efforts have been made to reconvert the economy because of the decline of the primary sector. The establishment of Sasol, originally a state-owned company, and the establishment of Sasolburg in the northern Free State in the 1950s was the first striking measure in this direction. Sasolburg today contributes more than two-thirds of the manufacturing GDP of the province. Another set of measures related to subsidies channelled to light manufacturing in the former homeland and self-governing areas but also on the "border" with these. Thaba Nchu, Botshabelo and Qwaqwa benefitted from such subsidies and industries (Krige, 1991). These subsidies did not, however, increase productivity and may have limited competition between firms or raised the prices at which producers could sell their products. Wages to labourers also remained very low while many industrial zones were never actually occupied, with Qwaqwa being a notable exception given its significant industrial occupation with more than 30 000 workers employed by the late 1980s, mostly in clothing industries (Nel, Marais and Rogerson, 2006).

The discontinuation of the subsidies that had originally created these industries in the early 1990s brought about many closures, affecting specifically Thaba Nchu. Fairly good management and the significantly lower rental prices asked by the Free State Development Corporation, manager of these industrial zones, resulted in some jobs being retained in Qwaqwa and in Botshabelo. At the same time, there has been large-scale closure of other manufacturing industries in the various small towns across the Free State since the early 1990s (Nel, Rogerson and Marais, 2006; Premier's Economic Advisory Council, 2006). The main reason behind the last decisions seems to have been the centralisation of manufacturing activity in order to remain competitive in the face of increased transport costs to the country's main markets. Furthermore, a contributing factor in certain cases appears to have been the enforcement of new wage and labour laws in South Africa, which have rendered many of these industries less competitive than their counterparts in neighbouring Lesotho, where wages are lower.

Summing up, efforts to prop up manufacturing sector activity so as to compensate loss of jobs in the primary sector have met with mixed results in

the Free State. Productivity growth (annual average increase in the Free State was 2.0% higher than the national average) was actually achieved at the expense of lower employment and higher unemployment, contrary to what occurs for fast-growing regions (OECD, 2009). In such a situation and in the face of the world economic crisis, the future growth in the Free State would need to be based not only on new industrial venues, but also local assets such as agriculture, provided that new niche markets are developed, and the tourism industry is bolstered.

1.6 Higher education in South Africa

Evolution of higher education in South Africa

Education and higher education under apartheid were characterised by rigid legal and policy provisions with separations according to race, ethnic groups, and institutions. All public higher education institutions (HEIs) were designated for a particular "race", and students from other racial groups could not be admitted without special permits. The institutional setting was also different in self governing territories or Bantustans and the rest of South Africa. By 1968, the administration of education at all levels for African countries was decentralised, whereas within the Republic of South Africa, the Minister of Education and Training administered all African education. Administrative responsibility for Coloured and for Indian education shifted over most of the twentieth century between provincial and central departments and in 1983 it became the responsibility of the Minister of Education and Culture. For Whites, before September 1984 provincial departments provided all education except higher education, which was the responsibility of the Department of National Education. Thereafter, provincial education departments became sub-departments of the Department in charge of Education and Culture.

A second set of divisions was the one made between universities, *technikons* and colleges. Each university was a "corporation" founded by an Act of Parliament, its functions were prescribed and could be terminated by the state. At the same time, a university was an independent sphere of societal relationships; the state could not interfere directly in its affairs but it could not reject the state's designation of it for a particular "race" group. The *technikons* emerged at the end of the 1970s from the former colleges of advanced technical education, established by an Act of Parliament in 1967. These institutions had the special function of training technicians and technologists, in parallel to that of universities, in charge of science, research and the development of knowledge and are distinct from colleges,

which focus on practical training in non technology fields. Before 1993, technikons did not award degrees, and were subject to central control of their curricula, examinations and certification.

The effect of the apartheid legal and policy framework was to engender a highly fragmented and uncoordinated higher education system that was fundamentally inequitable (Council on Higher Education, 2004 and OECD, 2008). Such a heritage could not be easily erased. The national department of education established after the first democratic elections in 1994, had to restructure a higher education and training system of conflicting political and educational pressures. Underlying these conflicting pressures were mixed policy messages at the national, provincial and institutional levels as well as vested interests and institutions inherited from the apartheid state and differing approaches by the institutional players to various issues. Instead of fostering co-operation, higher education institutions in many instances became the stage of intense power struggles (Gibbon & Parekh, 2001).

Soon after 1994, initiatives emerged from different horizons to develop the basis for post apartheid higher education policy. This includes policy research and consultations conducted by the National Education Policy Investigation, a civil society initiative originating in the people's education movement, the Union of Democratic University Staff Union policy forum and the Centre for Education Policy Development (linked to the ANC). At the end of 1994, the office of the President nominated a National Commission on Higher Education that submitted its report, *A Framework for Transformation*, in September 1996. It contained three sets of ideas that became pillars for a transformed system: increased participation, responsiveness and co-operation and partnership.

In 1997, the Department of Education unveiled its plans for the Programme for the Transformation of Higher Education. The aim was the development of a single programme-based system, planned, funded and governed so as to cover the full range of higher education: universities, *technikons* and public colleges in education, nursing and agriculture, and private higher education institutions. It advocated the need for a national higher education plan, with benchmarks for transformation and a system of three-year rolling institutional plans. In addition, a goal oriented, performance-related funding system was to be put in place to allow resource allocation in line with policy objectives. A system of co-operative governance would reserve for the state a steering and co-ordinating role, while autonomous higher education institutions would retain authority over their resources in exchange for the obligation to be publicly accountable for their use. Colleges would be gradually incorporated into the higher

education sector, beginning with the colleges of education but excluding Further Education and Training colleges.

On the basis of these proposals, the National Plan for Higher Education was only rolled out in February 2001, explaining this "incremental approach" to transformation because of the lack of human capacity and technical skills within the system, which led to significant delays in the implementation of the National Plan for Higher Education. This four year vacuum unleashed competition between institutions, putting at difficulty the Black Universities created under apartheid. The Council on Higher Education explained this "unplanned change" by the following factors: students' greater choice of institutions, student and parental perceptions of declining quality in certain universities, increased competition from private providers and the expansion of the National Student Financial Aid Scheme (NSFAS). Market pressures but also the inherited differences from apartheid, exacerbating institutional inequalities with respect to resources and outcomes explain the differentiation that persists today (OECD, 2008).

In line with the Transformation of Higher Education, the Department of Education restructured the higher education landscape through mergers and incorporations of institutions and programmes after the year 2000. This resulted in 24 public higher education institutions, as compared to 36 under apartheid: 11 "traditional" universities focussing on research and diverse discipline-based and professional degree qualifications; seven universities of technology (former *technikons*) offering technological, vocational, career-oriented and professional programmes leading to a certificate, diploma or degree; and six "comprehensive universities" that combine both types of higher education institutions. Two national Institutes of Higher Education were also established in Mpumalanga and the Northern Cape (Council on Higher Education, 2004).

Colleges of Education were incorporated into universities, but all other Nursing, Agriculture and Further Education and Training (FET) colleges were left within departments at provincial level, without well-structured co-ordinating bodies to develop a unified system. Recent reform has resulted in FETs becoming a national responsibility within a reinforced ministry.

The size of the private higher education sector is small, representing less than 10% of the total student population. It tends to be specialised and to operate on the skills side, with little if any research being produced. Most of the private higher education institutions offer certificates and diplomas, a few offer bachelor's degrees and very few are moving toward doctoral degrees. In 2007, there were seventeen private higher education institutions in South Africa, with none in the Free State.

National government steers the higher education system through three mechanisms:

- Planning: in order to stabilise institutions and the entire system's efficiency, 3-year rolling plans were introduced to support equity targets and increase the number of students in science, engineering and technology.
- Funding: before 1994, funding was fragmented, divisive and inequitable, advantaging Historical White Universities. As from 1995, public higher education was financed by the government and the NSFAS. The underlying principles were based on shared costs, equity, redress and development.
- Quality assurance: quality audits at higher education institutions and programme accreditation by the Higher Education Quality Committee were launched (OECD, 2008).

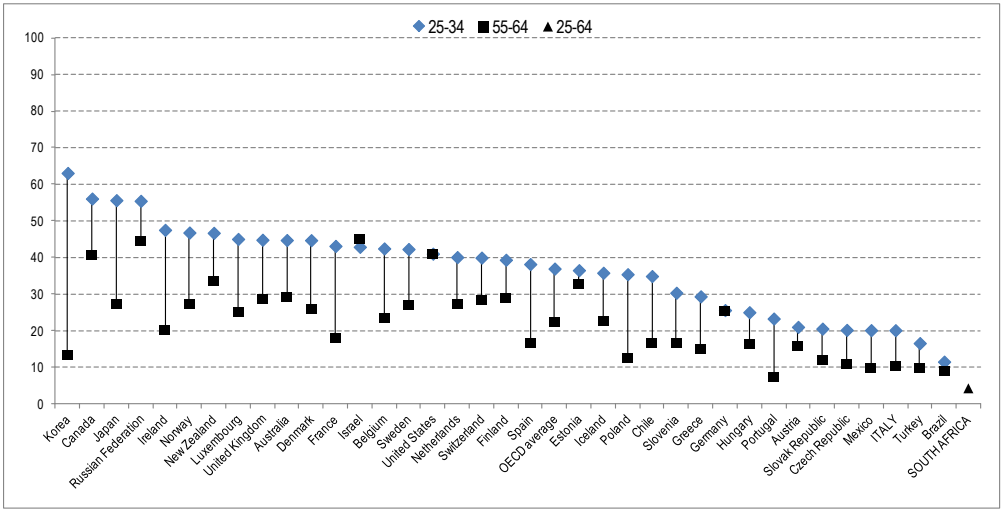
Challenges for higher education

Higher education in South Africa currently faces three major challenges: equity and quality, the situation of post-school youth, and financing and governance.

Equity and quality

By 2007, 4.3% of South Africans had attained a tertiary qualification, compared to the OECD 2009 average of 30% (See Figure 1.2) (OECD, 2011). South Africa is also on the par with emerging economies such as China and Indonesia.

Figure 1.2. 25-64 Population of selected countries that attained at least tertiary education (2009)



1. The year of reference for Argentina is 2003, China is 2000, Indonesia and South Africa is 2007, the Russian Federation is 2002 and Saudi Arabia is 2004.

2. For technical reasons, these figures use Israel's official statistics, which include data relating to the Golan Heights, East Jerusalem and Israeli settlements in the West Bank.

Source: OECD (2011), *Education at a Glance*, OECD Publishing.

In 2007, there were 761 090 students, or 1.6% of the total population of 48.5 million, enrolled in public higher education in South Africa. The participation rate (ratio between the total number of people enrolled and the number of people in the 20 to 24 years age group)[13] was 15.88% (15% in 2001). This compares favourably with the average 5.0% for sub-Saharan Africa, but is considerably lower than the average rate for Latin America and the Caribbean (31.0%), Central Asia (25.0%), and East Asia and the Pacific (25.0%). The average participation rate for North America and Western Europe in 2006 was 70.0% (UNESCO, 2008).

Post-apartheid governments have promoted fast expansion of higher education participation, but in practice the expansion has been difficult to achieve. In 2001, the National Plan of Higher Education set a target to increase the higher education participation rate (20-24-years old) from 15% to 20% by 2010-15. The assumptions behind the planned expansion have been questioned (OECD, 2008), in particular because of the insufficient number of high school leavers with the required credentials for study in higher education.

In 2007, 126 641 people graduated from public institutions with higher education qualifications.

While the demand for higher education is increasing, there is also a massive school failure in South Africa. 2009 witnessed record numbers of school leavers attaining university entrance passes, resulting in a large influx of applicants to universities. At the same time, only 15% to 18% of high school students sitting for the final exam each year, known as the "Matric", obtain a pass with endorsement, which qualifies them automatically for university.

South Africa has made great strides in ensuring more equitable access to higher education in terms of race and gender, but greater efforts are needed to ensure that Black and female students access elite and high-skill fields. Access to higher education for females and black African students has improved, whereas there has been a decline of White student enrolments in public universities. In 1994, 40% of students in public higher education institutions were Black, 47% White, 7% Indian and 5% Coloured. In 2006, 61% of students were Black (a 21% increase), 25% White (a 22% decrease), while Indians and Coloureds slightly increased their share (7.4% and 6.6% respectively). The proportion of African students in universities increased from 49.0% in 1995 to 63.0% in 2007 and is estimated to be around two-thirds today. This trend still has some way to go to reach the 79.0% of Black Africans in the population, but it shows steady progress since 1994. Also, before 1995, male students outnumbered females in public universities but this is no longer the case today: in 2006, 55.1% of all students were female. (OECD, 2008).

While access to universities has improved, low retention rates particularly among Black students reveal the underlying issues of under preparedness and quality. Between 1993 and 2000, the retention rate of new university enrolments remained relatively low, hovering around 16-17%, and demonstrating a negative trend. In *technikons* the percentages were even at a lower level (10% and 9%, respectively). Out of the 120 063 graduates produced in South Africa in 2005, the average success rate of black African students in contact undergraduate programmes was only 69.8%, while that of white students was 84.7%. (OECD, 2008)

Staff profiles in higher education and training institutions have not substantially changed since 1994, demonstrating an ageing white male demography. Academic and administrative staff overall, at senior levels, and especially at the historically white institutions, remain overwhelmingly white and male. The rising average age of academics (over 50) and low level of new entrants is a source of concern. A comprehensive, medium to long term national plan would be needed in order to persuade larger numbers of

young graduates to go on to post-graduate studies and to take up an academic career. It would also require ensuring acceptable salaries and working conditions in comparison to the private sector. The infusion of young and talented graduates into higher education and training institutions and teaching professions at schools is crucial for developing a robust human capital, and research and innovation systems. In spite of a few sectors of excellence in certain universities and an average level of publications, the system needs to be strengthened by attracting new talent and helping them to adopt their responsibilities in order to better cater to the needs of the economy (see Chapter 3).

Second-chance opportunities for post school youth

There are almost 1 million South African youth in need of multiple second-chance opportunities, while 700 000 young people with Matric need further education and training. Another 1 million need a variety of employment, training and youth service opportunities, which poses a significant challenge for the educational system. Higher education and training in South Africa has primarily become a "university" sector without a significant intermediate college sector, according to the Centre for Higher Education Transformation (Cloete, 2009), which characterises the current post-school education and work environment by:

- A large annual outflow of students without meaningful further education opportunities.
- A post-school institutional architecture that limits further education opportunities for youth.
- The lack of integrated and systematic data about the "excluded youth".
- A recapitalised Further Education and Training (FET) college sector that requires capacity building.

The situation in the 50 FET colleges across the country is clearly considered as unsatisfactory by the national government. During an April 2010 "Higher Education Summit" presided by the Minister in charge of Education, the need to expand the number of places available in FET and other vocational colleges was recognised. In parallel, there was consensus on the goal for the universities to assist with the training of FET lecturers and greatly expand their research on vocational training. The creation of a new Ministry of Higher Education and Training at the end of 2009 should facilitate such a process as responsibilities previously splintered between the Department of Labour for skills development and the administration of

FETs at the provincial level are now regrouped within a single national entity.

Higher education finances and governance

Since 2004, there has been a steady increase in the funds available for higher education in South Africa, both in absolute terms and when inflation is taken into account. However, the proportion of the national budget allocated to higher education has slightly declined since 2004. The overall budget for higher education in 2007-08 was ZAR 13.3 billion, representing 2.5% of the national budget and 0.65% of GDP, whereas the OECD average is 1.5% of GDP (OECD 2010). Sub-Saharan African countries that spend a greater percentage of their GDP on higher education include Botswana, Burundi, Ethiopia, Kenya, Lesotho, Rwanda, Senegal and Swaziland, with values ranging up to 2.1% of GDP (UNESCO, 2008).

In 2007, on average, 40% of university income is derived from state subsidies, 28% from student fees and 32% from other sources. The universities increasingly have to diversify their funding streams, although the individual capacity of institutions to generate other funding streams differs (FSRSC, 2010). The funding framework of 2003 for higher education is goal and performance oriented, with enrolment and graduation targets set by the ministry after consultation with each higher education institution. This competitive environment is one of the reasons explaining why differentiation between institutions remains intact, in spite of proclaimed policy goals to create a fully unified system after the abolition of apartheid.

These developments illustrate a system of higher education based on co-operative governance, which aims to respect the principles of university autonomy while seeking to reach goals relating to the national demand for qualified skills and scientific knowledge. Enrolments in science, engineering and technology on the one hand, and business, commerce and management on the other, have significantly risen between since 1993 but they still remain far below the needs of the economy (Department of Education, 2008; OECD, 2008). Creating adequate consensus within and between institutions and the national government on the issues of equity and the requirements of the society and economy, and the ways and means by which these can be reached, is a major challenge. Stakeholders generally recognise that the Institutional Forums involving all stakeholder groups in each institution as planned by the Higher Education Act (1997) have not been functioning adequately. Aiming to overcome this situation, the new ministry has established a permanent Higher Education Stakeholder Council at the national level that meets once or twice per year.

The Strategic Plan for Higher Education and Training covering the period 2010-15 has been adopted to address the needs of the economy and equity challenges, but fails to address the regional issues. The approach is integrative, associating all public and private actors in an effort to overcome past short-comings in higher education and training. It encompasses the National Plan for Further Education and Training (FET) Colleges (2008), with the goal of reaching a national enrolment of one million in these institutions by 2014. It highlights the importance of second chance and workplace learning in relation to employability. Underlying the whole approach is an expansion of R&D capacity and innovation. A Human Resources Development Council, associating business, the unions and government, placed under the responsibility of the Presidency will assist in prioritising these challenges. Within this holistic approach, the regional dimension seems to be overlooked, as no institutional or financial mechanism is in place to support universities' or FET colleges' regional engagement.

1.7 Higher education and training in the Free State

Educational profile of the Free State

Educational attainment at all levels is lower in the Free State than the South African averages (see Table 1.3). For both South Africa and the Free State, the majority of the populations have either some secondary or primary education or no education at all, whereas fewer people have competed secondary or higher education. The school enrolment rate of 15 to 19-year-olds, or learners of secondary school age, decreased continuously, with the decline in the Free State enrolment rate being especially acute at 10.0%. Furthermore, the school enrolment rate of 20 to 24-year-olds, or learners of higher education-age, have declined sharply, both provincially and nationally, demonstrating a worrying trend for the future development of the region.

Table 1.3. The educational attainment level of South Africa and Free State, 1996-2001

	Area			
	South Africa		Free State	
	1996	2001	1999	2001
% no schooling	22.3	15.8	17.3	13.1
% some primary	26.1	29.9	27.6	30.3
% completed primary	7.5	6.9	7.9	7.2
% some secondary	28.7	27.9	26.1	25.5
% Std 10/Grade 12	11.2	13.9	8.4	10.9
% Higher	3.9	5.4	3	3.7

Source: FSRSC (2010), "Free State, Self Evaluation Report", *OECD Reviews of Higher Education in Regional and City Development*, IMHE, *www.oecd.org/edu/imhe/regionaldevelopment*

In 2008, the share of the population in the 20 to 24 year old segment attending a higher education and training institution in the Free State was 9.2%, as compared with 9.9% in the whole country. Excluding colleges, the respective percentages were 5.9% and 6.4%. (Statistics South Africa, 2008). Nonetheless, the situation in the Free State has improved as in the rest of the country. At the same time, sub-regional differences remain significant. The highest levels are attained in Motheo, with 5.4% in 2001, and the lowest in Xhariep, with 2.0% in 1996 and 2001. In Fezile Dabi (which has the major industrial pole of Sasolburg), 3.8% of the population has higher education qualifications, while Thabo Mafutsanyana (3%) barely precedes the level of Lejweleputswa (2.9%).

Provision of higher education and training in the Free State is concentrated in the Motheo District in general and in Bloemfontein specifically. This district is home to around 28% of the province's population and it boasts two main university campuses, the University of the Free State (UFS) and the Central University of Technology (CUT) and a satellite campus of the UFS out of total of five, the other two campuses being located in Qwaqwa (UFS) and Welkom (CUT). The regional capital area thus aggregates around 60% of the university student population in the district. Three of the 15 further education and training campuses in the Free State are also located in this district, which accounted for close to 50% of its FET population in the year 2000 (FSRSC, 2010).

University sector in the Free State

The University of the Free State

The University of the Free State, created in 1904, had an enrolment of close to 30 600 students in 2010, with the majority located in the Bloemfontein campus (25 704 on the main campus, 1 074 on the South Campus) and the remaining 3 793 rest in Qwaqwa. During the recent higher education reform, the Free State University incorporated the Bloemfontein campus of the former Vista University and Qwa Qwa Campus of the University of the North.

Concerning the breakdown of enrolment by race, the University of the Free State did not provide overall figures or percentages but the Annual Report for 2009 of the Faculty of Natural and Agricultural Sciences provides some insight: in 2008-09, out of a total enrolment of 5 147 under-graduate, post-graduate, and "occasional" part-time students in this faculty, 2 920 were Black, 2 051 White, 97 Coloured and 79 Asian. The University of the Free State has seven faculties: humanities, law, natural and agricultural sciences, economy and management science, education, health sciences and theology.

Besides the teaching and research activities developed by the different faculties[14], within several of these, the missions of specific centres or units engaging in post-graduate studies and research are of special interest to regional development. These are:

- The Centre of Sustainable Agriculture and Rural Development of the Faculty of Natural and Agricultural Sciences (CENSARD) created in 1993, which prepares for an MA and has approximately 70 new students each year.
- The Centre for Health Systems Research and Development (CHSR&D) within the Faculty of Humanities that engages in top level research concerning health systems, prevention and treatment, two of its programmes focusing HIV/AIDS and tuberculosis.
- The Unit for Entrepreneurship of the Faculty of Economy and Management Sciences that offers entrepreneurship training within flexible modules, post-training and consulting services to new and existing entrepreneurs and seed capital to certain start-ups in the province.
- The Centre for Development Support (CDS) of the preceding faculty with activities relating to urban development on one hand and rural development on the other, offering a multi-disciplinary MA programme

and research activities often engaged in partnership with local authorities. It currently attracts a majority of students from other African countries.

Central University of Technology

The Central University of Technology (CUT) had an enrolment of over 12 500 students in 2010 on its two campuses and within its four faculties. The institution has gone a great way in promoting equity since 1994, as at that time only 30% of the student population was Black, versus close to 90% today. During the recent higher education reform, the CUT incorporated the Welkom Vista campus.

The Central University of Technology has its genesis in the former *technikons*, which, during the apartheid era, was not supposed to offer degree programmes, undertake research and had limited autonomy in comparison to universities. In the post-apartheid higher education system, the universities of technology are expected to offer degrees and undertake applied research. Their particular remit is to offer career focussed education and training programmes with a strong experiential component.

The Central University of Technology engages in applied research in many fields relevant to the regional economy but overall impact in firms is developed in a wider area, including Gauteng and the North Cape, because of the low level of entrepreneurship and difficulties in financing and bringing innovative ideas to market in the Free State, as will be discussed in Chapter 3.

The Central University of Technology has four faculties:

- The Faculty of Engineering and Information Technology with major mechanical laboratories in Bloemfontein and an IT Hub being developed in Welkom.
- The Faculty of Health and Environmental Sciences including applied agricultural research.
- The Faculty of Management Sciences addressing the civil service sector and the private sector, including entrepreneurship and business development. Its forthcoming African Entrepreneurship Centre aims to facilitate SME creation in the country and across the continent.
- The Faculty of Humanities, which includes teacher training.

The share of different study fields has not significantly varied from year to year since 2001, except in business management: humanities have remained relatively stable at around 15%; science and technology (including

engineering, IT, health and environmental sciences) at 50%; while business management has dropped from 35% in 2001 to 28% in 2010. The drop in the share of business management constitutes a negative trend for the province. In 2009, there were 913 science and technology graduates, 737 in business management, 349 in education and 371 in the other humanities.

The Further Education and Training sector in the Free State

The further education and training (FET) sector remains underdeveloped in South Africa. As in many other developing countries, South Africa has an inverted higher education and training pyramid: while about 800 000 students are enrolled in universities, only less than half of that number are in the FET sector.[15]

In the Free State, the Further Education and Training (FET) Sector has been consolidated into four colleges in the Free State: Flavius Mareka in Sasolburg with three campuses, Goldfields in Welkom with two campuses, Maluti in Qwaqwa with eight campuses and Motheo in Bloemfontein with four campuses. The FET colleges offer skills and learning programmes in partnership with the Sector Education and Training Authorities (SETAs). Enrolment in the four colleges in 2010 was 22 743. The FET colleges offer the National Certificate (Vocational) in eleven economic priority areas: civil engineering and building construction, electrical infrastructure construction, engineering and related design, finance, economics and accounting, hospitality, information technology and computer science, management, marketing, office, primary agriculture and tourism (FSRSC, 2010).

In the Free State, as elsewhere in South Africa, the FET sector faces a number of challenges, including the low enrolments and high dropout rates. The Free State FET institutes enrol less than 25 000 students, whereas 150 000 young persons aged 18-24 years are neither in school nor in employment. The four colleges of the region also feature very low pass rates. In a 2002 study of institutional pass rate, 60% of the FET students in South Africa and 75% of the FET students in Free State had a pass rate of below 60%, *i.e.* for every 100 learners, 59 or less passed the FET college examination (Department of Education, 2002).

The transfer of the FET College sector to the National Department of Education and Training (DHET) from 2010 has provided a window of opportunity for a profound reform to make the FET colleges in the Free State more responsive to the socio-economic needs of the region.

Notes

1. The Soweto student uprising in June 1976, also known as "June 16", was a response to the Afrikaans Medium Decree of 1974, which forced all black schools to use Afrikaans and English in a 50-50 mix as languages of instruction in order to reverse the decline of Afrikaans among black Africans. Teacher organisations such as the African Teachers Association of South Africa objected to the decree. Students formed the Soweto Students' Representative Council (SSRC) Action Committee, which organised a mass rally for June 16 to voice their discontent. The peaceful demonstration turned violent, the police firing into the crowd. The number of causalities is estimated anywhere from 200 to 600, though the official government figure was 23. Most of the victims were young black school-aged children.

2. The population in Qwaqwa grew between 1970 and 1983 from 25 334 to 500 000 people (Southern Africa Labour and Development Research Unit, 1995). Whereas the population density for the homelands averaged 151 per km², the population density for the rest of South Africa was 19 per km². In Qwaqwa, population density was as high as 500 people per km².

3. The soil is rich and the climate good, allowing for extensive agriculture, principally maize and grain. As a summer-rainfall region, it has extreme colds in winter, especially in the mountainous areas, reaching as low as -9.5 ℃.

4. In 2008, 23.0% of all South Africans had isiZulu as their mother tongue, followed by isiXhosa (18.0%), Afrikaans (13.0%), Sepedi and Sesotho (both 10.0%).

5. Five of the 14 national routes linking all four corners of the country pass through the Free State. There are also several rail lines between the north of the province and the south and also the west and the east, linking the provinces of Gauteng and Western Cape, as well as the Northern Cape and Lesotho. However, freight transport by rail has decreased over the past 20 years, largely replaced by road transport. The province has four airports, two in or near Bloemfontein, and one each in Bethlehem and Welkom.

6. The Free State has four types of urban settlements: *i*) large urban areas (mainly comprising Mangaung, Metsimaholo and Matjhabeng Municipalities), constituting 40.5% of the population and producing 63.3% of regional GDP (growth in population and the regional GDP concentrate on these settlements); *ii*) regional towns, constituting 5.9% of the population and producing 5.5% of regional GDP; *iii*) middle-order

towns, constituting 13.1% of the population and producing 11.4% of regional GDP; and *iv*) small towns, constituting 16.1% of the population and producing 11.5% of regional GDP. The Free State has also two types of rural settlements: *i*) commercial agricultural areas, 14.8% of the population and producing 8.1% of regional GDP; and *ii*) communal area towns, constituting 9.6% of the population and producing 0.4% of regional GDP.

7. The 2003 South Africa Human Development Report is the most recently available report in which the development indices are available by province.

8. South Africa has more people living with HIV than any other country in the world (5.2 million or 10.6% of the total population in 2009) but adult infection rates have stabilised and those among younger adults appear to have declined according to UNAIDS/WHO (July 2008).

9. Statistics South Africa uses the United Nations poverty indicator of USD 1 or less per day per person, which corresponds approximately to ZAR 630 per month in 1996 for a family of four and ZAR 800 in 2001, accounting for a 5.58% inflation rate.

10 1 USD = 6.98 ZAR; 1 EUR = 9.73 (November 2010).

11. For example, although the proportion of African households in the Free State with a flush or chemical toilet in the dwelling or on its site has almost doubled (from 33 % to just over 60%), the rate still lags substantially behind the access rate for other population groups (by 30% and more).

12. Formal dwellings consist of: houses or brick structures on separate areas; flats; town, cluster, semi detached houses; units in retirement villages; backyard houses, flats or rooms; and small flats on shared property.

13. Participation rates compare the number of students enrolled with the population age segment of 20 to 24 years.

14. The OECD review team was not provided with an overall breakdown of enrolment by fields of study, types of study (graduate and post-graduate) nor with figures concerning the numbers of graduates.

15. This is in stark contrast to, for example, the United States which has six or seven million students in the university sector, and the double of that in the community college sector.

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Chapter 2.

Human capital and skills development in the Free State

Human capital and skills development is the single most important factor for economic growth of countries and regions. In the Free State, the ongoing erosion of human capital poses a challenge for sustainable regional development.

This chapter examines how effectively universities and further education and training (FET) colleges in the Free State contribute to meeting the social and economic needs of the population in terms of opportunities to study and relevance of the skills and competencies offered. The chapter highlights the progress that has been made in building a common higher education system for all racial groups in the post-apartheid era. The chapter identifies the challenges facing the Free State regarding human capital, the roles that the universities and FET colleges are currently playing in addressing these challenges and alternatives for strengthening the engagement of higher education institutions in the future competitiveness of the Free State.

The key message is that cultivating relevant skills to fuel local growth is the best guarantee that the Free State will prosper in future. Joint efforts are needed to improve learning outcomes at schools and raise the level of educational attainment of the regional population. Better organised and more relevant skills development, vocational training and lifelong learning opportunities are needed. The demands of large numbers of youth outside of education, training and the labour market have to be addressed. Improvements are necessary in the quality and labour market relevance of higher education and training as well as financial, academic and social support for students from low income families. Region-wide collaboration is needed to articulate a long-term vision of human capital and skills development.

Introduction

The growth of education opportunities brings considerable public and private returns. Inclusive access and success in education is essential for achieving social justice and ensuring that people have the opportunity to achieve their full potential. There is also a strong economic efficiency argument in favour of widening access. A well-educated population is key to the social and economic well-being of a region. Education provides individuals with knowledge and competencies to participate effectively in a society and to break the heredity of disadvantage (OECD, 2009).

Universities and other tertiary education institutions can contribute to the human capital development in their regions in four different ways by:

- Widening access to and ensuring success in tertiary education of the existing youth and adult population of the region.
- Attracting talent to the region, including students, leaders and managers, university faculty and researchers.
- Producing graduates with knowledge, skills and competencies aligned with the needs and demands of the region.
- Contributing to the socio-economic development of the region and its global competitiveness, by helping create an economy that will employ graduates, and retain and attract an educated population.

Furthermore, human capital is critical to regional and local development because skilled workers are more productive and greater productivity is the basis of sustainable growth. Individual workers are more productive in regions where their peers have high levels of educational attainment.

The overall pattern of economic decline in the Free State has been accompanied by significant shifts between sectors. Agriculture and mining are in decline but have not been sufficiently compensated by industry or services. These economic shifts have resulted in the dislocation of workers, contributing to chronic unemployment and poverty which are consistently higher than the national averages.

At the same time, the Free State's overall education participation and attainment rates remain modest, with significant differences between Black and White populations. Many youth leave school and higher education and training without skills. The population of young workers is greater than the existing labour market can absorb and the province continues to lose its human capital.

In the context of poverty, low skills and outmigration, this chapter examines the following areas to assess the effectiveness and coherence of human capital and skills development policies and practices in the Free State:

- Do the existing higher education and training providers offer adequate learning and equal training opportunities to the local population in terms of age, gender, and socio-economic and ethnic backgrounds?
- Are the existing higher education institutions and training programmes adequately aligned with the skill needs of the local and regional economy?
- Is higher education and training in the Free State co-ordinated and governed in an appropriate way to meet the needs of the region?
- What lessons can be learnt from international experience?

2.1 Higher education and training providers in the Free State

The Free State is endowed with two established universities, which differ from each other in terms of missions and enrolment numbers. The University of the Free State is a broad-based university which recently under the leadership of Vice Chancellor Jonathan Jansen has embarked on a road of institutional transformation "to become a world-class, engaged university of excellence and innovation", and "an equitable, diverse, non-racial, non-sexist, multicultural, multilingual university where everyone will experience a sense of belonging and achievement". The Central University of Technology has under the leadership of Thandwa Mthembu undergone a thorough institutional transformation which has involved extending its career-focused education and training mandate into applied R&D. It aims to become an "engaged university that focuses on producing quality social and technological innovations in socio-economic developments, primarily in the Central region of South Africa" (see Box 2.1.).

Both universities are relatively well resourced, have a sound infra-structure and hold the potential of contributing to high level skills and socio-economic development of the Free State. While the higher education provision is concentrated in Bloemfontein, both universities also have campuses and off-campus learning sites across the province and in the northern part of the Eastern and Northern Cape. These learning sites and e-learning opportunities have removed some of the place-based barriers to higher education.

Box 2.1. Universities in the Free State

The Free State higher education scene is dominated by the University of the Free State (UFS), that offers a full range of undergraduate and postgraduate degrees and diplomas to more than 30 000 students: 26 000 students are studying on the Main Campus (Bloemfontein), 1 100 on the South Campus (Bloemfontein) and 3 800 on the Qwaqwa Campus. A total of 2 900 staff members are working in seven faculties: Economic and Management Sciences; Education; Health Sciences; Humanities; Law; Natural and Agricultural Sciences; and Theology. The UFS received the World Universities Forum (WUF) Award for Best Practice in Higher Education during 2010. The UFS's innovations to transform the institution include: campus-wide racial integration among students; the reinvigoration of the academic culture; the nurturing of the most promising young scholars by means of the Vice-Chancellor's Prestige Young Scholars Programme; sending 71 first-year students to top American universities to assist with their development into non-racial campus leaders; the revision of the undergraduate curriculum to promote a cross-disciplinary approach to key societal problems; raising the entry requirements; the facilitation of dialogue between senior leadership, staff and students; inauguration of the International Advisory Council consisting of key thinkers and practitioners; and the identification of 20 of the most dysfunctional high schools in the Free State Province and the building of relationships with those schools.

The Central University of Technology (CUT) is a fast developing technological university that enrols a much smaller number of students (11 500) in career-focused education and training programmes with a strong experiential component. The CUT has four faculties: Engineering and Information Technology, Health and Environmental Sciences, Management Sciences, and Humanities. The majority of students are enrolled in programmes in Faculty of Management Sciences and one-third in the Faculty of Engineering and Information Technology. In the post-apartheid higher education system, technological universities have a mandate to undertake applied research. To support R&D and innovation, the CUT has established a number of research centres and developed a Technology Transfer and Innovation Centre, an African Entrepreneurship Centre and an IT Hub with a telecommunications network in Welkom.

As in South Africa in general, in the Free State the vocational skills development is the responsibility of the further education and training (FET) sector which is currently in flux and has relatively low enrolments (22 743 in 2010). At the national level, within a relatively short space of time, 152 public colleges were merged to 50 diverse multi-site colleges. In the Free State, the FET sector has been consolidated into four colleges: Flavius Mareka in Sasolburg with three campuses, Goldfields in Welkom with two

campuses, Maluti in Qwaqwa with eight campuses and Motheo in Bloemfontein with four campuses.[1] National authorities see the transformation of the FET sector as key to successful skills development.

2.2 Regional demographics and human capital development

Demographic trends

The general demographic profile of the Free State province is that of a relatively stable population of about 2.9 million, dominated by young people. Over the last decades, the population growth in the province has been below the national average (0.6% versus 1.6%). Due to the lack of economic opportunities, outmigration to other provinces and the prevalence of HIV/AIDS, the Free State has lost prime members of its labour force.

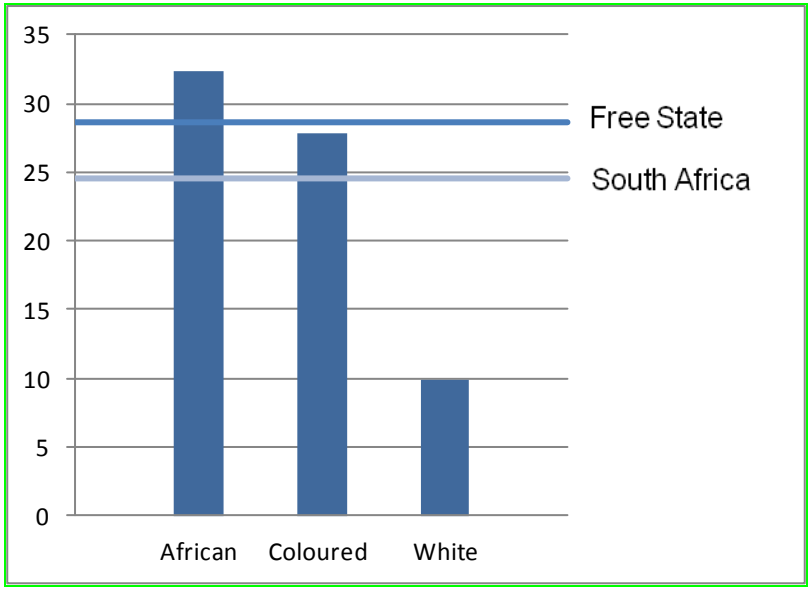
The regional population is dominated by Africans who are growing their share (87.1% in 2007), whereas due to ageing and outmigration White population is declining (9.7%) both proportionately and in real terms. The proportion of Coloured and Asian populations have stabilised around 3.0% and 0.2% respectively.

The Free State is characterised by a low skills/low wage economy with deep diversities between African and White populations. In general, the Free State population has a significantly lower level of educational attainment than the better performing regions in South Africa or the national average. As elsewhere in South Africa, there is a high level of school failure. About 150 000 youth (18 to 24 years age cohort) are outside education, training and labour market.

Poverty and unemployment are closely related in the Free State, and mainly affect the African population. The average household incomes are below the national average and feature deep racial inequalities. Only one-third of the working age population are in formal employment. The unemployment rate is consistently higher than the already high national average, 27.8% vs. 24.6% respectively, and unequally distributed between population groups (see Figure 2.1.). A high proportion of discouraged workers, 7.8% of the labour force (90 795 people in 2009), have given up searching for employment. Agricultural and mining employment has dropped, reducing the availability of employment opportunities for the less or non-qualified job seekers. The population is concentrated into urban areas due to outmigration from former homelands. At the same time a large number of people live in peripheral areas with limited access to services and educational opportunities.

The Free State population faces barriers and disincentives to higher education. Inadequate preparation at schools constitutes the most significant barrier. Other disincentives include the cost of education and low prospects for better labour market outcomes, with the unemployment rate for Whites being 22.5% lower than for Africans. Finally, a lack of accessible public transportation is not only a barrier to higher education and labour market participation, but also a source of school dropout, especially to those who live in the rural areas.

Figure 2.1. Unemployment rates in the Free State, 2009



Note: Due to the relatively small number of Indians in the Free State, their unemployment rates were excluded.

Higher education and training attainment, participation and retention

The human capital and skills development of the Free State is closely related to the graduate production of the province's universities and further education and training colleges. Increases in higher education and training participation and the addition of graduates to the regional population should positively contribute to the Free State's economic, social and cultural

development. Examination of the key data related to the Free State higher education development, however, reveals negative trends.

All age groups in the Free State have lower educational attainment levels than South Africa as a whole. Worryingly, the higher education attainment rates in the Free State not only lag behind the national averages, but also demonstrate slower growth rates or even decline. There is also a lack of robust data in this area.[2]

Between 1999 and 2008, South African higher education attendance rates demonstrated a sustained gradual increase, whereas in the Free State there was fluctuation, with a peak in 2003 and decline in 2008, when the attendance rate being only 9.2% among the 20 to 24-year-olds. At the same time, the Free State school enrolment rate of 15 to 19-year-olds decreased by 10%, while the school enrolment rate of 20 to 24-year-olds declined sharply both nationally and provincially (FSRSC, 2010).

There is currently a lack of national and institutional level data about students' socio-economic background, apart from the data on racial groups: African, Coloured, Indian and White.

The gap in higher education rates between the different population groups remains significant at the national and regional levels. During the period of 2004-07, the overall higher education participation rate was around 16%, with African and Coloureds featuring about 40-30 percentage points lower (both 12%) than White (54%) and Indian (43%) students (CHE, 2009) (see Table 2.1.).[3] While no precise data is available in the Free State regarding the participation of various population groups, the scope and extent of the challenge is evident from the national data.

Table 2.1. Participation rates by race, 2007. South Africa

	20-24 year olds in the country	Students enrolled in higher education	Participation rates
African		476 768	12%
Coloured		49 069	12%
Indian		52 596	43%
White		180 463	54%
Total		758 896	16%

Source: CHE (2009), Higher Education Monitor: The State of Higher Education in South Africa, CHE, Brummeria.

Both universities in the Free State have experienced rapid growth in student enrolments. In the case of the University of the Free State the head count enrolment increased by 14 100 in 2008 compared to 2000 (from

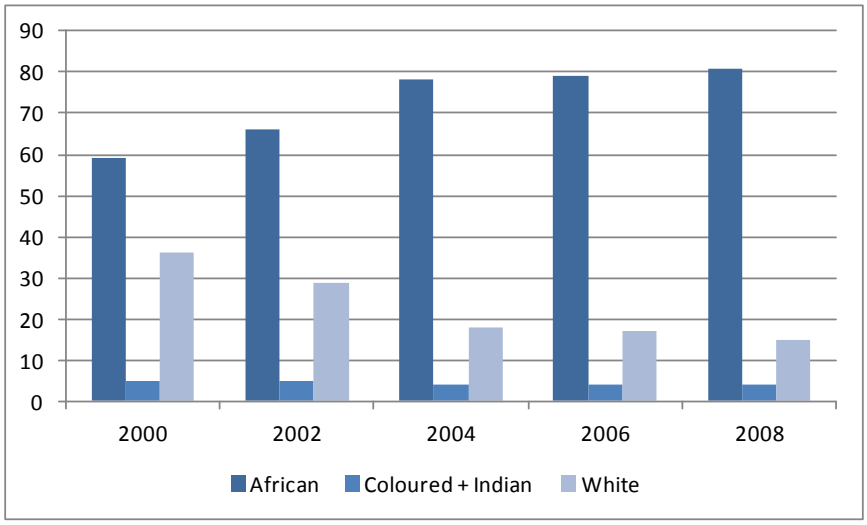
12 100 to 26 200 students) and the full time equivalent enrolment by 9 500. In the same period, the headcount student enrolment of the Central University of Technology showed greater fluctuation, increasing by 4 900 (from 6 000 to 10 900 students). (Bunting *et al.*, 2010)

The proportion of African students in South African universities increased from 49% in 1995 to 63% in 2007 and is presently about two-thirds of the total number of university students, whereas White students have decreased their share by nearly 50% to 25%.[4] However, the average success rate of African students in undergraduate programmes was 69.8% compared to 84.7% among White students. African students have a higher likelihood of dropping out: while 63% of all enrolled students are African in public universities, they make up only 57% of the graduates, (CHE, 2009).

Both universities in the Free State have seen an increase yet differ in patterns in the participation rates of African students. The Central University of Technology has experienced a steady increase in the proportion of African students, from 59% in 2000 to 81% of the total enrolment in 2008, whereas the proportion of White students has declined from 36% to 15%. The University of the Free State's participation rates for African students were 57% in 2008, and the university has set a target to enrol a higher share of White students (see Figures 2.2 and 2.3). In the further education and training sector, majority of the students are Africans.

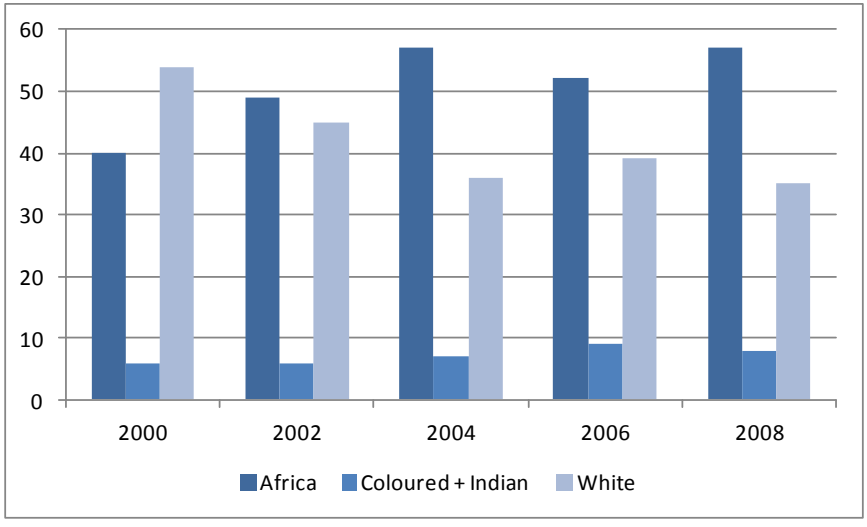
In 2008, a total of 57% of the University of the Free State students were women, whereas in the Central University of Technology the share was 48% (Bunting *et al.*, 2010).

Figure 2.2. Enrolment by race group in CUT



Source: Bunting *et al.*, (2010), South African Higher Education: Performance Indicators 2000-2008. Profile of the South African Higher Education System, The Centre for Higher Education Transformation, South Africa.

Figure 2.3. Enrolment by race group in UFS



Source: Bunting *et al.*, (2010), South African Higher Education: Performance Indicators 2000-2008. Profile of the South African Higher Education System, The Centre for Higher Education Transformation, South Africa.

The universities in the Free State do not have a regional focus in their recruitment strategies and do not systematically monitor the students' regional background. They aim to draw the best students from the country, with no specific regional targets for recruitment. However, the Central University of Technology has identified the Central region of South Africa as a key area of collaboration.

While the further education and training colleges tend to draw their students from the regional and local population, limited information is available about their recruitment strategies. There are currently no joint student recruitment efforts between the universities, or between the universities and the further education and training collages. Furthermore, there is a lack of career counselling at the school level to help students make career choices based on their abilities, interests, affordability and market needs.

Universities and further education and training colleges in South Africa and the Free State demonstrate a low level of efficiency in graduate production. University dropout rate in South Africa is high at 40% in the first year, while only 15% of students complete their degrees in the allotted time (MacGregor, 2010). While the Free State universities have increased their graduate production, the success rates remain below the national targets. From 2000 to 2008, the number of the graduates increased from 2 400 to 5 100 in the University of the Free State (figures include both undergraduate and postgraduate students), and from 800 to 2 300 in the Central University Technology. In the same time period, both universities underperformed in terms of students' success rates which remained below the national target of 80%. The success rates of the University of the Free State fluctuated, being 72% in 2008. The Central University of Technology's success rates improved between 2000 and 2008 (from 67% to 74%). The two universities feature opposite trends in the race-based success rates of their students. While in the University of the Free State White students outperform their Black peers in all fields apart from theology and humanities, in the Central University Technology, Black students have higher success rates in all fields except education (Bunting *et al.*, 2010).

The four further education and training colleges in the Free State attain very low pass rates: 60% of the further education and training students in South Africa and 75% of the FET students in Free State had a pass rate of about 59% (Department of Education, 2002).

Table 2.2. University of the Free State Success Rates 2009

First time entering undergraduates (%)

	White	Coloured	Indian	Black	Total
Economic and Management Sciences	78.6	77.1	72.1	66.1	71.7
Education	82.3	85.6	0.0	59.9	67.8
Health Sciences	90.8	93.5	77.3	77.0	87.2
Law	79.6	73.1	82.8	61.7	71.7
Natural and Agricultural Sciences	78.2	78.5	66.0	57.8	66.6
Humanities	79.4	85.2	80.1	79.3	79.7
Theology	90.4	100.0	0.0	93.9	93.2
Total	**80.1**	**81.7**	**73.5**	**66.4**	**72.8**

Source: University of the Free State (2009)

Table 2.3. Central University of Technology Success Rates 2007

All students (%)

	White	Coloured	Indian	Black
Science, Engineering and Technology	69.9	70.2	57.2	79.2
Business	73.3	80.7	90.4	82.0
Education	79.4	89.8	4.8	77.9
Other Humanities	79.1	83.1	79.1	85.6
Total	73.5	77.4	67.5	80.8

Source: Central University of Technology (2008a).

The PhD production in South Africa does not meet the needs of the economic development in terms of number and quality of degrees. In 2007, South Africa's 23 universities produced 1 274 PhDs; of these 83% were produced by 9 of the country's 23 universities. Only 454 of the PhDs were in science, engineering and technology whereas the estimated demand is about 1 200 every year (Assaf, 2010). Furthermore, a large number of teaching staff do not have a PhD and some lack a Masters degree. A total of 56% of the graduates with doctoral degrees in 2006 were White and only 30% African, including a significant number of foreigners (CHE, 2009). The lack of African PhD graduates highlights the need to ensure higher completion rates in undergraduate degrees.

Over the period 2006-08, the Free State university system, mainly the University of the Free State (only 5% of the students in the Central University of Technology were enrolled in postgraduate studies in 2008)

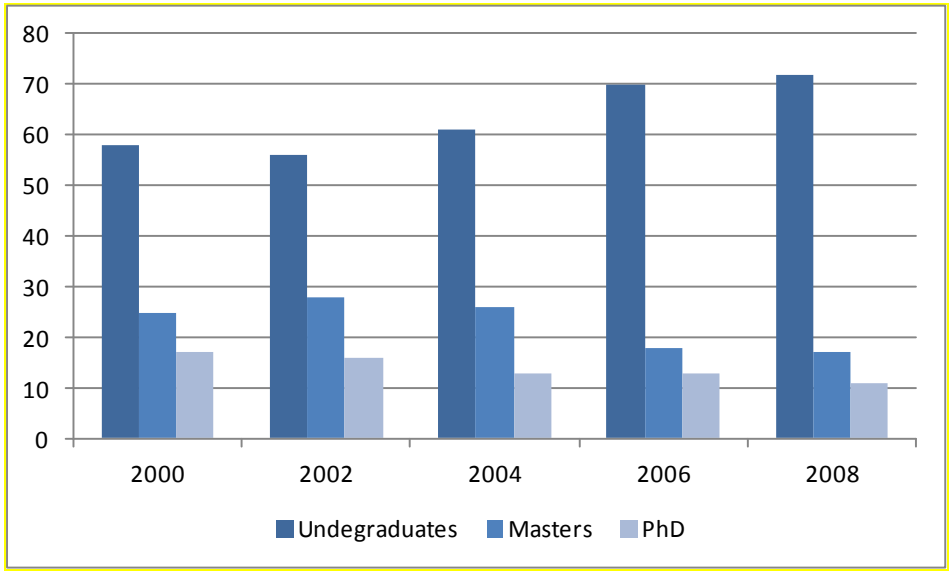
produced 1 553 masters and 213 doctoral degrees. Of concern is the declining number of students enrolling in Masters and doctoral degrees during this period (Figure 2.4.). Despite the university's focus on postgraduate education and research, the number of postgraduate enrolment and research output remain low, demonstrating a decreasing trend. In the period up to 2004, nearly 40% of the University of the Free State students were enrolled in postgraduate studies. In 2006, the proportion dropped to 30% and 2008 to 26%. To address this challenge, the university has taken steps to attract top academics and has established the Vice-Chancellors Prestige Scholars Programme and a postgraduate school.

Box 2.2. UFS building academic excellence and diversity

The University of the Free State has launched the Vice-Chancellor's Prestige Scholars Programme. This programme takes 25 young staff members with recent PhDs and teaches them how to become professors through intensive local and international mentorship, research support and academic training. This programme, unique in South Africa, focuses on the next generation of top researchers in South Africa who will fill the gap that is left by retiring academics. The programme also adds to the diversity of the professoriate at the university.

The University of the Free State has also taken steps to recruit top professors around the world. Professors have been recruited based on traditional academic merits with no consideration to the regional needs and challenges. These professors include Kwandile Kondlo (from the Human Sciences Research Council (HSRC) who is heading the Centre for Africa Studies); Hussein Solomon (from the University of Pretoria and joining the Department of Political Science); Hasina Ebrahim (from the UKZN joining the Faculty of Education); Sechaba Mahlomaholo (from the North-West University, joining the Faculty of Education); Prof. Greg Barr (from the US joining the Department of Music); Monty Jones (from Sierra Leone); Helena Strauss (joining the Department of English); Johan Neethling (joining the Faculty of Law); Cynthia Miller Naude (joining the Department of Classic and Near Eastern Studies); and Charles Dumas (of the US joining the Department of Drama and Theatre Arts).

Figure 2.4. Enrolment by qualification type in UFS



Source: Bunting *et al*., (2010), South African Higher Education: Performance Indicators 2000-2008. Profile of the South African Higher Education System, The Centre for Higher Education Transformation, South Africa.

No robust information is available about the employment outcomes of South African students at the national level, and data is also lacking in the Free State, both at the institutional and regional levels. South Africa has a recognised mismatch between the output of the higher education sector and the needs of the economy as evidenced by the concurrent shortage of high level skills and high levels of graduate unemployment (Scott, Yeld & Hendry, 2007). At the same time, a lack of robust labour market information makes it difficult to monitor the demand for graduates in specific regions (Council on Higher Education, 2009).The scope of the challenge for the Free State becomes evident from the fact that the employment of the black youth decreased between 2003 and 2008 despite the increase in educational attainment (Bereng *et al*., 2009). Furthermore, the unemployment rate in the Free State reached 28% in the second quarter of 2010 (South Africa 26.5%), youth unemployment being at least double this rate.

2.3 Ensuring access and success in higher education and training

To increase the education attainment of the regional population and to ensure sustainable development in the region, the Free State must ensure that a higher percentage of the population complete secondary education with the knowledge and skills needed for a knowledge-based economy and higher education. The region needs to improve access and success at all levels of education, increasing also postgraduate training, particularly in science, engineering and technology.

There are three broad approaches for improving access and ensuring success in higher education: *i*) broadening the scope of higher education and training by creating a strong intermediate college sector providing more learning opportunities related to vocational (career) orientated education and training ii) enhancing academic, social and financial support for students, especially those from a disadvantaged background and *iii*) improving the quality and relevance of teaching and learning.

Enhancing academic, social and financial support

Academic support

At present, the Free State, as South Africa in general, features poor quality of schooling, which means that entrants to further education and training colleges and universities are often inadequately prepared for higher education and training, and the dropout rates especially in the first year are high. (Bloch, 2009; Yeld, 2009; Wilson-Strydom, 2009)

The recent results from the Annual National Assessments of the Department of Basic Education highlight the general low performance of the South African school system and even weaker learning outcomes in the Free State. In the Free State, the average performance in literacy among Grade 3 children stands at 19%, compared to the average of 35% in South Africa. Among Grade 6 children the Free State average in languages stands at 20%, compared to 28% in South Africa.

Overcoming quality and equity gaps in primary and secondary education is not the direct responsibility of universities and further education and training colleges. The primary responsibility lies with school authorities to work towards improving the quality of education in South Africa. They will need to address the challenges in a comprehensive way and mobilise the appropriate levels of financial resources to support education. At the same time, universities can do more to reach out to local schools in order to raise

aspirations and academic performance of students and to improve the quality of teaching.

While collaborative efforts between the two universities in the Free State remain limited, both universities have developed their own programmes and initiatives to reach out to schools and further education and training colleges; they also provide bridging/preparatory programmes and academic support to ease the transition from school to university (see Box 2.3.).

Box 2.3. Universities improving access to and success in education

The Central University of Technology (CUT) offers students who do not meet all of the admission requirements an opportunity to undergo a series of tests to determine their academic potential. It operates a Saturday programme for students at Grade 11 and 12 to enhance access to and performance in university with a focus on math and science education as well as life skills and English. Between 2006 and 2010, 85 learners from this programme were admitted to the CUT. The CUT also runs a winter and spring school to enhance access to higher education; 72% from this programme passed the grade 12 examinations. Furthermore, the CUT has for the past 12 years been holding an Annual High School's Quiz. In 2009, more than 55 schools from across the Free State and Northern Cape participated in the event that was hosted by the Faculty of Engineering and Information Technology.

At the University of the Free State (UFS) depending on their Grade 12 school results, students are placed in mainstream programmes, an extended degree programme (1 year longer to obtain the degree) or the University Preparation Programme. The UFS has offered the University Preparation Programme since 1993. It is a unique bridging programme as it has been based on a partnership between the university and FET colleges. Although this is no longer the case in Bloemfontein, strong partnerships remain in place in Bethlehem and Kimberly. It is also based on a curriculum that combines academic skills development with two university subjects. This means that successful students enter university with credits for two subjects, in a similar way as transfer students do in the US community colleges. The programme is offered in nine sites across the province. From an initial number of 73 students, the programme has grown to enrol 1 000 students per year. Students take courses in three programme directions: human and social sciences, natural agricultural sciences, and economic and management sciences. Since 1993, a total of over 4 000 students have enrolled at the UFS through this programme. Between 1996 and 2008, the UFS conferred degrees on over 1 000 of these students who would have been otherwise excluded from university. These graduates held 113 honours degrees, 16 Masters degrees and 7 medical degrees. In addition 180 students have graduated from the Central University of Technology.

Box 2.3. Universities improving access to and success in education (continued)

The University of the Free State is also the host institution of a new Free State Education and Training Trust project focused on developing the FET Sector. This project is currently funded by a US-based foundation but lacks sustainability and strong basis to respond to the needs in the region. In addition, the university offers a comprehensive Orientation Programme for new students and their parents, and has introduced an academic advising programme from 2010.

Source: FSRSC (2010), OECD Review of Higher Education in Regional and City Development. Self-Evaluation Report, Free State, South Africa, *www.oecd.org/dataoecd/31/27/46661089.pdf*.

The University of the Free State is currently shifting its community engagement and service focus on closer collaboration with schools. The University of the Free State has identified 20 of the most dysfunctional high schools in the Free State Province and the building of relationships with those schools. This university-school partnership is based on a contract of reciprocal commitments to increase the chances of black children attending university. It is introducing various new projects involving schools, school teachers and school learners, such as the recently announced project "Every Child Reads." (see also Box 2.4) To complement its leadership in widening access initiatives, the University of the Free State could also consider taking a stronger lead in designing systematic induction and professional development programmes for new school teachers and leaders.

Box 2.4. CED enhancing science and maths

The Centre for Education Development (CED) at the University of the Free State is a regional centre that co-ordinates and manages Family Math and Family Science projects that enhance learning in science and maths.

Family Math is a sub-programme of the EQUALS Programme at the Lawrence Hall of Science, University of California in Berkeley and Family Science is a project of the Portland State University in Portland Oregon. The Family Math and Family Science projects assist parents and educators through training workshops to achieve further development of children in mathematics and science.

Box 2.4. CED enhancing science and maths (continued)

They raise mathematics and science literacy levels among young children and make use of everyday experiences in and around the home. They develop learning and teaching materials that are suitable as well as affordable for use in community workshops as well as in the formal classroom situation. They apply constructivist and hands-on methodologies in the teaching of mathematics and science for children with different learning styles. In order to suit the South African situation, some activities of the original Family Math and Family Science programmes were adapted for South African use and were also translated into English, Afrikaans, Sesotho, isiXhosa and Setswana.

Reading with understanding, numeracy, problem solving etc. are amongst some of the problems young learners of the foundation phase experience in learning mathematics and science. After consulting with officials of the Free State and Northern Cape Department of Education, the CED decided to address the learning issues by utilising the benefits of the Family Math and Family Science programmes in the formal school situation. At the beginning of 2009, it launched its Family Math and Family Science roll-out initiative in the two provinces in order to demystify mathematics and science for learners in the early school years by raising their levels of understanding and changing their attitudes towards sciences and mathematics. This is done by exposing learners to Family Math and Family Science activities on a regular basis in the classroom and integrating the activities into the curriculum.

In 2009, a total number of 5 112 learners from predominately rural communities in the Free State and Northern Cape provinces were involved in doing mathematics and science activities. The CED trained nine subject advisors to act as co-ordinators in their regions with the responsibility of training and supporting local teachers in the implementation of the programme. In 2011, the CED awarded certificates to 111 intermediate phase and 17 senior and further education and training phase students who performed well in the two programmes. The programmes served as the practical component of the students' community-service learning module. In addition to training sessions they also presented Family Science community workshops at five schools in the Heidedal and Mangaung area near Bloemfontein in order to qualify for the certificates.

The CED provides 134 participating teachers with training material to be utilised in the classroom. The materials are manufactured on site by CED staff. The manufacturing of materials has been made possible by the continued financial support of sponsors like ABSA and SANRAL. Funds from HP will take the project further.

Since the inception of the programme, numerous community as well as formal training workshops, which included parents, learners, community leaders, educators, subject advisors and student educators, were conducted in the Free State, Northern Cape, KwaZulu-Natal, Western Cape and in Zambia.

Source : NUUS (News magazine, University of the Free State) (2011),
http://apps.ufs.ac.za/media/dl/userfiles/documents/Publications/Bult/2011_Bult_01.pdf

At the university level, the academic support measures have focused on students and learning methods, rather than on professional development of university teaching staff. For example the University of the Free State has introduced blended learning[5] while the Central University of Technology is implementing work-integrated learning in study programmes. At the same time comprehensive professional development programmes are needed for university teachers, many of whom were educated during the segregated education system, in order to help them to address a larger and more diversified student population. The provision of regular short courses to improve teaching skills, assessment and feedback from students, attending seminars and workshops to improve teaching and learning, inclusion of state of the art information technology, and a provision of a teaching portfolio at the time of promotion would be important contributions in this direction.

Social support

Both universities in the Free State provide counselling and social support services in order to ensure that students are able to adjust to university. Kovsie Counselling at the University of the Free State and the Centre for Counselling and Social Services at the Central University of Technology each have a number of psychologists and psychometrists to assist students. These divisions offer programmes on study skills, peer pressure, balancing social and academic life, HIV/AIDS etc. No data was available on how many and what services are used by students. (For the FET sector, no information was available on the services to students.)

While commendable in their own right, the current counselling and social support services do not appear to meet the needs of the large number of first generation students, many from low socio-economic backgrounds, who face multiple challenges and barriers in education. There is a need to scale up and better target the provision of social support. This would include counselling in the appropriate choice of career pathways, adapting to a university environment and personal counselling for a number of reasons – transport, finance, academic challenges, diet etc. Early intervention with students in risk of drop out would require robust data about student progress and achievement.

Arrangements on and off campus to accommodate regional, national and international students are handled by housing and accommodation services in the universities. Currently these arrangements only benefit a small minority of the students.

Many students from low income families are faced with the challenges of commuting and the cost of transport.[6] Full advantage has not been taken of the university expertise in urban development strategies that could

address the challenge of accessible public transport. The University of the Free State has, however, with the help of private donors, launched a shuttle service for medical students (see Box 2.5.). While commendable in its own right, this service reaches only a small proportion of students who are in need of accessible transport services.

Box 2.5. University of the Free State's shuttle service for medical students

In 2011, the University of the Free State launched a shuttle service for medical students with the help of private sponsors such as NetCare, PPS and Pfizer. The service is targeted at 65 underprivileged fourth- and fifth-year medical students (Phase-3 students) in the English class who face significant difficulties with transport. About 90% of them are bursary students at the university.

Before the shuttle service was launched, the students used taxis to move between hospital rounds and classes. The average annual costs for the daily travels between the university and the various training hospitals amounted to ZAF 4 000.

The two Quantum mini-busses do the circuit according to fixed schedules each day. The route starts at the Francois Retief Building on our Bloemfontein Campus and then travels to the National Hospital, the Free State Psychiatric Complex (Oranje), Pelonomi, 3 Military Hospital (at Tempe) and then back again to Universitas Hospital.

Financial support and affordability of education

One of the major contributing factors to the student dropout rate in the South African and the Free State higher education and training institutions is finances, although the FET colleges provide a more affordable option.

Student financial aid is provided by: *i*) national government in the form of loans that are transferable to bursaries for studies in public institutions; *ii*) universities and sub-national (provincial) governments in the form of loans and bursaries; *iii*) companies in the form of contract bursaries, requiring graduates to be employed in the company; and *iv*) banks in the form of loans that are available also to students in private institutions.

Given the socio-economic circumstances in the Free State, most African students require financial support for higher education and training. Research by the University of the Free State has shown that the amount of

funding provided by the National Student Funding Aid System does not provide adequate financial support for students (Strydom-Wilson, 2010).

Under the National Student Funding Aid System (NSFAS), the Ministry of Higher Education and Training provides study loans to academically able but financially needy students. Much of an NSFAS loan can be converted into a bursary, which does not need to be repaid, depending on academic progress. A 100% pass rate would result in a 40% bursary rebate on an NSFAS loan. The size of the initial NSFAS loan ranges from ZAR 2 000 to ZAR 30 000. In 2007, approximately ZAR 2.5 billion was allocated in student support at South African universities. Support was provided for 120 000 of the 735 000 students in universities and only partly covers the cost of training. The National Student Funding Aid System has recently been reviewed.

In the Free State, universities provide limited financial assistance in the form of loans and bursaries that are available to students to help cover tuition fees, accommodation costs, living and other expenses. Loans are given to applicants based on financial status or background as evidenced by household income level. Bursaries are available to students with outstanding academic performance and also for extra-curricular participation, with the former weighted heavily.[7] Data were not provided to enable this report to conclude if loans and bursaries reflect the social dimension such as inclusiveness as well as economic dimension.

The Free State Provincial Government's bursary programme targets two groups: Grade 12 learners who continue in universities and provincial government employees who develop their skills and qualifications. In 2010, the provincial government provided over 900 bursaries to regional students at the two universities. According to the evaluation of the bursary scheme, albeit many commendable aspects, the bursaries failed to address the Free State's specific skills gaps or retain graduates in the region (Free State Youth Commission, 2009).

Many South African companies, for example in mining and engineering fields, offer bursaries to promising students, requiring students to "pay back" the bursary by working at the company after graduation. No information was provided about such schemes in the Free State.

While the Free State universities and the provincial government could better target and increase their bursaries, joint public-private efforts are needed to increase financial support for students, drawing on the Free State business and industry, university alumni and other donors (see Chapter 4 for examples on how to support private giving for higher education). Universities should also support students to access the funds provided by foundations (*e.g.* the Ford Foundation and the Gates Foundation) for

postgraduate study. Furthermore, the universities' research could be mobilised to identify skills development needs so that the provincial government's support could better address the regional development needs.

International examples

International experience from OECD countries shows that long-term collaborative efforts are needed to widen access to and improve success in higher education.

In the Free State, public-private long-term multi-stakeholder collaboration should be mobilised to reduce school drop outs and school failure in primary and secondary education throughout the province, and improve access and success in higher education. International best practice examples include the El Paso Collaborative for Academic Excellence in Texas, US that has brought measurable improvements particularly in the performance of Hispanic and low income students. Underlying individual institutional action is a College Readiness Consortium, which connects efforts in primary and secondary education institutions in all school districts in the region to higher education programmes to increase access and attainment (see Box 2.6).

Box 2.6. El Paso: widening access through broad-based long-term collaboration

The ability of the tertiary education institutions to widen access and increase educational attainment depends significantly on preparation in primary and secondary education. The El Paso Collaborative for Academic Excellence is a long-term multi-stakeholder public-private effort, initiated by and based at the University of Texas at El Paso, to improve educational attainment and retention from the first year in school through college or university degree programmes. The collaborative includes membership from the public sector, business community, all levels of educational institutions (from primary through university) and a non-profit organisation concerned with improving educational achievement. The goal of the collaboration, which started in 1991, was to make systematic changes in educational policy and curriculum in all of the twelve El Paso County School Districts that would produce measurable results in performance in key areas of the curriculum. A specific goal was to decrease the achievement gap across ethnic and socio-economic groups.

Box 2.6. El Paso: widening access through broad-based long-term collaboration (continued)

The approach of the collaborative has been measurably successful, particularly in improving the performance of Hispanic students, a group with the largest proportion of low-income students and for whom English is usually a second language. Test results for Hispanic students in the critical 11th grade (a year before college entry) show improvement in performance from the 33rd percentile in 1993 to the 72nd percentile in 2008. Hispanic students show increases in enrolment in science, technology, engineering and mathematics related curriculum over the period of collaborative activities and a graduation rate of 76.7%, which is the highest among the large urban school districts in the State of Texas. Given that Hispanic students make up 89% of the student population in the El Paso school district, improvement in their educational achievement has had a significant effect on the overall performance of the school districts.

Tertiary education institutions benefit from the efforts to improve college readiness in the primary and secondary institutes. El Paso Community College, with five campuses in the region, is critical to the effort of widening access to higher education. The community college system is the primary entry point to tertiary education for low-income students who are unable to pay for a four-year degree programme. As a result of direct efforts to widen access and increase educational attainment, for example by obtaining grant funding to improve remedial education, enrolment rates increased 35% between 2002 and 2008 and graduation rates increased 92% during the same period. Programmes to increase college readiness and thus potential success in a four year degree programme have resulted in significant improvements in mathematics, reading and writing measures, with, for example, the percentage of students assessed as college ready with respect to writing skills, improving from 35% in 2003 to 74% in 2008. One of the most innovative programmes undertaken at El Paso Community College to improve educational attainment and to increase the knowledge base of the region is the Early College High School Programme. This programme enables high school students to obtain credit for college level courses and thus to shorten the time and money needed to complete a college degree.

The University of Texas at El Paso (UTEP) benefits from the efforts to improve college readiness in the primary and secondary institutes as well in the community college and has undertaken its own programmes to widen access and improve student performance and completion rates. The relationship between the community programmes to improve college readiness and the ability of the University of Texas at El Paso to respond are integrally related because over 70% of the UTEP students come from within the region. UTEP has increased its enrolment by approximately 40% since the late 1990s and the vast majority of the increase has been in Hispanic students, who have increased from below 40% of the student body to over 75%. Degree awards have risen from approximately 2 000 in the late 1990s to 3 500 in 2008. Attesting to the commitment to serve the bi-national and bi-cultural region, approximately 10% of UTEP's students are Mexican citizens who cross the border every day to attend classes at the university.

Box 2.6. El Paso: widening access through broad-based long-term collaboration (continued)

The UTEP has also taken specific steps to make education affordable and accessible to students who almost universally have to work as well as to attend college. UTEP has undertaken programmes to change course scheduling, enable students to borrow money to purchase books needed for courses during the semester and pay for their education as they acquire the funds to do so. The programmes at UTEP are particularly important given the low-income levels of the college age population and their households, their lack of familial experience with higher education, their need to combine work and study and propensity to avoid borrowing to invest in higher education.

Source: OECD (2010a), *Higher Education in Regional and City Development, The Paso del Norte Region, Mexico and the United States*, OECD Publishing, *www.oecd.org/dataoecd/17/61/45820961.pdf*

Both universities in the Free State would also benefit from examining the comprehensive approach to widening access to education and improving success demonstrated by Victoria University, whose catchment area is one of the fastest growing but poorest areas of Melbourne in Australia. Victoria University serves a student population with a higher than average representation of students from low socio-economic and non-English speaking backgrounds. Commended by the Australian Universities' Quality Agency for its success in building effective relationships with schools, Victoria University's broad equity and diversity strategy comprises a wide range of initiatives, such as: *i)* the investigation of secondary school students' educational aspirations; *ii)* strategies to address student finances and financial literacy; *iii)* provision of access to IT resources for students from low income families; *iv)* provision of education for students with a disability; *v)* recognition of the cultural diversity of students; *vi)* provision of programmes designed to increase the participation of students from equity groups through Access and Equity Scholarships and *vii)* a Portfolio Partnership Programme that provides an alternative pathway to university for capable students that do not have a competitive score to enter higher education. This comprehensive approach to widening access and improving success of a diverse student population involves long-term collaboration with families, kindergartens and schools, and meeting local population in non-hostile surroundings such as community centres, libraries, shopping malls, sports events. (See Annex 2.A.1)

Improving the quality and relevance of education

Alignment with regional needs

Due the continuous outmigration from the Free State and high youth unemployment, the question of alignment of higher education to regional labour market deserves attention. The inter-dependence between regional economies and higher education systems means that their alignment is an issue of increasing importance.

The current mismatch between labour market demand and universities supply is undermining the Free State's growth and innovation potential, and has resulted not only in high unemployment but also skills shortages. High unemployment rate is combined with skills shortages, e.g. there is a shortage of technicians and a low proportion of science and technology graduates from the universities. University education provision is biased towards humanities and social sciences. The University of the Free State (UFS) is relatively strong in agriculture and natural sciences (15.4 %) reflecting the dominant place of the primary sector in the regional economy. The needs of the health sector are not well covered and there are manpower shortages for certain professions (paramedical, pharmacist). Engineering, law, accounting and health professions are areas of scarce skills.

The University of the Free State has a strong focus on catering for the national needs rather than those of the Free State, despite the fact that it plays an important role in the training of teachers, health practitioners, legal practitioners and public administrators for the province. Its education provision remains supply-driven, with only one-fourth of the university departments making use of labour market information in the design of study programmes and less than one-fourth tracking the alumni. In order to ensure that the pursuit of world class excellence does not draw the university further away from the needs of the Free State, concrete steps need to be taken to match the focus on global excellence with local relevance.

Graduate employability does not appear to be a high priority for the University of the Free State, evidenced by the understaffing of the Career Office and the lack of an overarching university strategy to address the employability challenges in the region.[8] The University Career Office (established in 2006) caters for 300-350 students a year for one-on-one sessions and about 600 students who participate in recruitment activities.[9] Due to the lack of staffing capacity (with 2-3 staff only) the career office operates at a suboptimal level and does not meet the needs of the diverse student population. Some study programmes have placement strategies,[10] but in general there are many academic departments/divisions that lack such

strategies and have no plans to implement them in future.[11] The university's technology transfer activities do not seem to be geared towards job generation or creating a new economy in the region.

In line with its mission as a university of technology, the Central University of Technology has taken steps to position itself as a critical element of the regional supply chain. This positioning manifests itself in a number of initiatives that not only focus on skills development and students' work-placed learning in local firms, but also on initiatives that aim to create a regional economy that can absorb these skills. For example the Central University of Technology Science Park includes an Innovation Centre that provides support to new innovators through mentorship of academics and provision of specialist equipment at reduced cost. The AHA Bokamosa Information Technology Hub aims to focus on employability of IT graduates. As part of this initiative, the Central University of Technology will offer a Human Resources training programme. The School of Tourism, Hospitality and Sport has established a centre of excellence called SKILLS that provides consultation, contract research, and commercial and community services. (FSRSC, 2010). The Central University of Technology also places a strong corporate emphasis on supporting students' employability and provides a broader range of mechanisms through the Workforce Development Centre (see Box 2.7.)

Box 2.7. CUT's focus on employability of graduates

The Central University of Technology has a Workforce Development Centre comprising various units and services:

- The Careers Unit focuses on running career development programmes to prepare students and graduates for the labour market. These programmes include career fairs, information sessions, Curriculum Vitae writing, interview preparation, compiling a database of job seekers, providing a space for potential employers to advertise jobs, internships or learnerships, and the distribution of career information available from various sources.

- The Cooperative Education Unit focuses on linking its students with industry with a view to securing experiential learning opportunities.

Box 2.7. CUT's focus on employability of graduates (continued)

- The Skills Development Unit works closely with the Services Sector Education and Training Authority in an effort to fast-track workforce development through assisting employers to register employees in university programmes and learnerships.

- The Alumni Career Portal provides a mechanism for companies to make contact with the Central University of Technology alumni, to advertise jobs, and for alumni to make their information and/or Curriculum Vitae available to potential employers. The reach of this system and whether or not it includes a regional focus is not clear from the available information.

Source: The FSRSC (2010), OECD Review of Higher Education in Regional and City Development. Self-Evaluation Report, Free State, South Africa, *www.oecd.org/dataoecd/31/27/46661089.pdf*.

In the Free State, there is not enough robust data available about regional labour markets to align university education programmes to regional needs. There is limited capacity to identify labour market needs and trends on a regional and institutional basis. There is also a lack of robust data about student progress and achievement as well as the labour market outcomes (*e.g.* employment after graduation, salary and career paths) and graduate destinations (where student find employment). Part of the problem stems from the lack of collaboration between the universities, further education and training colleges and the provincial government, which has a negative impact on the ability of individual institutions to address the regional labour market needs.

Studies at the regional and institutional level have highlighted the mismatch of the demand and supply of skills from the perspective of graduates and employers (see Box 2.8). A comprehensive research programme was undertaken in 2003-04 by the Free State Youth Commission to explore the views of unemployed youth (school leavers, FET and university graduates) as well as job seekers and employers in the region. Some departments in the University of the Free State have conducted surveys among the alumni and employers. The surveys provide a disappointing picture of the universities' ability to develop skills necessary in the workplace.

Box 2.8. Relevance of skills in the Free State

A comprehensive research programme undertaken by the Free State Youth Commission explored the views of unemployed youth (school leavers, FET and university graduates) as well as job seekers and employers in the region. The unemployed youth generally felt that their education neither prepared them adequately for employment, particularly in respect of practical skills, nor for starting their own businesses (Erasmus *et al.*, 2004). At the same time, the public and private sector employers felt that entrants to the labour market needed specific in-service training, coaching and mentoring before they were prepared for the demands of the workplace. The key job-related shortcomings of job entrants included: inability to integrate theory and practice, unrealistic salary expectations, lack of job-related experience and interpersonal skills, and an inability to work in groups, particularly in diverse teams (Bester *et al.*, 2004).

Studies of the University of the Free State's Bachelor of Commerce and Bachelor of Laws alumni and their employers revealed that 33% of Bachelor of Commerce graduates were in jobs totally different from those for which they had qualified. Half of the alumni noted that more practical training was needed during their degree courses. The employers felt that the graduates were lacking in practical experience and identified the inability to apply theory in practice as a weakness. (Botes *et al.*, 2007). Similar findings emerged in the Bachelor of Laws study with both alumni and their employers noting a gap in practical experience. A total of 76% of the employers reported a huge gap between theoretical knowledge and practical application (Pelser *et al.*, 2008).

Source : The FSRSC (2010), OECD Review of Higher Education in Regional and City Development. Self-Evaluation Report, Free State, South Africa, *www.oecd.org/dataoecd/31/27/46661089.pdf*.

Work-based and experiential learning

One solution to the mismatch between supply and demand of labour market skills is to incorporate work-based and experiential learning as an integral part of the education and training system.

Both universities in the Free State have taken steps to provide experiential learning opportunities for their students, the Central University of Technology focusing on work-integrated learning and the University of the Free State on service learning (see Box 2.9). The universities offer programmes for which work-based/experiential learning is a compulsory part of education (as teacher education, accountancy, nursing, medicine and law), but have also integrated experiential learning in other programmes. The number of students involved in work-based learning is 3 600 in the

University of the Free State and 1 580 in the Central University of Technology. It is estimated that about 40% of all undergraduate UFS students are involved in this type of learning (Higher Education Management Information System, 2010).

In the further education and training colleges, work-based learning should be a key element of the learning process but in practice this often takes place within the colleges due to the lack of industry collaboration.

Box 2.9. Universities' work-integrated and service learning

As a technological university the Central University of Technology (CUT) follows a holistic approach where students have to apply the theoretical concepts in practice. Systematic efforts are being made through the CUT's Unit for Work Integrated Learning in mainstreaming work-based learning to study programmes. This unit plays an important role in providing students with information about work placement opportunities in the Free State. It organises placement positions in companies and institutions, assists in developing work-integrated learning guidelines and programmes, liaises with various faculties and schools in order to develop effective systems of experiential learning activities, and collects and reports data on work-integrated learning. In 2008, 1 580 students, majority from management studies, participated in work-integrated learning, whereas students in humanities do not seem to have access to experiential learning.

Number of Central University of Technology students involved in Work-integrated Learning

Faculty	Number of students
Faculty of Engineering, Information and Communication Technology	448
Faculty of Management Sciences	804
Faculty of Health and Environmental Sciences	328
TOTAL	**1 580**

Source: Council on Higher Education (2008), *Service Learning in the Disciplines, Lessons from the Field*, Pretoria.

Box 2.9. Universities' work-integrated and service learning (continued)

The University of the Free State (UFS) has developed a wide portfolio of service learning in line with the South African policy that advocates the integration of community service and work-based learning with teaching, learning and research as a strategic priority of the universities. (Council on Higher Education, 2008; Billig & Furco, 2002). The UFS defines service learning or "community service learning" as an educational approach involving curriculum-based, credit-bearing learning experiences in which students participate in contextualised, well-structured and organised service activities aimed at addressing identified service needs and problems in a community. Institutional policy identifies three types of community work: community service that is integrated in the academic programmes, scholarly and other expert services to the community, and extra-curricular community involvement and interaction. In 2010, the UFS had 65 problem-based service learning modules funded for inclusion in programmes. These modules provide organised problem-based learning experiences for about 1 700 students per year. Partnerships have been established between the university, the communities and the world of work (*e.g.* the Law Society of the Free State, the provincial departments of health and of education, financial institutions, local radio stations, Performing Arts Centre of the Free State, South African Institute of Chartered Accountants Free State, the Lesiba and the Matsodi writers' associations, municipal clinics and the Biokinetics Association).

Source: The FSRSC (2010), OECD Review of Higher Education in Regional and City Development. Self-Evaluation Report, Free State, South Africa, *www.oecd.org/dataoecd/31/27/46661089.pdf*.

Despite good progress in introducing work-based and service learning into study programmes, only a small proportion of students benefits from these arrangements. For example only 15% of students of Central University of Technology are involved in some type of work-based learning Universities have identified constraints in the expansion of work-based learning including lack of funding, lack of collaboration with the private sector and attitudes among the teaching staff. Currently, the Ministry of Higher Education and Training does not provide any specific funding streams to encourage work-based and/or experiential learning in universities. The relatively small and less diversified economy in the Free State offers limited opportunities for work-based learning. In the absence of specific incentives for staff, there are also difficulties to mainstream work-based learning in study programmes and qualifications.

Collaborative efforts should pool the resources of the two universities in the Free State to enhance work-integrated and experiential learning opportunities. The Central University of Technology should take steps to provide work-integrated learning opportunities to all students across faculties. Better institutional co-ordination of service learning opportunities including staff training is needed within the University of the Free State. Furthermore, service learning should be targeted at recognised needs in the region with long term community development programmes that help empower the local population. At the same time, the work-based experience should be carefully monitored and evaluated in order to enhance the quality of learning. Due to limitations of the regional economy, internships and work placements could also be sought from outside the province, especially in the industrial hubs of Gauteng, KwaZulu/Natal and the Western Cape.

In order to create an economy that creates jobs, both universities should increase their efforts to support student enterprise, entrepreneurialism and internationalisation. These aspects will be dealt with in detail in Chapter 3.

International examples

Internationally, many universities and higher education institutions are building closer, more systematic links with the professional world, with concrete consequences on the teaching and learning process. In the Bío Bío Region in Chile, INACAP Technical University has built an experiential educational approach on the basis of "learning by doing" that has direct positive effect on the employability of its graduates. INACAP has targeted its efforts to address some of the key challenges in the region, for example regeneration of former mining areas and developing tourism. (Box 2.10.)

Box 2.10. INACAP - Embedding employability in learning process

INACAP Technical University is the largest educational community in Chile. It has 25 campuses throughout Chile with around 82 000 students in more than 100 educational programmes. It is a multi-sector institution with study programmes at vocational, professional and university levels, ranging from 2.5 to 5 years in length. In the Bío Bío Region, there are three INACAP campuses in Chillán, Los Ángeles and Talcahuano in the metropolitan area of Concepción, with around 9 900 students and 470 faculty.

Box 2.10. INACAP - Embedding employability in learning process (continued)

INACAP maintains close labour market links with Chile's business and industry and professional and business organisations to ensure labour market relevance of its study programmes. Almost 40% of faculty comes from the business sector. The heads of educational programmes participate in business and professional organisations. INACAP's educational approach is based on "learning by doing": it combines theoretical knowledge through practical application in laboratories and internships in order to build skills and competencies for the workplace. Its global partners include University of Texas at Austin's IC2, Monterrey Tech, Harvard University and the Paul Bocuse Institute in hospitality. This network of global partners facilitates professional development of the faculty and up-to-date academic programmes and contents. INACAP collaborates actively with local businesses and municipalities. In the Bío Bío Region, it has carried out different projects to regenerate the former coal mining zone. The INACAP professors, in collaboration with 80 students, have developed "a gastronomic route" in the region. In partnership with the local governments and Fundación Chile, INACAP has also developed marketing strategies to foster tourism in distressed communities.

INACAP monitors the employment outcomes of its graduates. The 2008 graduate follow-up study showed that 91% of the INACAP graduates found employment during the first 6 months after graduation and 36% within a month. 45% of the graduates in employment identified work-placed learning as the most important factor in obtaining employment.

Source: OECD (2010b), *Higher Education and Regional and City Development: The B'io B'io Region, Chile*, OECD Publishing.

The University of Aalborg in Denmark, has also taken steps to embed employability and transferable skills in their core curriculum through project-oriented problem-based learning model. This brings together students from different disciplines (*e.g.* law, engineering, management) to solve real life problems identified in industry or for example the public health sector and allows a larger number of students work on a same theme (see Box 2.11). Some institutions have implemented extensive co-op learning for students as is the case in the University of Waterloo in Canada (see Chapter 3, Box 3.8).

Box 2.11. Problem Based Learning in Aalborg University

Aalborg University was established in 1974 after years of popular campaign in the region to establish a university in northern Jutland in Denmark. The campaign formed the basis for a close dialogue with the surrounding society relying on co-operation with the business sector, trade unions and cultural life. An important early decision was to base research and educational activities on interdisciplinary integration, problem orientation and group work.

In the Aalborg project-oriented problem-based learning, study programmes are organised around interdisciplinary projects students working in groups. Up to 50% of the study is problem-oriented project work: student work in multidisciplinary teams to solve real-life problems which have been defined in collaboration with firms, organisations and public institutions. At any one time, there are 2 000 to 3 000 ongoing projects to ensure a high degree of collaboration with the society and private sector.

The Aalborg model is based on a win-win situation: it provides students with transferable skills and authentic work experience while enterprises benefit from a clearer picture of what the university stands for and how students might fit in as prospective employees. Finally, the university gains feedback from the world of work and also benefits from access to instructive cases and ideas for research and teaching.

The university has developed its PBL expertise into an export article and now collaborates with universities worldwide to develop locally relevant PBL models for example in Brazil, China and Mexico.

Source: OECD (2007), *Higher Education and Regions: Globally Competitive, Locally Engaged*, OECD Publishing.

2.4 Increasing participation of adults: Lifelong learning

Due to rapidly changing skill requirements, lifelong learning, upgrading skills and re-skilling are increasingly important. Access to upper secondary and tertiary education throughout an individual's working life is key to improving the prospects and living standards for adults with low skills and to provide a second chance to acquire skills needed in the labour market. For non-traditional learners, who often combine work and study, flexible ways of provision need to be in place through work-based, e-learning and distance education. In addition, attendance to tertiary education on the basis of non-formal and informal learning should be facilitates. (OECD, 2008)

In the Free State, areas that need to be addressed in lifelong learning include: updating skills and knowledge of the workforce, addressing the

needs of the long term unemployed who lack basic numeracy and literacy; continuing education for teachers at schools, further education and training colleges and universities; updating training of provincial and municipal employees, providing entrepreneurship programmes, and addressing the needs of the jobless youth, many of whom do not have adequate skills or work readiness to enter the labour market or the education system.

South Africa has more than 2.8 million young people in the 18 to 24-years-old cohort outside of education, training or labour market (Cloete, 2009). In the Free State, 150 000 jobless youth are outside of training and education. Part of the challenge is related to the closing of teaching and nursing colleges, tougher restrictions on private higher education and the merging of universities and *technikons*, which reduced the availability and variety of higher education options (Cloete, 2009; see also Branson *et al.*, 2009).

To address the needs of the large number of unemployed people many of whom who have low skills and lack basic numeracy and literacy, the Free State provincial government has launched public works programmes that support practical skills development. Through the Premier's Operation Hlasela, the provincial government is implementing an Expanded Public Works Programme in health services, construction, maintenance and environmental projects.

While the provincial government's focus on practical skills development is commendable, too narrow skills development schemes and short-term employment contracts will not serve the regional population in the long run. Stronger emphasis should be placed on general competencies that will allow people to adjust to rapid changes in the labour market and gain the capacity for lifelong learning. At the same time, current skills development efforts could be improved through partnerships with local further education and training colleges and universities. This would ensure that workers participating in expanded public works programmes have the opportunity of developing lifelong learning skills, literacy and numeracy skills, and life skills needed to finding employment.

The further education and training sector in the Free State has the potential of providing relevant skills and competency training for the large numbers of population including: the SMME, the unskilled and under-skilled, school leavers, university leavers and the unemployed. The further education and training sector features lower costs (20-30% below the university sector), openness and flexibility of admissions and provides transfer and pathways to universities and reverse transfer opportunities.

The national authorities have acknowledged the challenges in the skills development (see Box 2.12). To improve the synergy of the post-school

education, the further education and training sector was transferred to the National Department of Education and Training (DHET) from 2010. This change has provided an opportunity for a profound reform that can make the further education and training colleges more responsive to the socio-economic needs of their regions. In the Free State, a number of task teams have been established to facilitate this transfer, comprising representatives of the DHET, the provincial government and the further education and training colleges. Issues of governance, financing, staffing, teaching and learning, programme mix and quality control have to be resolved.

Box 2.12. Challenges of the Free State FET Sector

As in many other developing countries, South Africa has an inverted higher education pyramid, with approximately 800 000 students enrolled in universities, but less than half in the FET sector. This is in stark contrast to for example the United States which has 6-7 million students in the university sector, but the double of that in the community college sector. (Bawa and Wale, 2009)

The Free State FET sector does not appear to be a competitive alternative to universities, and faces many challenges. The Free State has about 150 000 jobless youth outside of training and education, but only 25 000 students in the FET colleges.

The Free State FET Sector has low levels efficiency in graduate production which is caused by chronic underfunding, management and leadership challenges, a lack of trained qualified teaching staff and poor infrastructure (libraries, laboratories, classrooms, student support centres).

A major constraint for the expansion of the FET sector and for the improvement of its quality is the lack of trained FET teachers. There are currently no institutions in South Africa geared towards the training of FET teachers.

The two universities in the Free State should actively support the reform of the further education and training sector through restructuring, expansion and quality improvement in collaboration with the Ministry of Higher Education and Training (MHET) and the provincial and municipal governments. The universities could collaborate in: *i*) training FET teachers; *ii*) establishing transparent articulation mechanisms and pathways between different levels of education; and *iii*) undertaking research to better understand the FET sector and provide labour market information to align programmes with the labour market needs.

Currently, the universities in the Free State play a limited role in lifelong learning activities. They provide a range of short courses for continuing education, mainly for higher educated population, but these courses remain uncoordinated. In contrast to many other South African provinces where universities run continuing education centres and programmes, the Free State universities do not actively engage in organised continuing education that addresses the skills needs in the region. At present, people from the province who wish to enrol in continuing development programmes must travel to other provinces to do so – most often Gauteng. The universities have also not taken full advantage of existing mechanisms for continuing professional development and training. For example no formal mechanisms have been created with the Free State Training and Development Institute, which is responsible for continuing professional development of provincial and local government employees and currently rents office and training space at the University of the Free State Open Learning Campus.

The Free State universities role is even more limited role in addressing the education and training needs of out-of-school youth or the low skilled population in general.[12]

The current provision of lifelong learning activities, continuing education and professional development and training in the Free State does not meet the regional needs and tends to be organised on an *ad hoc* basis. While limited collaborative efforts are in place in the regional education sector, it is clear that neither the universities, further education and training colleges nor the provincial government, working independently, have the capacity to meet the lifelong learning needs in the province. It is recommended that the two universities, provincial government and the Services Sector Education and Training Authority consider opening a provincial continuing education centre. The Free State Development Training Institute appears to be a good vehicle to co-ordinate lifelong activities and programmes at the regional level, and could take this role if its mandate was extended to the whole population, rather than the public sector. The mobilisation of the two outlying campuses of the University of the Free State and the Central University of Technology (Qwaqwa and Welkom) to lifelong learning, and better regional distribution of further education and training colleges would ensure that lifelong learning were provided evenly across the province.

At the same time, however, the Free State offers good practice example in the field of recognition of prior learning and work experience. The Centre for Recognition of Prior Learning (Box 2.13) provides an alternative pathway to higher education and facilitates credit transfer towards higher education programmes.

Box 2.13. Recognition of Prior Learning Centre

The Recognition of Prior Learning Centre in the Free State provides alternative admissions paths into higher education, widens access to education and addresses the inequality issues in the Free State arising from apartheid. The centre serves three educational institutions: the Central University of Technology (CUT), University of Free State (UFS) and Free State School of Nursing (FSSON). Through the slogan of *Kopano ke matla* (togetherness is strength), the centre maintains links between the education and training sectors, and the service providers, local government departments and industry.

Between 2005 and 2009, the Recognition of Prior Learning Centre received 2 394 enquiries and engaged in 1 931 RPL processes. The number of enquiries increased from 372 to 1 505, whereas the number of processes grew modestly from 209 to 515. The increase in the number of enquiries highlights the growing demand for alternative pathways to higher education.

The South African Qualification Authority has acknowledged these RPL efforts as a novel approach in addressing redress and inequality. The Regional Recognition of Prior Learning Centre has maximised benefits by involving multiple institutions to share information, expertise and resources on RPL. In recent years, most activities have concentrated on two institutions only (the Free State School of Nursing and the University of the Free State).

The benefits for institutional participants include economies of scale, affordable service and reduction of internal costs as well as sharing of costs, resources and expertise. Users of the services gain admission to learning undergraduate and postgraduate programmes, and earn subsidy and class fees for the institutions. Users receive unbiased advice on alternative learning paths also in other institutions. They take responsibility for their own learning, improve their own self-esteem and motivation to learn, while simultaneously reducing costs and facilitating transition between learning environments.

Source: The FSRSC (2010), OECD Review of Higher Education in Regional and City Development. Self-Evaluation Report, Free State, South Africa, *www.oecd.org/dataoecd/31/27/46661089.pdf*.

Table 2.4. Recognition of prior learning

Enquiries and Processes processed 2005-September 2009

Year	Institution				
	CUT	Free State School of Nursing	UFS	Dept of Health	Total
2005					
Enquiries	90	192	90	-	372
Processes	42	116	51	-	209
2006					
Enquiries	75	325	170	153	723
Processes	53	240	100	153	546
2007					
Enquiries	57	545	272	-	874
Processes	39	312	162	-	513
2008					
Enquiries	-	320	334	-	654
Processes	-	161	140	-	301
2009					
Enquiries	-	922	583	-	1 505
Processes	-	292	223	-	515
Total					
Enquiries	**222**	**2 304**	**1 449**	**153**	**4 128**
Processes	**134**	**1 121**	**676**	**153**	**2 084**

Source: FSRSC (2010), OECD Review of Higher Education in Regional and City Development. Self-Evaluation Report, Free State, South Africa, *www.oecd.org/dataoecd/31/27/46661089.pdf*.

Although the Free State Recognition of Prior Learning Centre has made significant progress in responding to a regional need, the reach of this work remains low. The centre also faces challenges arising from its project-based organisation. There is an ongoing uncertainty of the sustainability of the centre as it receives its funding from the Free State Education and Training Trust, from which institutions can withdraw at any time. Instead of creating a comprehensive RPL system, the centre has developed pockets of excellence in RPL implementation. There is also a lack of involvement of the further education and training sector and Services Sector Education and

Training Authority in the recognition of prior learning because of financial and structural transformation, and capacity constraints in the sector.

International examples

Currently, there are no public-private partnerships in the Free State in skills development. The Penang Skill Development Centre (PSDC) in Malaysia is an example of how public-private partnerships can foster skills in the region. The evolution of services provided by the PSDC over its 20-year existence reflects the changes in the demand for human resources over that period. The centre has grown into one of the leading skills learning institutions in Malaysia, dedicated to meeting the human resource needs of the business community. It provides a one-stop shop for human resource development geared towards the promotion of shared learning among the manufacturing and service industries. The centre acts as a broker between the needs of employers, higher education institutions and other sources of training capacity, and also trains fresh university graduates providing them with skills needed in the industry. Its initiative "School 2 Work" provides a complete education-to-employment pathway for school leavers (see Box 2.14.).

Box 2.14. Penang Skill Development Centre

The Penang Skill Development Centre (PSDC) is a non-profit industry-led skills training and education centre. It was established in 1989 as a tripartite institution between the industrial, governmental and academic worlds in order to meet the growing demand for skills emanating from local businesses in Penang. The PSDC has a membership of around 150 companies. PSDC is 80% financed by the private sector with 149 member firms representing 60% of the Penang workforce. 32% of these members are electronic companies, 22% engineering and 19% manufacturing. Initially there were 589 participants in the programme (1989/90). In 2008, the number of participants had increased to 12 108. The PSDC has attained both national and international recognition as a model of shared learning among the manufacturing and service industry and one stop human resource development entity. Between 2007 and 2010, it trained more than 150 000 participants and prepared them for professional life.

Box 2.14. Penang Skill Development Centre (continued)

The PSDC provides training mainly to improve technical and engineering skills. It offers courses leading to various levels, such as: *i*) certificate, *ii*) diploma, *iii*) bachelor's degree, *iv*) master's degree and *v*) doctoral degree. The degrees are awarded by the Multi-media University of Malaysia. Apart from the training in technical and engineering areas, the PSDC also provides language training to improve the employability of the trainees in the business sector. It aims at promoting linkages between multinational companies and local companies and to promote fast track for radio-frequency, computer embedded and green technologies. PSDC provides training and reskilling programmes for SMEs and operates with an SME cradle fund.

"School2work" provides a complete pathway from education to employment. Students are admitted from secondary school on the basis of their performance on the Malaysian examinations (SPM and STPM). They can earn a PSDC Diploma in Engineering in three years in electronic engineering, mechatronic engineering, computer engineering, and telecommunication engineering. The programme includes extensive field experience including factory visits, talks with external examiners, professors and CEOs. After earning a diploma, students may enter a programme of skills enhancement ("FasTrack" programme) to equip them for employment or enter a bachelor's degree programme through an affiliated university. One option is to earn a degree locally in two to three years at a local private university. The other option is to earn a degree through one of several affiliated foreign universities. Students completing a degree programme are then given intensive skills enhancement training ("FasTrack") to prepare them for employment. The "FasTrack" programme is a government-funded initiative designed in collaboration with multinational corporations to accelerate learning and hands-on experience of new and existing engineers to support industry's competitiveness in design and development.

The PSDC supports the building of the knowledge infrastructure in the state of Penang, supported by a fast track programme to accelerate learning on experience, technology training lab, and shared and incubation facilities. To improve its efficiency and diversify its offer the centre has set up five commissions that focus on the following tasks: *i*) sustainable education and learning (led by Motorola), *ii*) mentoring young scientific entrepreneurs, *iii*) establishing a science tech park, *iv*) encouraging innovation and research (led by INTEL) and *v*) life science and medicine.

Source: OECD (2011), *Higher Education in Regional and City Development, Penang, Malaysia*, OECD Publishing.

The Free State would also benefit from learning from the US experience where community colleges play an important role in strengthening the local

capabilities for innovation. Much of the community colleges' workforce training is state sponsored and charge free to employees. Approaches vary from a one-stop-shop such as the Georgia Quick Start programme and to a centralised service offered by 58 community colleges in Northern Carolina (see Box 2.15).

Box 2.15. Free Employer specific training in the US

The Georgia Quick Start programme

The Georgia Quick Start programme offers a number of innovations in the process of training for job specific needs in new technology. An arm of the 33 campus Technical College System of Georgia (Georgia does not use the term "community college"), it is located in close proximity to the State Department of Economic Development. The programme is free for new employers but also for existing companies that are increasing employment and/or making substantial upgrades in plant and equipment. Quick Start has the centralised staff, resources and experiences to quickly develop and deploy customised training anywhere in the state. The basic programme, carrying Georgia's commitment to provide free training for new and growing businesses, dates back to 1967. The state ramped it up in the 1990s after finding that offshore competitors were undermining the state's traditional cost competitiveness. By early 2010 it has conducted almost 6 000 projects involving 780 000 trainees. The basic budget is USD 22 million a year, at times that is supplemented with extra funds allocated as part of the incentive package for a major plant.

When qualifying employers want training or retraining for their workers, Quick Start assigns teams of analysts to examine the process of workflow in question. Then it develops a customised training programme, complete with handbooks, presentations, videos, online lessons or other training material produced by its own specialists. For all new projects, Quick Start will pre-screen potential hires for the company, using the technology it has acquired of the production system to match candidates with the skills required. The training is deployed at the company location, at one or more of the technical colleges or at any five Quick Start facilities located around the state.

Box 2.15. Free Employer specific training in the US (continued)

North Carolina Community College Collaboration

In North Carolina the provision of free, employer specific workforce training began in community colleges in 1958. Currently, North Carolina Legislature provides USD 12.4 million a year for its customised training programme. Each of North Carolina's 58 community colleges can access the funds to design and deliver training tailored to the specific needs of a new or existing company without charge to the company. North Carolina is looking to help businesses that grow its economy. The company must demonstrate that it is making an appreciable capital investment, deploying new technology, creating new jobs or expanding an existing workforce or enhancing productivity and profitability.

The training programme is developed at the local college in concert with the employer. Colleges design the programmes and share their experiences. Each community college has an employee assigned to reach out to local business and industry, identify their training needs and find ways to meet them. The cost of this post is shared by the state and the local college.

For the five years leading up to the current recession, North Carolina community colleges averaged training 26 277 employees a year at an average of 774 companies a year. The recession cut that to 19 861 employees at 671 companies in 2008/09. The cost to the state averages about USD 500 per employee. For example, Talecris Biotherapeutics has a longstanding training relationship with Johnston Community College. Every year the facility's production is put on hold for three weeks for maintenance and upgrades while the entire 550 person manufacturing workforce goes to training classes operated by the college.

Source : Shaffer, D. F. and D. J. Wright (2010), A New Paradigm for Economic Development, in Higher education, The Nelson A Rockefeller Institute of Government, March 2010.

2.5 The governance of the higher education and training system in the Free State

One of the main issues impeding higher education and training development in South African provinces is the absence of co-ordination mechanisms at the provincial level to articulate a long-term vision, including goals, policies and priorities, and to implement an integrated development strategy for the higher education and training system in line with national priorities. The Human Resource Development Strategy for South Africa

report notes that "[O]ne serious gap in the current human resource development coordinating architecture is the lack of explicit and uniform mechanisms throughout the country to incorporate higher education institutions into the human resource development planning processes at the provincial (and, by implication, the local government) level. This is a serious shortcoming, as it robs the provinces (where higher education institutions exist) of an extremely valuable source for human resource development. The incorporation of higher education institutions into the provincial skills development forums will therefore be actively promoted" (Republic of South Africa, 2009).

While South Africa's provincial governments in general have limited powers,[13] the Free State provincial government features a number of structures and activities that are relevant to the human capital and skills development of the region, and that could be further strengthened and built on. These include: a Capacity Building and Skills Development Plan for the province, municipalities and for the unemployed; Workforce Development Centre that has a co-ordinating role for policy development, provincial bursary scheme and monitoring and evaluation; the Free State Training & Development Institute that could play a stronger role in continuing education, and the Free State Skills Development Forum that brings together the key regional players in the public and private sector as well as higher education institutions, SETAs and NGOs meet on a quarterly basis.

In the interest of sustained regional development efforts should be made in the Free State to strengthen a co-operative culture among the post-school educational institutions, the provincial and local governments and other relevant stakeholders. A post-school educational body should be constituted of all the relevant stakeholders and should include a representative/s of the national Ministry of Higher Education and Training (MHET) and business and industry. Its goals should include the following: *i)* leading the skills component of the regional strategy for development; *ii)* mobilising stakeholders around educational projects for the region; and *iii)* co-ordinating the provision of education and training from a coherent lifelong learning perspective. The co-ordinating body should be a small and efficient structure with a secretariat and meet quarterly during the first year. Once the division of labour has been established, institutions could report back about progress and obstacles in accomplishing their tasks. This body should bring coherence in the production of high level skills for the socio-economic development of the region, while respecting the autonomy of the individual institutions.

A promising development in the Free State Province in this direction is the re-establishment of the Skills Development Forum that includes representatives from the provincial government, industry, the two

universities and the further education and training sector, the Services Sector Education and Training Authorities. This body has the capacity to become an important platform for supporting the development of pathways within the education system including a credit transfer system between the skills development programmes, further education and training colleges, the Central University of Technology, and the University of the Free State. It could also consider relaunching the regional programme review in order to avoid unnecessary duplication and to make the best use of limited resources.

International examples

The efficacy of regionally based co-ordinating structures in education has been demonstrated in a number of countries, for example the United Kingdom, Australia, Denmark and South Korea, which have improved their higher education outcomes in support of their economic growth and social development objectives.

The Free State could draw lessons from the state level systems in the United States. Some states in the United States, such as Ohio, rely on comprehensive governance and co-ordination mechanisms to guide the development of their higher education system - see Box 2.16 which illustrates the Ohio model of governance and co-ordination.

Box 2.16. Ohio model of governance / co-ordination

Ohio is one of 12 states in which the senior institutions are governed by individual governing boards. All institution heads are presidents. A state-wide board, the Ohio Board of regents, is the co-ordinating body for higher education. The State Higher Education Executive Officers (SHEEO) in Ohio is called a Chancellor.

Ohio's higher education structure presents a paradigm of autonomous public and private universities and colleges co-ordinated by a strong state board. According to the 1988 master plan prepared by the Board of Regents, "*over 150 institutions offer higher education and are licensed or authorised to award associate of higher-level degrees in Ohio*."

The decentralised structure in Ohio provides significant institutional autonomy. Ohio's public colleges and universities have been able to retain significant independence over the years in a state whose government has been active in higher education policy.

Box 2.16. Ohio model of governance / co-ordination (continued)

The stability of the Ohio system stems from the state's geographic distribution of political power. In the establishment and operation of the structure, legislators and higher education administrators acknowledge the importance of population distribution. There are significant population centres in every geographic region of the state (except one), which has been a key factor in the development and continuation of the public colleges and universities.

Source: Schick et al. (1992), Shared Visions of Public Higher Education Governance: Structures and Leadership Styles that Work, American Association of State Colleges and Universities, Washington, DC.

The advantages of a system-wide governance model, as opposed to the segmented organisational setup, is the ability to plan more effectively for the higher education needs of the region, to co-ordinate institutional missions and programmes, to encourage an appropriate division of labour among institutions and to maintain appropriate data bases for institutional and system policy research. In some systems, a comprehensive approach also provides the ability to reallocate resources among institutions as needed, to shift programmes and staff among institutions and facilities, to merge programmes or even institutions, and to close programmes, facilities, and even institutions that are redundant, too expensive, of low quality, or simply too small in scale to be cost-effective. Finally, a system-wide governance model allows presenting a strong and unified political front to the national authorities in order to maximise the case for sufficient and stable public resources (Johnstone, 2000; Bowen, 1997).

To steer the future of higher education and training in the Free State, the proposed co-ordinating body would need to define a comprehensive vision which outlines clear qualitative and quantitative goals and confirms the respective contribution of each type of higher education and training institution. An important dimension of good governance consists of putting in place an adequate information system to monitor the performance of higher education and training in the Free State to benchmark its progress with appropriate comparators in South Africa and other countries. The Minnesota tertiary education accountability system is an interesting example that the Free State could learn from (see Box 2.17).

Box 2.17. State-wide monitoring and accountability system of Minnesota

Since 2005, the Minnesota state legislature has mandated the preparation of an annual report that measures the progress of the higher education system in supporting the state's economic development strategy. Minnesota's leaders recognise that in order to lead consistently in these areas, the state must first embrace a system of accountability that can measure progress toward the achievement of its ambitious agenda.

The report reflects the results of a consensus-building exercise that brought together educators, policy makers, employers, and community leaders in 2005 and 2006. Together they identified five broad goals that define the public agenda for higher education and 23 indicators that measure success towards these goals. The five goals are to:

- Improve the success of all students, particularly students from groups that are traditionally underrepresented in higher education.
- Create a responsive system that produces graduates at all levels who meet the demands of the economy.
- Increase student learning and improve the skill levels of students so they can compete effectively in the global marketplace.
- Contribute to the development of a state economy that is competitive in the global market through research, workforce training, and other appropriate means.
- Provide access, affordability and choice to all students.

For each indicator, the report benchmarks the results of Minnesota against the top three US states, the national average, and a group of peer states selected on the basis of common characteristics such as geography, higher education structure, economic situation and demographic features.

Source: MOHE (Minnesota Office of Higher Education) (2009), *Minnesota Measures: 2009 Report on Higher Education Performance, Minnesota Office of Higher Education*, St. Paul, *www.ohe.state.mn.us/pdf/MinnesotaMeasures2009.pdf*

Conclusions and recommendations

South Africa and the Free State province have made significant progress in building a common and diversified higher education system for all racial groups after the apartheid era. The Free State has two well resourced universities in close proximity to each other and four further education and training colleges with potential to significantly impact skills development in the region. Considerable efforts have been made to improve access and success by both universities in the Free State. The provincial government has played an active role in the capacity building and skills development.

Central challenges for the Free State are to develop a more inclusive labour market and educational system and, at the same time, to create a regional economy that is able to absorb both highly skills and low skilled workforce. The education and employment outcomes of the majority population will need to be significantly improved while retaining and attracting highly skilled population and aligning the higher education and training system to the needs of the Free State. The overall low educational attainment levels call for a special focus on lifelong learning opportunities and skills development programmes that build literacy and numeracy and provide opportunities to enter the labour market or the education system. In order to have an impact on improving the quality of human resources in the Free State, the universities and FET colleges must reach beyond their traditional roles and provide opportunities to the larger number of people with low skills while at the same time playing a role in attracting and retaining talent from the Free State and elsewhere in the country and abroad.

The Free State higher education and training system faces challenges in terms of access, retention, completion and employment outcomes. Ensuring access and success in higher education and labour market calls for a recognition of the scope of the challenge of under-preparation at schools. There is currently a lack of long term collaborative public-private efforts to improve learning outcomes at schools and post-school institutions. While equity policies have improved, students' financial, academic and social support system remain at a suboptimal level considering the needs of the large numbers of first generation students from low income families. Unemployment in general and youth unemployment in particular is a serious challenge that the provincial government and the university system need to address. There is a limited capacity to identify labour market needs and trends on a regional and institutional basis. There is also a lack of robust data about student progress, achievement, labour market outcomes (*e.g.* employment after graduation, salary and career paths) and graduate destinations (where student find employment). Absorptive capacity of the

Free State economy remains low and the Free State universities appear to be training graduates for other regions.

The Free State further education and training sector could play a much stronger role in regional development by building skilled workforce and widening access to education, for example in remote and rural areas. Today, the sector attracts less than 25 000 further education and training students which is a modest figure in a region with 150 000 unemployed youth outside of training and education. At the same time pathways and collaboration between universities with the further education and training collages and schools are in need of strengthening.

Although great efforts have been made to introduce service learning and work-integrated learning into university curricula, there is a fragmented offer of practice-based pedagogy and research, entrepreneurship training and well organised student internships. To change the economic fabric of the Free State it is necessary to develop new types of programmes and learning modes and to integrate employability, industry linkages and entrepreneurialism in all study programmes.

The current extent of widening participation activities, industry collaboration in the Free State universities are not fully reflected in a region-wide set-up and lack collaboration between and within the institutions. Although significant efforts have been made, gaps remain in important areas, such as pathways between universities and further education and training colleges, lifelong learning activities, addressing the needs of the jobless youth out of training and education as well as the first generation students from low income families, and aligning the study programmes with the needs of the labour market and SMMEs to improve employability of graduates.

There is a need for a stronger policy for human capital and skills development in the Free State. This requires: *i)* robust data about status of human capital in the Free State; *ii*) a policy audit to identify barriers to meeting needs; *iii*) provincial/national policy to foster higher education and training institutions with multiple, complementary missions aligned with regional needs and *iv*) revision of student selection, finance policy (institutional, provincial and national student support), and governance/regulation. Specific data needs include: *i*) educational attainment benchmarked to country-level achievement and OECD average; *ii*) migration by educational level and age; *iii*) higher education participation rates in the Free State (*e.g.* youth, adults, racial groups, socio-economic status); *iv*) robust information which educational institutions serve the region's population, *v*) labour market needs; *vi*) degrees awarded by regional higher education and training institutions and *vii*) functioning pathways

between and among universities and FET colleges as well as other levels of education.

The OECD review team recommends that the following measures are taken to improve the human capital and skill development in the Free State:

Recommendations for the national level

- Improve affordability of education in order not to price higher education attainment beyond the reach of students from low socio-economic backgrounds. The national government should develop the forms of cost sharing in higher education through means-tested scholarships, income contingent loans or other funding packages to complement the existing loan and grant schemes.

Recommendations for the sub-national (provincial) level

- In the interest of sustained regional development, make every effort to establish a co-operative culture among the post-school educational institutions, the governments and other public and private stakeholders in the region. To this end a post-school educational co-ordinating body should be constituted with representatives of all the relevant stakeholders including the national Ministry of Higher Education and Training, business and industry. It would articulate a vision for the socio-economic development of the region, foster co-operative projects between institutions and other partners in the region. Among its goals should be the following:

- *i)* Lead the skills component of the regional strategy for development. Articulate a vision for the socio-economic development of the region. Jointly plan the offering of new programmes with the help of market research indicators. Plan for the development of high level skills provision for the socio-economic development of the entire Free State.

- *ii)* Mobilise public and private stakeholders around educational projects for the region. Share strategies in mobilising private funding in addition to state funding for education projects. Foster co-operative education projects between institutions. Prioritise efforts and funds in accordance with long term educational goals.

- *iii)* Co-ordinate the provision of education and training from a coherent lifelong learning perspective. Develop a comprehensive long-term strategy to increase completion rates in secondary education and the preparation of both the youth and adult population for further education

and the labour market. Avoid the duplication and overlap of educational programmes. Facilitate the joint provision by different stakeholders of training for continuing professional development. Articulate the FET and university offer through educational pathways and the accreditation of prior learning. Establish a management information system for post-school and higher education institutions of the region.

- Recognise the increasing relevance and importance of the further education and training sector for the long term development of the Free State, and support and encourage its restructuring and rejuvenation through collaboration with the higher education institutions. The development of the further education and training sector can make a crucial contribution to middle level skills development by absorbing large numbers of out of school unemployed youth.

- In collaboration with higher education and training institutions, take steps to significantly expand educational opportunities for working age adults. These steps should create clear and transparent pathways to advanced education for adults, including the ability to attend multiple institutions, obtain short-term education and training that can later be applied to degrees, and re-skilling and up-skilling courses and programmes designed around the particular needs of adults who combine work and study or may lack entry level skills to education and the labour market. In addition to skills development, place emphasis on general competencies that will allow people to adjust to rapid changes in the labour market and develop the capacity for lifelong learning. In collaboration with the universities and the Services Sector Education and Training Authority establish a provincial continuing education centre, for example by developing the Free State Development Training Institute.

- In collaboration with higher education and training institutions, develop and improve robust data on the regional context and on the situation of individual universities and further education and training colleges, particularly on labour market needs and trends and student access and progress, in order to support evidence-based decision making at the regional and institutional basis. The most effective region-wide graduate labour market systems are based on comprehensive labour market intelligence, on-line publication of the data in a single place to improve students' ability to make rational choices about their studies and to help graduates and employers to come together and increase students' chances of moving into employment. Finally, the data should be strategically used to identify regional priorities and to develop the provision of course offerings and employer-specific skills.

- Improve connectivity and mobility between the urban centre of Bloemfontein and the rural areas. Accessible public transport and high speed internet connections should be developed to enhance access to education and labour market in remote communities.

Recommendations for institutions

- Expand efforts to increase the enrolment of students from low socio-economic backgrounds as well as the efforts to improve their completion rates. These efforts should build upon international best practices of effective academic, social and financial support for students, long-term collaboration with schools and further education and training colleges to improve students' learning outcomes. To improve quality of teaching take a lead in designing induction and professional development programmes for new school teachers and leaders. Ease the financial burden of attending higher education and make bursaries and loans available to students.

- Provide comprehensive professional development programmes for university teachers, many of whom were educated during the segregated education system, in order to help them to address a larger and more diversified student population. The provision of regular short courses to improve teaching skills, assessment and feedback from students, attending seminars and workshops to improve teaching and learning, inclusion of state of the art information technology, and a provision of a teaching portfolio at the time of promotion would be important contributions in this direction.

- Work together with public and private sectors to improve the quality and labour market relevance of university education, and alignment with the regional needs in a systematic way. Focus on strengthening the regional employability and entrepreneurial skills of all graduates providing them with the skills and competencies needed in the globalised knowledge economy. Create ties between students and regional employers in fields of critical importance to the region through internships and co-op programmes. Ensure that all students have access to well organised high quality work- and problem-based learning opportunities to help improve graduate retention in the region. Monitor student progress, as well as students' labour market outcomes and graduate destinations.

- In collaboration with other institutions enhance lifelong learning provision to address in particular the needs of large numbers of unemployed, out of school youth and to ensure that courses are offered in the different geographical areas of the province, mobilise the outlying

campuses in Qwaqwa and Welkom for lifelong learning. Use intellectual and physical resources in partnership with the Ministry of Higher Education and Training and the provincial and municipal governments to train FET college lecturers, establish articulation mechanisms between different levels of education and undertake research to provide labour market information in order to align programme offerings of the further education and training colleges with the regional needs.

- Make stronger efforts to internationalise the region, through talent attraction and development programmes supporting key areas of development of the Free State, integration of international students and faculty in the academic and social life of their universities and the region by training them to become "ambassadors for the Free State".

Notes

1. The FET colleges offers the National Certificate (vocational) in eleven economic priority areas: civil engineering and building construction, electrical infrastructure construction, engineering and related design, finance, economics and accounting, Hospitality, information technology and computer science, management, marketing, office, primary agriculture and tourism
2. In 1996, 3% of the Free State population had tertiary education degree, compared to 3.9% of the whole of South Africa.
3. The Ministry of Education asks the universities to pay due regard to racial and gender equity in student enrolment but does not set institutional targets for race groups or gender.
4. In 2006, 61% of students in public higher education in South Africa were black, compared to 40% in 1994. The Coloureds and Indians had slightly increased their share (5% to 6.6% versus 5% to 7.4%), whereas White students had decreased their share from 47% to 25%.
5. To meet the growing demand, the University of the Free State has also introduced the "blended learning" approach to teaching and learning, designing course modules that incorporate face-to-face contact between lecturers and students and also some electronic contact both between lecturers and students, and between groups of students. The move towards

a blended learning approach has encompassed a re-evaluation both of learning materials and of support to lecturers and is in the process of designing interactive learning modules that encourage active student engagement. Instructional designers were appointed to offer lecturer support in terms of the pedagogical foundations upon which the modules have to be designed.

6. No robust data was available about the cost of transport for students, According to OECD, cost of transport may constitute one-third of income of African population.

7. For example the University of the Free State has introduced academic merit bursaries for new first year students and bursaries for culture, art and leadership.

8. Students holding bursaries from the Free State Provincial Government need to be placed in the region (teachers and school managers). The programmes that have placement strategies correspond to the areas of scarce skills, such as psychiatry and the health professions, African languages, and law and accounting.

9. Services include career advising, industry-preparation workshops and a Graduate Recruitment Programme that involves inviting companies to campus to make presentations, arranging career fairs and plant/site visits, selection processes and distributing career-related publications from research companies via a resource centre.

10. These departments/divisions in collaboration with career services aim to extend such placements so as to step up their contribution to the development of the Free State and to monitor the achievement of the professional learning objectives for which universities remain accountable. Also some other departments have developed job placement strategies. These range from annual job fairs that help match students/graduates with employers (accounting and nursing) and using alumni networks (Department of Roman Law and History of Law; Department of Urban and Regional Planning), to placing vacancy information on notice boards (Department of Educational Technology), sending CVs to relevant organisations (Department of Education Management), collaborating with employment agencies (Department for African Languages) or employing postgraduate students as assistants in the department. The Department of Afrikaans, Dutch, German and French The Drama and Theatre Art Department tries to place students in professional careers in the Free State Province, for example at radio stations, as actors and as drama teachers. Specific links are established with the Department of Education via the teaching bursaries offered, with schools that directly make contact with the Drama Department and with FACTS and VEE (professional acting societies).

11. The survey conducted at the University of the Free State provides some indication of trends at this specific institution. The vast majority of the departments (81%) that provided information indicated that they did not have job-placement strategies to assist their students to secure employment. Only three that had no job-placement strategy reported that they planned to develop such a strategy.

12. In 2010, the Central University of Technology offered a Human Resource Development course for the Free State Department of Education; Public Administration Leadership and Management Executive Development Programme for Senior Managers at all levels of government; Project Management programme for government officials; Integrated Development Planning Programme for Municipal Managers and Officials. The University of the Free State's continuing education provision included Disaster Risk Management, Management Development programme, Strategic Human Resource Management, Corporate Governance, Project Management, High Performance Supervision, and Black Economic Empowerment.

13. These include control of transport, basic education, agriculture, health services, provision of water etc. In financial terms, 97% of the provincial revenue is sourced from the central government.

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Annex 2.A1. Widening access to and improving success in higher education: the Victoria University case

Victoria University's longstanding Access and Success programme demonstrates university's strong commitment to collaboration across sectors. It involves both school and community partners in designing and delivering interventions to increase their relevance to particular contexts. It builds relationships between schools, students and mentors (university students and prominent community figures). It constitutes early, long-term and sustained interventions. Some projects take a cohort-based approach to changing student attitudes and peer culture in relation to education in order to improve achievement and aspirations for future education and employment.

Box 2.A.1. Victoria University's Access and Success programme

Victoria University provides both higher education, and technical and further education. It has over 50 000 local and international students enrolled at campuses across the city-centre and western suburbs of Melbourne which experience below average educational outcomes. The Access and Success programme works with schools in the west of Melbourne to improve access to, and successful participation in post-compulsory education. It has established collaborative teaching and research partnerships with schools and has implemented programmes across more than 70 different sites. It comprises different "arms", which involve university staff and students working in schools (Learning Enrichment), professional development of teachers via participation in post-graduate education (Teacher Leadership), working with senior secondary students to support their aspirations and provide information on pathways to higher education and employment (Youth Access), enhancing students' educational engagement through school-based programmes with community partners (Schools Plus) and developing and disseminating research (Access and Success Research).

Box 2.A.1. Victoria University's Access and Success programme (continued)

"Learning Enrichment" involves learning teams of school and university staff and students. Continuous university presence in schools improves student achievement and raises aspirations. Pre-service teachers work with in-service teachers and university researchers to design action research projects that investigate student disengagement and participate as literacy mentors in a whole-school literacy intervention, while also researching the impacts of this intervention on school staff. "Teacher Leadership" aims to engage teachers and principals in professional learning that increases teaching capacity in the schools. This has involved delivering professional development that articulates with the university graduate certificate or masters of education programmes. Research partnerships are based on participatory methodologies, which give teachers and principals control over the research agenda in their schools.

Schools Plus builds school-community connections and increases the engagement of students and families with education and community life. The Kinda Kinder programme (launched in 2005) seeks to address low levels of pre-school participation by engaging with parents and children. Children attend once a week with a parent or a caregiver for one hour free programme in public libraries, other community settings and schools. Pre-service early childhood teachers provide education through storytelling and other play activities, while supporting parents to develop social networks and familiarisation with formal education and community services. In 2009, Kinda Kinder operated in 19 sites. A new generation of adult learners including parents and grandparents are learning along with the children, the pre-service teachers and university staff in the Kinda Kinder setting. Kinda College has been developed with the vocational higher education part of the university and will offer parents the opportunity to gain further education accreditation for their skills. A range of quantitative and qualitative research methodologies is used to evaluate and inform collaborations with school and community partners and to track the impact of the projects. This investment in research and the emphasis on capacity building through cross-sector and cross-agency partnerships has increased the reach and sustainability of the project.

Source: Sellar, S., *et al.* (2010), Interventions Early in School as a means to Improve Higher Education Outcomes for Disadvantaged (Particularly Low SES) Students: Case Studies of Selected Australian University Outreach Activities, Department of Education, Employment and Workplace Relations, Canberra; OECD (2010c), *Higher Education in Regional and City Development. State of Victoria, Australia,* OECD Publishing. *www.oecd.org/dataoecd/54/14/46643288.pdf.*

Chapter 3.

Innovation in the Free State

The promotion of regional innovation and the development of a regional innovation system are important drivers of long-term economic growth and competitiveness. All regions can improve their capacity to adapt and transfer knowledge to regional needs.

This chapter examines the effectiveness of current innovation policies and practices in the Free State and the role of R&D and knowledge transfer conducted by the two Free State universities. It considers the efforts made by the National Government, Provincial Government, the University of the Free State (UFS), the Central University of Technology (CUT) and, to a lesser extent, the further education and training (FET) colleges. It examines the current knowledge transfer and exchange mechanisms and highlights good practice from other regions. Finally, the chapter concludes with specific recommendations to improve the regional innovation outcomes in the Free State.

Universities and other educational institutions have an important role to play to strengthen the Free State regional innovation system. To play this role in a more meaningful way, they need to make a quantitative and qualitative leap in the development of research capable human resources and in RDI by extending their current fields of investigation, aligning them with the needs of the Free State, and widening the innovation focus to low tech, and organisational and social innovation. Increasing efforts need to be devoted to co-operation with the private sector and the provincial and local governments. Finally, collaboration between the universities as well as the FET colleges needs to be enhanced.

Introduction

Over the last decade, South Africa has made remarkable progress to surmount the difficulties created by the weak framework conditions for innovation of the early 1990s. It has made great strides in research development and innovation through `establishing a national innovation system and committing itself to achieving an investment of 1.0% of GDP on R&D by 2012. The Department of Science and Technology launched a ten-year Innovation Plan in 2008 to address the South African failure to commercialise the results of scientific research and its inadequate production of knowledge workers. The government has also made significant progress in improving the governance of the innovation system. The question remains whether the current policy focus sufficiently prioritises industry-relevant R&D conducted in universities.

For emerging economies, the effort to sustain long term economic growth necessitates catching-up in terms of industrial and technological capability. This catch-up process requires sustained investment in two phases of learning: first, acquiring the ability to do what others have done; and second, generating innovations and new capabilities in technologies, products, and services. Furthermore, there is also a need to develop specialisations in economic activities to differentiate from other competing nations/regions. Such specialisations typically need to be at a sufficient scale to achieve critical mass and agglomeration economies through industrial clustering.

In order to enlarge its research potential and the quality of RDI, the South African government now recognises the necessity of local regional development. At the same time, however, there are few financial incentives for promotion of local / regional RDI activities. The higher education sector is a crucial area, not only because universities and other FET-colleges can increase the supply of skilled people, but also because they can drive national and regional growth. Strong efforts are needed to ensure that the current pursuit of the world class status by universities will be balanced with local and regional relevance.

In the Free State, underinvestment in innovation and human capital development is undermining the region's growth trajectory. There is a growing concern about the rising levels of poverty, inequity and unemployment; the region's overall weakening position, and long-term sustainability. Conditions have not been established to generate an environment in which new products and new processes can thrive. Connectivity and ICT capabilities are insufficient and not mobilised to

increase productivity especially of small firms. Technology diffusion remains low and few firms are committed to innovation.

In the context of a lack of human resources, mounting socio-economic challenges and restructuring of the economy, this chapter examines the following three dimensions to assess the effectiveness and coherence of innovation and R&D policies and practices in the Free State, as well as the role that the universities play in regional innovation system:

- Is the innovation system well connected and responsive to the industrial structure of the Free State and the economic needs of the region?
- Do the universities support the regional innovation system in an optimal way? Are there gaps in delivery where performance could be improved?
- What lessons can be learnt from the international experience?

3.1. Research and teaching potential in the Free State

Free State relative position in HERD and GERD

In South Africa, albeit increasing since 2000, the Gross Domestic Expenditure on R&D (GERD) is relatively low (ZAR 12 billion *i.e.* 0.87% of GDP in 2004). While the business sector funds 45% and performs 58% of total R&D, the higher education sector undertakes 21% of R&D. This is an average proportion when compared to OECD countries where it records considerable variation ranging from less than 20% in Korea, Finland and Japan to around 30% or more in Spain, Norway and Canada. The high BERD (business expenditure on R&D)/GERD ratio can be seen as a significant strength of the South African innovation system.

While the business sector R&D has experienced some growth from 1992 to 2004, there has been a R&D decline in universities. Available data suggest that during this period there has been an annual emigration of 2 000 members of the scientific workforce, with an outflow of 2 500 and an inflow of 500 researchers on a yearly basis. Brain drain remains a considerable challenge in South African Provinces.

In the Free State, two thirds of the research and development spending is realised by the business sector, and notably a handful of big firms. While Gauteng-based universities account for about one-third of Higher Education Research and Development (HERD), the Free State accounts for 5.4% (see Table 3.1 below), slightly higher than the Free State's share of the national GDP (about 5%). Sectoral research in the province, financed by the science

councils and the National Research Foundation (NFR), is particularly low at 2.4% of the total.

Higher education and training in the Free State

While the number of South African higher education institutions has been reduced from 36 to 23, largely by merging *technikons* (technical colleges or polytechnics), the higher education sector as a whole has expanded dramatically, with the number of students rising from 473 000 in 1993 to 761 000 by 2007[1]. The rate of faculty growth has been slower. In the university sector, total faculty numbers grew from 20 500 in 2000 to 21 800 in 2003, an increase of 6%, compared with an increase of 22% (18% in full-time equivalents) in the size of the student body. The arithmetic result of the different growth rates has been a rise from 21:1 to 23:1 in the student-faculty ratio over four years.

In the Free State, enrolment is mainly taking place in the two universities: The University of the Free State and the Central University of Technology that enrol altogether approximately 41 500 students. The present University of the Free State is a result of a merger of the former UFS, of the Vista University campus in Bloemfontein and the University of the North Qwaqwa. A full range of undergraduate and postgraduate degrees and diplomas are offered in seven faculties[2] to more than 30 000 students, majority of whom are studying on the Main Campus and the rest on the Open Learning Campus and the Qwaqwa Campus. There are 2 457 international students, mainly for sub-Saharan Africa. A total of 2 900 staff members are working on all the three campuses.

Table 3.1. Provincial split of R&D 2005/6

R 000	BERD	%	Govt	%	HEI	%	SC	%	Total	
Eastern Cape	42 692	2.9	4 071	10.0	14 701	7.9	123 956	2.9	672 008	4.7
Free State	476 346	5.8	41 856	5.0	14 6823	5.4	50 197	2.4	718 908	5.1
Gauteng	464 3864	56.3	291 639	34.5	1 030 801	37.7	1 103 284	52.5	7 173 591	50.7
KwaZul/Natal	843 499	10.2	72 131	8.5	379 681	13.9	201 811	9.6	1 53 2158	10.8
Limpopo	84 187	1.0	15917	1.9	43 564	1.6	48 058	2.3	197 054	1.4
Mpu Malanga	187 934	2.3	36 001	4.3	58 549	2.1	48 051	2.3	340 773	2.4
North West	180 227	2.2	20 857	2.5	73 457	2.7	45751	2.2	323 838	2.3
North Cape	14 691	0.2	42539	5.0	15 263	0.6	64 284	3.1	138 426	1.0
West Cape	1 570 336	19.0	239 630	28.4	769 378	28.2	416 702	19.8	3 052 483	21.6
Total	**8 243 776**	**100.0**	**844 640**	**100.0**	**2 732 215**	**100.0**	**2 102 094**	**100.0**	**1 414 9239**	**100.0**

Source: National Survey of Experimental Research and Development, 2005/06 and Pogue, T and L. Abrahams (2010)

The Central University of Technology is the result of the restructuring of the *Technikon* landscape and a merger of the *Technikon* Free State in Bloemfontein and Vista University in Welkom. It offers contact and distance learning and has about 11 500 students. Less than 600 international students come mainly from other South African Development Community (SADC).

While the university students represent an important part of the population in the Free State (2.4% of the population), there is a mismatch between labour market demand and higher education supply that is undermining the region's innovation potential. Unemployment is high in the Free State and above national average *i.e.* about 30%. Youth unemployment is at least double this rate. Shortage of technicians is said to be dire. Against that background, higher education institutions are training a relatively low proportion of science and technology graduates; also Master and PhD graduates are limited in numbers (See Table 3.2.) Although the desire not to nurture brain drain is understandable, the current low level of graduate production might lead to a reduction in the regional capacity of innovation.

Currently, education provision is biased towards humanities and social sciences (see Table 3.2). The University of the Free State is relatively strong in agriculture and natural sciences (15.4 %) reflecting the dominant place of the primary sector in the regional economy. At the same time, the needs of the health sector are not well covered and there are manpower shortages for certain professions (paramedical, pharmacist). Engineering in the Central University of Technology as well as law, accounting and health professions in the University of the Free State are areas of scarce skills. Only 2.6% of students are enrolled for master's and doctoral degrees in the Central University of Technology in 2010. The figure is better for the University of the Free State but still relatively low and rising through institutional efforts.

Table 3.2. Enrolment in CUT and UFS by faculties (2007 figures)

Enrolment	CUT	UFS	Total	% Total
Business, management and law	3 226	6 502	9 728	27.7
Science, engineering and technology (SET)	3 948	4 655	8 603	24.5
Health/environment	1 041	2 496	3 537	10.0
Humanities and social sciences (including Theology)	2 260	1 031	13 291	37.8
Total	**10 478**	**24 684**	**35 162**	**100.0**

Source: UFS and CUT, Free State questionnaire response

The intermediary level is served by four further education and training colleges serving 28 000 learners. In addition, a nursing college and an agricultural college also serve the province, while a number of private sector institutions provide services to the intermediary sector.

HEI research in the Free State

Table 3.3 shows the amount of R&D expenditure, number of publications and PhD students at South African universities. As in most national systems, these values are concentrated in a small number of the most successful universities. The figure shows, among other things, that 75% of higher education expenditure on R&D (HERD) is spent in five universities. The highest-spending historically black university is the University of the North West, in seventh place.

Table 3.3. R&D expenditures, publications and PhD students at South African universities, 2003

	University HERD (ZAR million)	Publications	PhD students
University of the Witwatersrand	330	557	620
University of Cape Town	312	564	783
University of Pretoria	254	954	1529
University of KwaZulu-Natal	238	704	960
University of Stellenbosch	205	624	757
University of the Free State	86	334	529
North West University	84	267	558
University of South Africa	83	435	859
Rand Afrikaans University	82	277	578
University of the Western Cape	63	106	245
Rhodes University	60	165	193
University of Port Elizabeth	38	123	183
University of the North	19	63	75
University of Fort Hare	12	79	23
University of Zululand	11	61	128
University of Venda for S&T	11	24	27
Medical University of South Africa	8	50	64
University of Transkei	6	14	1
Total	**1 900**	**5 401**	**8 112**

Source: OECD/Department of Science and Technology, South Africa (2007), Integrating Science & Technology into Development Policies: An International Perspective, OECD Publishing.

Pouris has analysed the citations to South African academic publications over the last decade and found that the citation-based performance of South African universities is among the global leaders: six universities are positioned among the leading 1% in nine of the 22 fields. The author ranks those universities by their quartile within the 1% leaders in each discipline as in the Table 3.4. below. The Free State is well placed for two disciplines: clinical medicine (ranked fourth) and plant and animal science (ranked third), (See OECD, 2007).

Table 3.4 Quartile ranking among the leading 1% of world universities in each discipline, 1995-2005

Scientific Discipline	UCT	Pretoria	Orange Free State	Witwatersrand	Natal	Stellenbosch
Clinical Medicine	1	2	4	3	2	2
Plant and Animal	2	2	3	4	2	3
Social Sciences	2	-	–	2	4	–
Environment/ Ecology	2	3	–	4	–	–
Geo-Sciences	3	–	–	2	–	–
Engineering	3	–	–	4	–	–
Chemistry	–	–	–	4	–	–
Materials Science	–	–		4	–	–
Biology	*4*	–	–	–	–	–

Source: OECD (2007), *OECD Reviews of Innovation Policy: South Africa 2007*, OECD Publishing. (based on Pouris).

In the Free State, two different approaches to knowledge generation and diffusion are prevailing. The Central University of Technology follows the university of technology business model and targets its interaction with the business sector. It provides services to firms and prioritises engineering R&D. In the University of the Free State, research activities are focussed on agriculture, water management and biotech with a more inward looking posture (see Box 3.1.).

Box 3.1. Central University of Technology R&D service-oriented approach and the University of the Free State cluster organisation

Central University of Technology (CUT)

The main campus of CUT is situated in Bloemfontein, capital city of the Free State. Other campuses have been established at Welkom in the heart of the Free State goldfields and at Kimberley in facilities managed by the Northern Cape Higher Education Institute. The CUT employs over 800 academic and research staff spread across four faculties. The first and most important is the Faculty of Engineering, Information and Communication Technology; the second is the Faculty of Health and Environmental Sciences; the third is the Faculty of Management Sciences and the fourth is the Faculty of Humanities. The faculties together produce approximately 2 500 graduates each year. CUT emphasises the career-orientation of its technology training by referring to its human product as "practitioners".

The CUT's research activity aims to bring the knowledge resources to the service of industry and job creation. The research programmes of the CUT's Centre for Rapid Prototyping and Manufacturing and its Centre for Environmental, Community and Industrial Development include new product design and development; automated materials handling and radio frequency identification; hydro-informatics; applied food science and biotechnology; and information and communication technology. The CUT also houses a School for Entrepreneurship and Business Development, a Centre for the Built Environment and a sleep laboratory. The CUT is part of a Science Park where university-based technological expertise and skills are made available. In addition, since 2006, the university has been running central South Africa's first fabrication laboratory (the FabLab), which serves as an incubator where local inventors and micro-businesses can conceptualise, design, fabricate and test almost any potential product.

A wide range of initiatives have been in recent years, including Product Development and Technology Station that provides services to 200 clients each year, new research and information platforms: the SEDA Agriculture and Mining Tolling incubators, the Medical Research Council's National Medical Device Innovation Platform, the Regional Innovation centre and the Free State IT hub.

University of the Free State (UFS)

The UFS has over 30 000 students and approximately 2 500 international students from more than 50 countries, the majority from Africa. The university has a high number of research and exchange agreements with many internationally recognised institutions, contributing towards a diverse, mutually beneficial international culture, within the framework of research, teaching and community service. The UFS plays an important national role in research and has close ties with a number of universities and industries on the continent and around the world. More than 74 academics are rated by the National Research Foundation (NRF), indicating the quality of its research portfolio.

Box 3.1. Central University of Technology R&D service-oriented approach and the University of the Free State cluster organisation (continued)

Recently, the UFS announced the formation of six Strategic Academic Clusters in which the university excels in, or plans to establish areas of expertise. They are: water management in water-scarce areas, new frontiers in poverty reduction and sustainable development, social transformation in diverse societies, ecologically sound value chains for agricultural commodities, materials and nano-sciences, and advanced bio-molecular research. Each cluster is associated with at least one recognised Research Niche Area (RNA) of the National Research Foundation's (NRF) Institutional Research Development Programme (IRDP). Eight RNAs were approved for the UFS in 2007 – the highest number of all universities in South Africa. These encompass 24 NRF-funded research projects, representing a combined total commitment of almost ZAR 30 million to the UFS over a period of five years (2008-12). The course to develop a differentiated set of niche areas was set in 2005 and – after extensive internal and external consultation – culminated in the approval of the strategic academic clusters. The clusters embody the pursuit of quality and excellence. The name – strategic academic clusters – signifies the concern with not only research, but also undergraduate and postgraduate teaching and learning. The vision is that the cluster activities will not only drive world class research outputs, but also contribute to internationally renowned graduate programme activities.

Source: The Central University of Technology and the University of the Free State

International and national rankings have led to an accelerating reputation race among universities. In the South African context, they reinforce polarisation with traditionally white universities coming on top. The University of the Free State and the Central University of Technology are preceded by at least 11 South African universities. The University of the Free State also performs modestly in the Scimago classification (ranked 1 864) with a low publication output, a quotation index significantly below the leading South African university: the University of Cape Town Furthermore, the university has not yet made notable progress in the internationalisation of its research (see Table 3.4). The Central University of Technology does not appear among the 2 100 universities of this list.

Table 3.5. South African universities in the Scimago classification*

Institution	World ranking	South Africa ranking	Publication output	Quality index Cx	Cooperation intensity	A	B
University of Cape Town	405	1	5 469	6.65	50.36	1.04	1.32
University of Witwatersrand	532	2	4 191	4.88	43.33	1.01	1.1
University of Pretoria	584	3	3 881	3.6	41.59	0.98	0.84
Univerity Stellenbosch	615	4	3 656	5.36	41.3	1.01	1.05
University of KwaZulu/Natal	639	5	3 496	4.3	44.02	1.01	0.96
University van die Vrystaat (UFS)	1 864	8	551	2.6	32.49	1.02	0.51
Thswane University of Technology	2 072	10	367	1.44	31.06	0.89	0.58

Source: Scimago database, www.scimagoir.com/pdf/sir_2010_world_report_002.pdf.

* Universities are ranked according to their publication output (Column 3). Cx (column 4) is an indicator showing the average scientific impact of an institution's publication output in terms of citations per document. Column 5 shows the institution's output ratio that has been produced in collaboration with foreign institutions. Column A shows the journal average importance where an institution output is published. Column B reveals the ratio between the average scientific impact of an institution and the world average impact of publications of the same time frame and subject area.

Another part of the higher education and training sector is the further education and training colleges. Partly due to the restructuring in operation and the reintegration of this sector to the new Department of Higher Education and Training, the further education and training colleges are in turmoil and performing sub optimally. The 15 technical and teachers training colleges, now merged to 4 FET colleges, in the Free State have very low if not non-existent incremental innovation capabilities. They train the technicians and middle management officers that are important to nurture the incremental innovation of a number of locally based industries. These industries – retail, transport and logistics, tourism, distribution – are not only labour intensive, but also core activities that underpin the growth dynamics of the province. The further education and training sector is being recapitalised and revamped, but is still in a state of flux with significant performance deficit. Quality of teaching and employability of graduates are in need of serious upgrading.

3.2. Challenges

In the Free State, the regional innovation system is relatively weak and the economy remains biased towards the primary sector and the chemical industry (see Box 3.2.) thus putting the emphasis on process and equipment embodied innovation. Although agriculture and floriculture are expanding, many agricultural products leave the province unprocessed. Furthermore, only limited public R&D is executed in the province. There are no chairs, no centres of excellence and no government-based research institutes in the Province. Therefore much depends on HEI research and university-industry collaboration.

Box 3.2. Economy and geography of the Free State

The Free State Province, one of the nine provinces in South Africa, is centrally located in South Africa and borders Lesotho and the KwaZulu-Natal Province to the east, the Eastern Cape Province to the south, the Northern Cape and North-West Province to the west and Gauteng and Mpumalanga Provinces to the north. The Free State represents 10.6% of the total land area of South Africa and contributes to 5.5% of the national population with 2.94 million inhabitants (2006). The economy has lost ground to the rest of the country in recent years: from 1996 to 2003 the regional growth rate was 0.7% compared 2.8% for the country.

The province is composed of *i)* the Xhariep district in the south west, a semi-arid area with extensive farming and small rural towns (contributing to 2.8% of provincial GDP); *ii)* the Motheo district in the centre comprising big cities like Bloemfontein, Botshabelo or Thaba Nchu (with 27% of the total population and 32.7% of GDP); *iii)* The Thabo Mofutsanyana district in the east with many fruits farms, mountain ranges and touristic areas (11.7% of GDP); *iv)* the Fezile Dabi district with agricultural production (maize) and large chemical and synthetic fuel plant (Sasolburg) (32.2% of GDP) and *v)* the Lejweleputswa district that contains the Free State goldfields (20.6 % of the GDP).

Box 3.2. Economy and geography of the Free State (continued)

Over the past 20 years, mining and agriculture have seen their previously dominant role contested and now represent less than 17% of the provincial GDP. This development has impacted negatively on the employment rate in the province and large numbers of former farm workers have flocked to the nearest urban centres. This migration to urban areas has placed pressures on the available infrastructure in these areas. There is limited growth in the secondary sector and large numbers of jobs have also been shed in the manufacturing sector. Sectors which have grown proportionally better in the past decade are trade, transport and financial services. However, their labour absorption rate is very low compared to that of agriculture and mining. The recession in 2009 has had a further negative impact on the overall economy of the region. The key economic challenge for the Free State are now to absorb the shock of the declining mining sector, maintain the existing contribution of agriculture, increase the global links and address inherent inequities in the economy.

The consequences of a struggling economy include rising levels of poverty and unemployment, and an increase in inequality. More than 50% of the population in the Free State live on less than USD 2 per day, while unemployment is estimated at 30%. The Human Development Index (HDI)[3] for the region is on the decline and was estimated at 0.55 in 2004. At the same time, the Gini-coefficient increased to an estimated 0.64 in 2004.

Source: FSRSC (2010), "Free State, Self Evaluation Report", OECD Reviews of Higher Education in Regional and City Development, IMHE, *www.oecd.org/edu/imhe/regionaldevelopment.*

The trends in the South African higher education and training sector are influenced by the legacy of the apartheid past. Until 1994, a majority of the population was excluded from educational opportunities, thus generating considerable disparities and seriously undermining the competitiveness potential of the country and its provinces.

The present constrained availability of skilled human resources raises issues that impact the Free State economy. Firstly, while South Africa has been isolated, this was particular the case for the Free State, a province located at a distance from the most dynamic economic centres of South Africa: Gauteng, the Cape region and the KwaZulu-Natal coastal region. The task of the Free State universities is not only to increase higher education participation rate among the population, but to build and consolidate the links between the universities and the global world. This is a mission that takes time and requires resources and changes in mindsets.

Secondly, universities all over the world are now increasingly perceived as agents of economic growth in their own regions. In the Free State, the higher education sector is poised to play an important role notably through the implementation of industry relevant research and the supply of services tailored to firms and especially SMMEs. Technology transfer of offices can be a catalyst helping to generate spinoffs. Higher education efforts can also help to bridge the gap between the supply of design engineering and related managerial capabilities and the corresponding demand. R&D capabilities in the two universities in the Free State are, nonetheless, not reaching the critical mass and limiting the interface with the business sector. Thirdly, universities remain a major vehicle for instilling the entrepreneurship spirit among students, given that innovation is now increasingly produced by new firms and small businesses.

Linking universities to the international education and research market

South Africa is making efforts to attract foreign students especially Sub-Sahelian African students. It is the only sub-Saharan country where a substantial number of non-nationals are studying with 7.25% of enrolled students belonging to a foreign country in 2006. This figure is, nevertheless, relatively low in comparison to developed countries' standards.

The University of the Free State has developed a number of collaborative links with the United States (Cornell and Yale universities and Virginia Tech for R&D in agriculture), Belgium (Ghent and Antwerpen universities) and with business schools in France and Germany. The university has a newly established structure dealing with international affairs that is part of the directorate for research. 80% of its 2 457 foreign student comes from three countries: Lesotho, Namibia and Zimbabwe.

Recently, the UFS – under the leadership of the Rector and Vice-Chancellor Jonathan Jansen – has also embarked upon attracting research talent to the University (see Chapter 2, Box 2.2). Professors have been recruited on the basis of traditional academic merits with limited consideration to the needs and challenges of the Free State. This effort, helped by the global financial and economic crisis, has already proved successful. This initiative should be aligned with regional priorities to help recruit research faculty for example in key industry fields and/or with a record of entrepreneurial activities, industry collaboration and spin-offs.

The Central University of Technology is also investing resources to increase the share of foreign students at post-graduate level as well as making regular visits to overseas institutions. It holds a wider portfolio of

partnerships than the University of the Free State (532 contracts signed in 2008/2009). The focus seems, nonetheless, more on academic exchange than on collaborative research (see good practices below in Box 3.4). Currently, the Central University of Technology's internationalisation strategy lacks focus and resources. The share of foreign students is low (5.5%) and smaller than in the University of the Free State (close to the national average) with most students coming from the South African Development Community (SADC).

Annex 3.1 presents the current state of internationalisation of higher education in the Free State, providing benchmarks in a wide range of elements of internationalisation and the current situation in the universities in the Free State.

Box 3.4. Internationalisation of universities: some examples

Numerous OECD countries and regions have designed policies for attracting high skills and professional technical labour (students, researchers, IT specialists, research scientists etc.), such as tax incentives, repatriation schemes and improving the attractiveness of academic careers. In Quebec, Canada, the government is offering five-year income tax holidays to attract foreign academics in IT, engineering, health science and finance to take employment in the region's universities. In Finland, Nokia invests in the cultural adaptation of foreign IT workers as a way to improve productivity.

One way to increase the internationalisation of the university sector in the region is to attract branches of universities from other countries. Singapore has been particularly efficient in this domain. The University of Chicago's business and mathematics (via their financial mathematics unit) programmes has now established a branch campus in the downtown central business district, and the University of Chicago is listed in the suite of HEIs sanctioned by the Singaporean Ministry of Education. In addition, MIT (Boston), Technische Universität München (Munich), Karolinska Institutet (Stockholm), Georgia Tech (Atlanta) have all extended their networks into Singapore, and used this development process to enhance the research and teaching process (*e.g.* via the acquisition of research funding, industry feedback, joint research, and guest speakers in classes).

ICREA (Catalan Institution for Research and Advanced Studies°) is a dedicated heading agency that attracts top researchers to Catalonia, Spain. It is a foundation supported by the Catalan Government and guided by a Board of Trustees and is currently part of Talència, an agency set up by the Catalan Ministry of Innovation, Universities, and Enterprise (DIUE), ICREA maintains its independent status within this agency. The purpose of ICREA is to promote scientific excellence by recruiting and retaining top researchers for the Catalan R&D system.

Box 3.4. Internationalisation of universities: some examples (continued)

ICREA senior calls are addressed to the international research community. Up to 20 permanent senior research positions are filled each year. ICREA aims at incorporating senior researchers capable of leading new research groups and setting new lines of research on the right tracks. Scientific excellence, international standards and leadership are expected from ICREA researchers. The selection Committees have appointed 255 researchers since 2001 from 2 525 applications. The advisory board of the Georgia Institute of Technology-NUS Logistics Institute – Asia-Pacific is made up of seven people, five of whom are Singapore-based industry representatives. Georgia Tech's Singaporean presence acquires knowledge, feeds it back to Atlanta, and enables Georgia Tech to play a key role in enhancing the regional development process in Atlanta, a key air and road transport logistics node in the US system (Olds, 2007; on Georgia Tech, see Youtie and Shapiro, 2008).

Source: OECD (2010), Review of Higher Education in Regional and City Development: The Region of Catalonia, Spain, OECD Publishing ; OECD (2006), *OECD Territorial Reviews: Milan, Italy 2006*, OECD Publishing, and OECD (2005), *OECD Territorial Reviews: Busan, Korea 2005*, OECD Publishing.

Enhancing and nurturing university research

University research faculty, often white males, is ageing, pointing to the need to develop a new generation of research leaders with greater diversity. An estimated 10% of South African researchers are National Research Foundation (NRF)-rated researchers, while the regional average is 9%. The universities in the Free State have 89 (4.2%) NRF-rated researchers in the country, which is less than either the share of the national population or of the national economic output. The region has no A-rated (international level) researchers, but there are 12 B-rated and 60 C-rated researchers. In 2010, the average age of B- and C-rated researchers was 56 and 53 years respectively.

In terms of universities' research output, the Free State contributes to a small percentage of the national total: 5.9% in 2008 (down from 6.8% in 2004 and 2006), in par with its relative share of the national GDP. Efforts have been made in the two Free State universities to increase the number of accredited publications and to develop basic scientific writing skills. Recent data show that the University of the Free State's accredited publications increased from 395 in 2008 to 470 in 2009. In the Central University of

Technology, 333 articles were written by 305 researchers over the period 1998-2009. 44 external research partners co-authored the articles. The creation of an in-house research journal of the Central University of Technology, INTERIM, published twice a year, has helped to improve the performance. The goal of the journal is to provide young researchers with an opportunity to publish their research and to give established researchers a chance to publish work in progress.

Research budgets have followed an upward, albeit limited, trend. The total funding made available for research at the University of the Free State (UFS) increased from ZAR 183 million in 2008 to ZAR 198 million in 2009. A total of ZAR 25.5 million was allocated to researchers from central research funds. The university received about ZAR 34 million from the National Research Foundation (NRF) in 2009. Currently there are 39 grant holders in the Thuthuka programme receiving ZAR 2.5 million in funding support. The University of the Free State also received a total of ZAR 3 million during 2009 from the NRF's Institutional Research Development Programme and ZAR 12 million from the National Equipment Programme.

The Central University of Technology receives a considerably less public funding for RDI even when the difference in size with the University of the Free State (800 academic staff and researchers for the Central University of Technology against 1 083 for the University of the Free State[4]) or in student population is taken into account. The Central University of Technology was awarded during the period 2001-10 an amount of ZAR 19 million of research grants for postgraduate students, post-doctorate fellows and equipment. National Research Foundation (NRF) funds and the Central University of Technology's supplementary allocation for the same period amounted to ZAR 23.6 million. Total funding for research in the Central University of Technology (grant, strategic funds, support for learning and research) amounted to around ZAR 15 million in 2010.

The question remains whether the South Africa's current policy focus sufficiently prioritises HEI industry-relevant R&D conducted in universities. A reform has recently taken place to boost South Africa's innovation policy but it is too early to see results (see Box 3.5.). At the same time, the interest of the province (the third largest in the country) could be probably better voiced in the capital at the Department of Science and Technology and at the Department for Education and Training. As underlined in the Free State Self-evaluation Report, the impact of research activities is also limited by the insufficient engagement of the provincial authorities, their limited resources and sometimes difficult relationships with higher education institutions (FSRSC, 2010). As a consequence, there is a lack of policy to guide regional development through research.

Box 3.5. Innovation and R&D Policy in South Africa

South Africa has made remarkable progress to surmount the difficulties created by the extremely poor framework conditions for innovation of the early 1990s. Formal R&D spending is 0.87% and the government target is to raise it to 1% for 2012. The business expenditure on R&D (BERD) has been rising in recent years and constitutes a larger fraction of total R&D than in most other countries with similar level of per capita GDP. Moreover, corporate R&D seems locally engaged to an unusually high degree.

In this context, the government has made significant progress in improving the governance of the innovation system. The Department of Science and Technology launched a ten-year Innovation Plan in 2008 to address the South African failure to commercialise the results of scientific research and its inadequate production of knowledge workers. The great challenges include the Farmer to Pharma value chain, Space S&T, Energy security, S&T in response to global change and human and social dynamics.

To address the fragmentation of funding instruments, the plan led to the introduction of the Technology Innovation Agency (TIA) that will incorporate the Innovation Fund and the Biotech innovation Centres. TIA also aims at stimulating investment (venture capital and foreign direct investments) and at providing an intellectual property support platform (through the Patent Support Fund and the Patent Incentive Scheme).

Another objective of the plan is to significantly increase the PhD production to 3 000 science, engineering and technology (SET) graduates from only 561 SET graduates in South African universities in 2005.

The Department of Trade and Industry has also reoriented its policy towards the knowledge economy. A Small Enterprise Development Agency (SEDA) has been created to increase the number of incubators throughout South Africa and to enhance the provision of services to SMMEs (small, medium and micro enterprises). The SEDA Technology Programme is a growing network of incubators and technology support centres with a footprint across all provinces. Linked to this is a dedicated fund that enables SMMEs to access funding for technology and technical services. The National Empowerment Fund (NEF) offers a range of start-up, business growth, and rural- and community-upliftment financing products with a focus on black economic empowerment (BEE) transactions.

Tshumisano Trust, a small business support agency of the Department of Science and Technology (DST), has established technology "stations" across the country. The sector-focused stations, located at universities of technology, facilitate technology transfer between these educational institutions and small enterprises. One of the technology station programme's critical contributions is to expose students at the stations' home institutions to small enterprises, thus helping to foster a culture of entrepreneurship. Tshumisano Trust's initiative also involves placing engineering graduates in internship programmes with small enterprises. The increasing rate of client referrals between SEDA Technology Programme and the technology stations is playing an important role in bridging support initiatives between sector departments and mainstream enterprise-development support agencies.

Box 3.5. Innovation and R&D Policy in South Africa (continued)

Among other new mechanisms for public funding for R&D recently created, the THRIP (Technology and Human Resource for Industry Programme) an initiative of Department of Technology and Innovation (DTI) managed by the National Research Foundation (NRF) has been very effective in integrating the development of research capable human resources with industry-university co-operation in R&D. The programme has been internationally recognised as particularly successful as compared with similar schemes in other countries.

Source: OECD (2007), *OECD Reviews of Innovation Policy: South Africa 2007*, OECD Publishing.

Transfer of university research results

The two Free State universities have in the last decade created technology transfer and innovation support structures often with complementary functions. In the Central University of Technology, the centre of Rapid Prototyping and Manufacture (CRPM) gives assistance to SMMEs and start-ups, and helps the commercialisation of research. The Product Development Technology Station (PDTS) is focussed on materials application and vehicular technologies and the Fabrication Laboratory (Fablab) on medical product development. Although these intermediary (and also incubator) organisations provide a basis for small scale export and favour import substitution oriented initiative for mechanical products, they are still at the early stages of development, generating limited income for the university (less than ZAR 2 million) and few jobs. In a few cases, some of the incubated companies have survived and left the incubator (see examples in Annex 3.2). In the University of the Free State, a small Technology Transfer Office or Direction of Commercialisation and Innovation was recently created (2008) with a staff of only three people.

While the University of the Free State has taken strides towards a more robust focus on and performance in research, it continues to lack a coherent technology transfer or innovation strategy. As is the case with the Central University of Technology,[5] there are efforts to foster projects linked with community engagement but the distinction between topical community service and demand-driven research is not made. Business interface has a strong focus on the primary sector. The University of the Free State has had some success stories in creating spinoffs such as Pharmovs-Parexel (see Box 3.6.), but most of them do not generate royalties or create jobs in the region.

Most spinoffs are based on agricultural and medical fields. So far, the university incubating centre is home to six companies. The University of the Free State had a portfolio of 13 patents in 2009 (only six patents were filed between 2001 and 2007). While the Innovation Fund of the National Research Foundation (NRF) provides some of the funding to cover the costs of the patents, there is no venture capital and access to patenting advice, for example from the Faculty of Law because that would require financial compensation for the expertise.

Box 3.6. Pharmovs-Parexel

The University of the Free State's PHARMOVS-PAREXEL joint venture bears testimony to the potential of venture creation from academic activities in securing third-stream funding. During the mid-1970s, an era when contract research at South African universities was considered the exception to the rule, the University of the Free State Department of Pharmacology was able to secure a number of external research contracts annually. International firm Hoechst noticed this hub of activity and invested in the Department, establishing the Hoechst Research Unit which catered exclusively to the needs of Hoechst and its subsidiary companies. During the mid-1980s the demand for pharmacology research and clinical trials from other sectors within the pharmaceutical industries increased. Recognising the opportunity, the university established a research unit called Pharmovs with associated expansion of infrastructure on the campus. After the withdrawal of Hoechst from South Africa in the late 1990s due to political pressure, the Hoechst Research Unit was incorporated into the PHARMOVS Research Unit. Soon after the world leading preclinical trial company, Parexel, approached the University of the Free State with the aim of forming a joint venture. The joint venture gave rise to the current company, PHARMOVS-PAREXEL.

Today, the company boasts a staff component of more than 300 highly specialised personnel and has a 100 bed unit with a turnover in excess of ZAR 100 million per year. The University of the Free State retained an equity share in the company.

Source: FSRSC (2010), "Free State, Self Evaluation Report", OECD Reviews of Higher Education in Regional and City Development, IMHE, *www.oecd.org/edu/imhe/regionaldevelopment.*

The co-operation between the Central University of Technology and the University of the Free State in technology transfer, commercialisation and entrepreneurship remains limited, reflecting the difficulties of the top

management to establish links. The Free State Provincial Government could act as a go-between and has already taken steps to stimulate joint endeavours. For example the Regional Innovation Centre (RIC) is a shared initiative between the Central University of Technology, the Free State Provincial Government and hopefully the University of the Free State. The Regional Innovation Centre (RIC) is conceived as an expert knowledge and technical services hub supporting and advancing regional socio-economic development as well as improving the sustainability and competitiveness of regional enterprises. At the time of the OECD review visit in October 2010, the operating mode of RIC was unclear and the founders had not made commitments on projects or programmes[6]. International experience, for example, the innovation labs in Rotterdam, (Netherlands) could help RIC designers in completing their plan, for example (See Box 3.7. below).

Box 3.7. Innovation labs in Rotterdam University

Rotterdam University's Innovation Labs contain projects in which third and fourth year students and lecturers from different domains collaborate in an innovative learning and working environment in order to develop new solutions to complex and persistent problems in the Rotterdam region. New projects are selected annually in partnership with the strategic partners. In November 2009, Rotterdam University had 11 Innovation Labs, *e.g.* Future Mobility, Flood Control 2015, Transformers Rotterdam, Talent Development and Cultural Diversity.

Each innovation Lab brings together representatives of the so-called "knowledge triangle" between professional practice, education and R&D. Each of them has a direct connection to the regional themes of R&D of the university. The projects are commissioned by the strategic partners of the university. Students from different disciplines are required to address multi-disciplinary problems from the point of view of their own disciplines. The aim is expose students complex problems and expand their competencies. Students who have participated successfully in an Innovation Lab project get an additional certificate at graduation. They can also choose to continue to participate in research for another period in order to get an Honours Degree, developing their competencies to tackle complex problems.

Meetings are organised on a regular basis to discuss the questions concerning different lines of research. Research workers and students are requested to present their research set up and research activities. These meetings provide an inspiring learning environment. As a result, all participants are highly engaged in the process.

Source: Rotterdam University of Applied Science

International experience in knowledge transfer/exchange models

Many universities in the OECD countries and beyond have established technology transfer offices based on tech push model and focusing on commercialisation of research through intellectual property out-licensing and, in some cases, the formation of spin-outs. While a handful of TTOs have proved successful, most of them have been unable to cover their costs and raise sufficient revenues from the commercialisation of research outputs.

International experience also shows that while the traditional university technology transfer models may lead to saleable intellectual property and start-ups, they seldom produce enterprise that grow in the region and contribute to regional economic development.[7] Localised supply networks are therefore critical to the process through which innovation is transferred to enterprises and to create new innovation that transforms and upgrades existing industries.

A well-functioning regional knowledge transfer model is based on ongoing relationship with industry to determine what innovations have the best opportunities for adoption and commercialisation, creating an industry-university learning environment. It supports the human capital development required to adopt and apply process and product innovations and works with SMEs as well as large corporations. It measures success in terms of the sustainability and transformation of regional industry and employment growth. University entrepreneurship programmes should therefore also support the existing industries and SMEs (Christopherson, 2010).

Leading research-intensive universities are moving towards a more holistic approach in knowledge exchange. For example the University of California reformed its commercialisation infrastructure in 2004 to achieve a more holistic approach to industry collaboration in recognition that in many cases there is no need for a discussion over Intellectual Property (IP). The new office has seen a reduction in cultural and negotiation biases, an increase in industry and foundation funding as well as collaboration types and number, a reduction in barriers to giving donations to the university and a formation of greater numbers of contracts and strategic alliances (Box 3.5).

Box 3.8. The University of California, Berkeley and knowledge exchange

The University of California Berkeley reformed its commercialisation infrastructure involved with industry contracting in 2004 to adopt a holistic approach to research commercialisation. It recognised that industry could approach the university from many different directions, some of which require contracts while others do not. By merging the activities of the Office of Technology Licensing and Industry Alliances Office into the Intellectual Property and Industry Research Alliances (IPIRA) office, Berkeley was able to streamline industry transactions and increase corporate sponsored research.

IPIRA identified the following programmes:

- Philanthropy (no strings attached to gifts).
- Open collaboration model where firms undertake research alongside academics and students with an open dissemination framework.
- Industry Affiliates Programme where firms pool resources to fund common research around particular expertise.
- Corporate sponsored research (large and small) including the establishment of large scale cross-disciplinary university-industry research institutes where the results are taken up and commercialised by industry research, including through start-ups.
- Socially responsible Intellectual Property Rights management to promote widespread availability of technology and healthcare in developing countries.

Source: PACEC (Public & Corporate Economic Consultants) (2010), The Higher Education Knowledge Exchange System in the United States. A report to HEFCE by PACEC and the Centre for Business Research, University of Cambridge.

University-industry relationships

The willingness of South African industry to fund research at universities is influenced by Technology and Human Resources for Industry Programme (THRIP) as well as by a number of historically strong relationships between key South African companies and a handful of universities (such as the long-standing and strong links between the mining

industry and the University of Witwatersrand). This degree of connection between industry and the university sector is very high in international terms and constitutes an unusual asset. The share of higher education R&D (HERD) financed by industry is about 16% in South Africa, comparing very favourably with the OECD or EU-15 average about 6%; Only Korea scores higher at 21%.

In general, however, South African higher education sector is poorly connected to the business sector and the government (FSRC, 2010), but progress is being made in this domain.

The Free State universities have a growing record of co-operation agreements but mainly with the big business sector which is located and/or controlled outside of the Free State. The University of the Free State for example, is currently engaged with many large industrial partners and notably multinational companies through the Technology and Human Resources for Industry Programme (THRIP). Between 2004 and 2008, it has been involved within this framework with 12 firms including ARM Gold, Pharmov-Parexel, Southern Sun, Telkom or Xstrata. Only half of the university's industry partners were local and regional firms based in Bloemfontein, Welkom and Kroonstad.

The University of the Free State has also received third stream funding from some prominent South African and international companies. These include global energy company Sasol, and BioPAD, a South African biotechnology company that brokers partnerships between researchers, entrepreneurs, business, government and other stakeholders. In the case of Sasol, the co-operation has involved the secondment of a researcher of the company and the funding of specific equipment. The project with BioPad (ZAR 13.7 million in 2007), one of the largest contracts of the University of the Free State led to the establishment of a platform for metagenomics and the engagement of industrial and academic collaborators from US universities (Princeton and Tennessee Universities), the Oak Ridge lab, BHP Billiton and MINTEK and South African mining companies Harmony, Gold Fields and AngloGold Ashanti.

Collaboration also takes the form of internships, notably with some industries in Bloemfontein. In general, however, internships have been more common with banks and local government services companies. In the Central University of Technology (CUT), within the framework of arrangements for work-integrated learning (WIL) students can complete their training at accredited labs and hospital, in the tourism industry or the IT sector depending on their faculties. So far, this practice does not seem to have pervaded the engineering and material sector, mainly due to the recognised difficulty in finding placements for students. Only 15% of

students of Central University of Technology are involved in some type of work-based learning (see also Chapter 2). Encouraging steps have been taken recently to include WIL in all CUT qualifications in 2010, 3 293 students were engaged in WIL for six months (3 020 in early 2011).

International examples of work-based learning include the University of Waterloo in Canada that has the largest co-operative education in the work with over 1 000 students and 3 00 employers involved in the programme. The key obstacle to the success of the co-op programme has been the cost of finding and maintaining the placement positions for the student body. The university has invested a considerable amount of its own resources in financing and managing the programme. Today, it benefits from the high reputation that both the programme and the university's students enjoy, which makes it easier to find firms willing to take the students on work placement. Investment of resources in this type of programme can pay dividends to the local economy over a long period of time.

Box 3.9. The Co-op Education at the University of Waterloo, Canada

The Waterloo Region in Ontario, located about 100 km west of Toronto, has a rich local labour pool largely as a result of a strategic decision made at the inception of the University of Waterloo. The founding document for this university in the 1950s (the Waterloo Plan), called for a new type of education to be offered on a co-operative basis with industry. The rotation of students to industry and back to the classroom has strengthened the university's relations with local industry.

Extensive co-op programme offerings are available in all faculties and departments and in over 100 different programmes. Many local and global firms have strong links with the co-op programme. For example, Sybase, an enterprise software company has over 250 employees in its Waterloo campus alone, and 15% of its current employees are Waterloo co-op students, and more than half of their Waterloo staff is former co-op students.

The co-op programme brings a number of benefits to the local economy: *i)* it acts as a steady source of new hires, because firms know that the students have work experience, and they get an opportunity to evaluate their performance in the work place before hiring them; *ii)* students transfer tacit knowledge and know-how; they also act as a critical source of knowledge circulation within the local high-technology cluster, transferring knowledge between different firms as they undertake different placements over the course of their integrated work-study programme and *iii) t*he relationship between the university and local industry allows the curriculum to keep up-to-date with the changing technological frontiers of industry while industry support of the programme funds the acquisition of technology to enhance classroom learning.

Box 3.9. The Co-op Education at the University of Waterloo, Canada (continued)

The University of Waterloo has also developed an Enterprise co-op programme that enables students to start their own venture, instead of co-op placement with an established firm, and focuses on creating a local network of contacts and mentors to support the new venture.

Source: OECD (2010f), *Entrepreneurship, SMEs and Local Development in Andalusia, Spain*, OECD Publishing.

Mobilising universities for entrepreneurship

South Africa and the Free State has a low rate of business innovation, which suggests that finding ways to increase entrepreneurship could be an effective strategy for job creation in the province. The Global Entrepreneurship Monitor's South African Report (2006) compiled by the Centre for Innovation and Entrepreneurship at the University of Cape Town shows that South Africa's total entrepreneurial activity rate is 50% lower than that of almost 40 developed and developing countries that participated in the Global Entrepreneurship Monitor (GEM). The GEM also found that people aged between 25 to 44 years were more involved in entrepreneurial activities but people with low education level were less likely to perceive themselves as entrepreneurs. (See Dr Van Zyl, Unit for Entrepreneurship, UE brochure, UFS)

Both universities in the Free State have embarked on building up entrepreneurship teaching modules, with the Central University of Technology demonstrating stronger initiatives based on its mission to serve the world of work. In the Central University of Technology, all learning programmes in the Faculty of Management Sciences include entrepreneurship as part of the curriculum. The Central University of Technology has also launched a comprehensive STEPS (Strategic Transformation of Educational Programmes and Structures) process. One of the aims is to include entrepreneurship in all learning programmes. Another aim is to introduce formal inter-faculty learning programmes where entrepreneurship will be one of the major modules. Students have exposure to the practical application of entrepreneurship while they are undergoing work integrated learning (WIL). The university is also part of SIFE (Students in Free Enterprise). The principle behind SIFE is that students receive practical training in entrepreneurship from external facilitators which they, in return, use in supporting entrepreneurship in the community.

The Central University of Technology has also a number of new entrepreneurship projects in the pipeline. Its flagship programme is to create an African Entrepreneurship Centre aimed at enhancing entrepreneurial skills of ordinary people who do not have high level of education. The goal would be threefold: *i)* to foster and develop African entrepreneurship, *ii)* to establish a training concept and centre to be emulated throughout Africa in order to develop African success stories, *iii)* to contribute to socio-economic development and employment. USD 500 000 seed money will be invested in the programme that aims to nurture self-driven entrepreneurs. The Central University of Technology also plans to establish an Entrepreneurial Hub at the Welkom campus in 2011. The main aim of this hub will be to facilitate practical entrepreneurial exposure for students.

In the University of the Free State entrepreneurship training is a relatively new development. Accredited training is now offered through 80-hour or 160-hour courses (NQF level 5) by the Unit for Entrepreneurship of the Faculty of Economic and Management Science[8]. Shorter and more applicable training sessions are also possible (two to five day courses). While there is a growing recognition of the need to address the high rate of unemployment and the lack of job creation of the maturing economy of the Free State and to reach all groups of the population, the unit has not yet accumulated long experience. It has small budgets but generates some income through the co-ordination of different outsourced activities (prepaid education, training of entrepreneurs, business plans services etc.).

The development of sustainable businesses is another important aspect of creating new ventures in the Free State. In both universities only a few post training services are provided as part of the support programme for new venture creations. The following long-term programmes (Box 3.9) in the Netherlands could inspire new efforts to rationalise the initiatives and enhance their synergies. In addition various approaches to entrepreneurship education are listed in Annex 3.3, which also highlights the main challenges in the implementation.

Box 3.10. Minor in Entrepreneurship at the University of Twente

The University of Twente in the Netherlands has, for a quarter of a century, styled itself as an "entrepreneurial university". The University was established in 1961 to support industrial conversion of the textiles industry, but its steady decline in the face of overseas competition undermined the rationale behind the university and its long-term sustainability At the time, the rector of the university was Harry van den Kroonenburgh, an energy researcher who had experimented in entrepreneurship, and who encouraged his masters students to turn their thesis research into commercial activities. Van den Kroonenburgh's philosophy was that an entrepreneurial university was entrepreneurial at every level and that students, staff and services all had to be oriented towards promoting entrepreneurship.

In the 1980s and early 1990s, the emphasis lay on providing all graduates of the university with the opportunity to pursue entrepreneurial trajectories. The Temporary Entrepreneurs Scheme (the international standard for innovation process management) – TOP was established. TOP continues to this day to produce graduates with business ideas with micro-finance, business mentoring, research advice and workspace. TOP has successfully produced around 20 companies per year from the university alumni and has moved between a variety of different funding regimes closely aligned to the institutional mission.

From the turn of the century, the focus has been on exposing as many students as possible to the ideas of entrepreneurship and providing them with the tools to establish their own business. To that end, the Minor in Entrepreneurship has been established as a means of encouraging entrepreneurship in the whole student base. In the course of this minor, students work with real company problems to identify how new products can be brought to the market and new business established. The course is open to students across the university's faculties, and provides access to the Masters in Enterprise and Innovation.

Source: OECD (2009), *OECD Reviews of Regional Innovation: Piedmont, Italy 2009*, OECD Reviews of Regional Innovation, OECD Publishing.

Conclusions and recommendations

In the Free State, underachievement in innovation is caused by a number of reasons. Firstly, the regional economy is fragmented with heterogeneous innovation structures concentrated in a limited number of urban centres such as Bloemfontein, Sasolburg or Welkom. Secondly, the Free State has unfavourable framework conditions such as high unemployment and specific skills shortages. Innovation infrastructure remains underdeveloped and public R&D is mainly performed in the higher education sector. The

economy is underperforming with the productivity rate below national average. Thirdly, training in science, engineering and technology is relatively low (one quarter of graduates) while the increasing shortage of school teachers has a negative effect on the transition of students from secondary to higher education and training, and increases the dropout rate at universities. Fourth, there are widening gaps between poor rural areas and the main urban centres.

The Free State has also a number of strengths and comparative advantages in research to build on. It is well placed on several sophisticated R&D niches such as water management, new technology for crop, nanotech and advanced molecular research and furthermore, endowed with some cutting-edge costly equipment (*e.g.* the University Free State exploits an equipment worth ZAR 23 million in physics research). Flagship centres includes the Centre for Health System that focuses on HIV-AIDS (see Chapter 4) and the Centre for Disaster Management in the University of the Free State.

At the same time, the development of educational attainment levels is a cause of serious concern. While in South Africa as a whole the level of education attainment has been slightly increasing among the 25-29 years old, in the Free State it has been continuously decreasing (since the late 1990s)[9]. The Free State higher education participation rate remains very low, while retention rates show only slight improvement. In that context it is crucial to strengthen the regional innovation capacity, increase the region's competitiveness and capabilities to generate jobs and skills, and consolidate the R&D policies initiated at central and regional levels.

The OECD review team recommends that the following measures are taken to improve innovation outcomes in the Free State:

Recommendations for the national level

- Enhance the regional contribution of higher education and training institutions. Given the financial constraints, it is important to build on existing strengths and align research programmes with regional priorities to ensure future sustainability.
- Strengthen the Regional Innovation Systems by launching new initiatives at the national and local to help universities forge stronger links with the business sector. First, policy measures should be taken to improve university services to firms and to develop communication policies about research results. Second, an incentive system should be established to favour the development of contract research. Voucher

systems (such as those operating in Netherlands or Italy) could be a way to link small and medium-sized enterprises and the R&D units in the universities. Third, public grants to research programmes should be extended to priority sectors.

- In collaborative research, research awards and research collaboration, move away from direct allocations to competitive mechanisms in order to enhance outcomes and to increase overall productivity.

- To upgrade existing industry and to improve graduate retention, consider establishing specific people-based mobility programmes to link the students, graduates and post-graduates with the local business and industry in a more systematic way. Models for linking postgraduate students with the local industry include the Knowledge Transfer Partnership Scheme in the United Kingdom that has improved the competitiveness of the companies through introduction of innovation or new technology and helped retain 75% of the postgraduate associates which participate in the projects.

- Provide opportunities for provincial governments to build innovation programmes involving the higher education sector and in particular to support these programmes in collaboration with neighbouring provinces. In South Africa, provinces have limited margin of manoeuvre and resources. In the case of the Free State, an overwhelming share of funds comes from the central government and is earmarked to national priorities, whereas only 3% i.e. ZAR 600 million go to regional development promotion. At the same time, The Free State Provincial Government is endowed with a growth and development strategy and the capacity to co-ordinate initiatives at regional level and agencies and state-owned corporations (e.g. the Free State Development Corporation to attract investment and the industrial and small enterprise development corporations to assist the business sector) have been established to translate the provincial strategy into action and to conduct the innovation policy. There is a need to link academia with state agencies, public corporations and special purpose vehicles in order to take advantage of the social capital in the regions and focus on collaboration in science, technology and innovation. University faculty could also participate on the board of agencies and public corporations and assist in soft co-ordination and evaluation of their activities in close collaboration with the private sector. The Free State would also benefit from joint efforts with neighbouring provinces to pool resources and to fund joint research programmes in areas of common interest. This would not only help to reach the critical mass in technological niches but would also encourage the international networking of universities.

- Enhance the co-operation between the universities at the local and regional level. Although industry co-operation seems central to the Central University of Technology's policy (business and industry are considered as primary partners for building strategic partnerships for broader societal development) as well as the University of the Free State policy (cluster initiative), there is very little evidence of research collaboration between the two universities which have embarked on numerous overlapping research areas. For example, the Central University of Technology has strengths in applied food science and biotechnology and nearly half of University of the Free State's research output is in natural and agricultural science. Moreover, there are few interactions between the University of the Free State and the SMMEs sector. Forming a consortium with the Central University of Technology would help the University of the Free State to take advantage of the CUT experience. The Regional Innovation Centre (RIC) offers an opportunity to depart from the legacy of the past and to overcome the traditional barriers to co-operation. While incentives could come from R&D national funding agencies such as the Technology Innovation Agency or the National Research Foundation, the provincial government would be best placed to act as a mediator. It is necessary to change the *status quo* in order to better harness the research assets of the two institutions.

- Promote a research culture within universities and increase universities' R&D. The expansion of innovative activities throughout the South African economy requires considerable expansion of university research in order to provide the necessary research capable human resources at all levels of qualifications. This is particularly important in the Free State where the government and science council spending in R&D is relatively low (12% of provincial R&D, compared to 20% for the whole country). At the same time, the researcher population is ageing and mainly composed of white males, calling for more racially balanced replacement cohorts. Greater efforts are needed to make research activities more attractive, to reduce dropout rates and to encourage student intake of the most comprehensive curricula. The restructuring of R&D programmes along those lines imply a new funding approach with two focuses: concentration of funds and innovative project selection. Firstly, it is important that the central government and its agencies channel sufficient research money to university R&D programmes and avoid stretching resources too thinly over too many priorities. So far, among the 93 research niche areas identified by the National Research Fund, the region has accessed 12 and received ZAR 15 million. On average, this is about ZAR 1.25 million or EUR 125 000 per niche,

which is a relatively low figure. Secondly, the focus should increasingly be on interdisciplinary R&D and the co-operation between art and design, and science, engineering and technology, or between health and environment and agriculture.

Recommendations for the sub-national (provincial) level

- Encourage more systematic and institutional collaboration between universities and FET-colleges, and local firms. This collaboration should focus on areas where the Free State has a real or potential comparative advantage, rather than on a narrow sector specialisation. Technologies with cross-sector fertilisation potential should be promoted. Universities should work to ensure that local firms are aware of the benefits of hiring graduates.

Recommendations for institutions

- Focus concerted university efforts on challenge-driven innovation on the key issues in the region, such as water, health and poverty reduction, and use the region as a "laboratory" for research, knowledge transfer and outreach to reach global levels of excellence. Job creation should be seen as the goal of innovation activities. Combining community outreach into training and challenge-driven research can generate improvements in life quality and low tech innovations.

- Broaden the understanding of knowledge transfer, knowledge utilisation and exploitation and place less emphasis on immediate and direct financial return to the university. By focusing on how the university research can support jobs, industry productivity and innovation in the region, the university technology transfer offices could move towards a system that is based on continuous collaboration with industry, government and other partners. Interventions with low revenue potential but high potential to yield societal returns in order to build support among broader segments within universities and within non-profit sectors in the region.

- Widen the innovation focus to low tech sectors and to organisational and social innovation, and align with regional priorities. The further education and training sector has an important role to play because it trains the technicians and middle management officers that are important to nurture the incremental innovation of a number of locally based industries. These industries – retail, transport and logistics, tourism, distribution – underpin the growth dynamics of the province. It

is important to enhance the synergies between this sector and the universities, particularly the Central University of Technology, that provides part of the teaching staff for the further education and training colleges. Improving the information base about private FET sector is also necessary if the efficiency of the catch up strategy is to be improved.

- Strengthen and clearly articulate a demand-oriented technology transfer strategy in both universities. In its 2005-10 R&D Plan, the Central University of Technology has taken steps to cluster together academic research leading to qualifications, research outputs and commercialisation of R&D. Although the research cycle concept has merits, care needs to be taken not to overemphasise the technology push approach which involves risk of maladjustment to demand and may reduce the chances of success of R&D commercialisation. Bottom-up demand can be promoted through intermediary organisations such as CRPM or Fablab in the Central University of Technology. These structures respond to service demand for testing, prototyping and technical assistance, and provide a good vehicle for innovation development, but would benefit for a stronger SMME customer base that would enhance the university's brokerage role. This would be facilitated if the technology transfer office could act as a forum for clusters and local firms and be an intermediary in building supply chain. More attention should be devoted to the incubation process which in both universities is generating few firms. Recourse to coaching and mentoring initiatives could be implemented to trigger off more significant outflows of new firms. Finally, the technology transfer strategy in both the University of the Free State and the Central University of Technology need to be conceived in a long term perspective integrating entrepreneurship teaching for students and linking it with incubation activities.

- Align skills development and higher education and training with regional needs. Teaching and education play an important role in innovation. Governments often focus on R&D conducted by academia, the development of university spinoffs and HEI patenting, whereas there is too little emphasis on skills development. Because undergraduates and graduates are the primary source of innovation in the organisations they join, it is crucial to consider the broader significance of labour market processes for the technological and organisational dynamisms of regions. In the Free State, this is all the more important as the skill potential is limited and seemingly not significantly expanding. The Central University of Technology provides dedicated degrees and certification courses to suit the needs of the local and regional markets

as do most polytechnics and universities of applied sciences in the world. However, its yearly production of graduates is low: in 2010 only 198 Masters Degrees and 65 PhDs were awarded. While figures are ten times higher in the University of the Free State, a significant share of these graduates find jobs outside the Free State. The Central University of Technology has strengthened its co-operation with companies and engaged in placement arrangements but internships remain limited to a small number of sectors. These arrangements need to be expanded and organised on a more systematic basis. Both universities also need to build a strategic intelligence capacity in anticipating needs. The focus on regional engagement is fully compatible with both universities' focus on internationalisation. These two policies of regional and international engagement are in fact mutually reinforcing as a better understanding of labour market demand helps to identify the skills gaps and to focus international collaboration on foreign institutions supplying them.

Notes

1. According to the Council for Higher Education (CHE), the national enrolment rate of the 20-24 years old is estimated at 16% in 2007.
2. The faculties are economic and management sciences, education, health sciences, humanities, law, natural and agricultural sciences, theology.
3. See OECD Reviews of Higher Education in Regional and City Development: The Bio Bio Region, Chile or The State of Veracruz, Mexico, *www.oecd.org/edu/imhe/regionaldevelopment*.
4. In the fields of science technology and engineering, the University of the Free State employs 410 academics and researchers and the Central University of Technology 298 (2007 figures).
5. The Central University of Technology has established an Office of Community Engagement.
6. The Regional Innovation Centre's (RIC) mission was endorsed at the Free State Economic Summit on 20-21 May 2010.
7. Some of the more enterprising universities worldwide have addressed the weaknesses in commercialisation. For example, the University of North Carolina at Chapel Hill identified a number of factors hindering the start-

up of new firms, including: *i*) excessive demands for equity in Intellectual Property (IP), often exceeding 15%, *ii*) royalties being required to exceed cash flows, *iii*) the expectation of external financing and unpredictable or unreasonable licensing terms and *iv*) concerns that the process of launching a company involved competitive, rather than collaborative, negotiations between faculty and the university. In response to these challenges, the Carolina Express License Agreement was designed to reduce barriers to firm formation, addressing the issues of universities taking substantial equity position in start-ups and unhelpful royalty structures (PACEC, 2010).

8. It includes the following courses : *i)* Entrepreneurship development and how to start a business (80 hours), *ii)* how to manage your business (80 hours), *iii)* Marketing your product/service (160 hours), *iv)* Strategic management (160 hours), *v)* Financial management (80 hours), and *vi)* Project management (160 hours).

9. Educational attainment has increased among the 25-29 years old from 9.8% in 1999 to 10.2% in 2008. Corresponding figures for the Free State are 9.1% in 1999 and 6.9% in 2008.

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Annex 3.A1 Internationalisation in the Free State universities

Internationalisation elements	Level of development and implementation in leading countries and institutions	Situation in the Free State universities
International dimension in the institutional mission.	The international dimension is clearly defined as part of the institutional mission.	International dimension is included in the institutional missions.
Internationalisation policy.	Clearly defined and publicised.	The UFS policy is clearly defined and publicised. The CUT policy is in early stages of development.
Office of International Programmes (OIP).	Formal unit fully dedicated to support internationalisation. Adequately trained professional staff. Formal budget.	The UFS International Affairs (part of Directorate of Research) supports both research development and international student mobility. The CUT does not yet have an OIP.
Internationalisation of the curriculum.	Present in most of the academic programmes. Mechanism in place to include the international dimension when relevant in courses.	Only present in a few academic programmes. No formal mechanism established to include the international dimension in the review of the curriculum.
Outbound student mobility.	5-10 % of all domestic students participate in a study abroad programme.	Less than 0.5% of domestic students participate in a study abroad programme.
Inbound student mobility.	5-10 % of total enrolment composed of international students (including degree-seeking and exchange students).	7% of total enrolment composed of international students in higher education institutions in the Free State.
Full command of a second language.	All students must demonstrate full command of a second language.	UFS is a bilingual institution (Afrikaans and English); Optional fee-based courses offered to interested students.
International academic staff mobility.	In-bound and out-bound mobility of academic staff. Sabbatical programmes aimed at international experiences. Policies to attract foreign teaching academic staff.	Limited number of academic staff being supported for out-bound mobility. Small number of foreign academic staff in regular teaching activities. The UFS has introduced a strategy to recruit top academics.
Subjects being taught in a foreign language.	Availability of some regular subjects being taught in a foreign language.	In general, no regular courses being taught in a foreign language.
International partnerships for the development and offering of dual/joint/sandwich degrees	Offering of degrees in conjunction with selected international partners. Strict internal quality assurance policies and regulations aimed at guaranteeing similar quality to regular domestic offerings.	Some programmes offered in conjunction with international partners. No formal quality assurance policy.

Annex 3.A2. Examples of incubated innovation at the Central University of Technology (CUT)

Odyssey Software

Ettienne Smit studied Electronic Engineering at the CUT and received his Diploma in 1991. Shortly afterwards he decided to develop a battery-powered point of sale system. He started with the development of Odyssey Software in 1998 and his enterprise has since grown into a leading point-of-sale business. He joined the CUT Incubation Programme in the Science Park in 2001. Initially the Centre for Rapid Prototyping and Manufacturing (CRPM) assisted him with the development of components for the point of sale unit, whilst he and his team developed the necessary software. He employed some experiential training students to assist with some of the activities. In time he became too big for the incubation programme so he left the incubator in 2005. Odyssey Software received assistance in terms of office/workshop space, normal administrative office assistance and technical assistance from CRPM.

With over 18 years programming and retail experience, well-trained employees and innovative improvements in their products, the company provide corporate and general retail clients with sales and after sales service. Odyssey develops, sells and supports point-of-sale products (POS) both nationally and internationally. The company focuses on the point-of-sale, network support and maintenance service industry.

Odyssey now sells a wide range of scanners, label printers, slip/receipt printers, cash drawers, touch screens and various other POS related products. Due to the high demand for stock control in shop security, Odyssey also stock a wide range of CCTV and access control products. Fully integrated into their POS software, clients can now search for transactions on their CCTV recordings.

Odyssey Software has its head office in Bloemfontein and more that 18 branches – three of which is owned by Smith. Thirty staff members are working in these three offices. With over 9 000 packages sold nationwide in

small to medium-sized businesses, Odyssey has proven itself to be competitive and is now one of the largest suppliers of point-of-sale software in South Africa with a turnover per year of between ZAR 11 and ZAR 12 million.

Paracam Computers

John Antunes studied Mechanical Engineering at the CUT. He completed his B Tech: Mechanical Engineering in 2002. During his studies he was employed as a student in the Centre for Rapid Prototyping and Manufacturing (CRPM). He joined the CUT Incubation Programme at the end of 2003 and started an enterprise named Paracam Computers, with focus on IT support, and computer service and maintenance. He also sold hardware, whilst also hosting websites, providing internet services, carrying out network installations and supplying and install CCTV camera systems.

He left the incubation programme in 2007 and opened an office in Bloemfontein. The support he received from CUT was in the form of subsidised office space, access to office facilities, general office assistance and most importantly professional and technical training and advice support. The support he valued most was the technological advice and assistance he received from the Science Park personnel.

Paracam Computers has since changed its name and is now known as Iclix. It has recently opened an office in Kimberley – that will serve the Northern Cape – and is in the process of signing the contracts for another branch in the Eastern Cape. Iclix employs 14 people and has a turnover of about ZAR 5 million.

Annex 3.A3. Types of entrepreneurship teaching

Type of approach	Main activities	Challenges
Classroom lectures	Lectures on themes such as market analysis, venture creation, new product development, project management, financing, strategy development, etc.	Classroom lectures need to be combined with more experiential approaches to learning. Theory needs to be combined with practice. Lectures must be made relevant to real-world entrepreneurship problems.
Business plans	Preparing business plans individually or in teams. Competitions and prizes for the best business plans.	Business plans must be made realistic. Ways are required to test business plans against market conditions and potential shocks. Teaching must also look at turning business plan ideas into real practice.
Case studies	Presentations and discussions of real company/entrepreneur experiences of business creation, growth, adaptation and failure.	Significant resources are required to develop case studies. Case studies must focus on problems potential entrepreneurs will actually face.
Entrepreneurs as guest speakers	Entrepreneurs invited to present their experiences in lectures and discussions, in the classroom or in their enterprise.	HEIs must find ways of attracting entrepreneurs to teaching programmes. They must also support entrepreneurs in their teaching practice, notably in drawing out the learning from their experiences.
Student business start-ups	Students start real or virtual businesses individually or in teams.	Funds will be required to create start-ups and to develop virtual firm technologies. Rules must be established for sharing rewards from successful starts.
Business games	Computer-simulated or other business games.	The requirements for developing or purchasing the technology should not be underestimated. Efforts are needed to integrate games with other teaching. Teachers need training to provide a framework for learning from the games.
Placements with small firms	Short-term assignments with small firms to assist with business development projects such as market or technology development.	Firms must be found to provide good quality placements. University staff must support the student during the placement.
Student entrepreneur clubs and networks	Student societies and networks to discuss entrepreneurship issues, create entrepreneurial teams, obtain mutual support and increase confidence.	Nurturing is required to make networks successful. Activities must be found to animate the networks. Networks should be expanded to include experienced entrepreneurs, investors, consultants, etc.

Annex 3.A3. Types of entrepreneurship teaching (continued)

Feasibility studies	Exploring the feasibility of business ideas with environmental scans, market potential investigations, competitor analysis, etc.	It can be difficult to assess how well feasibility studies have been undertaken compared with real conditions on the ground.
Communication training	Presentation techniques, interpersonal communication.	Communication skills need to be developed under pressured and real-world conditions.
Consulting for SMEs	Student participation in consulting projects for new and small firms with the support of university staff.	It is necessary to find suitable companies and consulting opportunities. Although academics will often be expected to lead, ways must be found of involving students in the projects.
Support for graduate student start-ups following the course	Seed money, mentoring, incubation, consultancy, etc.	Sufficient funds must be generated for the support. Decisions must be made about the right amount and duration of support. Where possible links should be made with existing support providers outside of the HEI.
University-wide entrepreneurship education	Spreading entrepreneurship teaching out to faculties beyond the business school.	The right balance must be found in a trade-off between the benefits of proximity and tailoring to subject specificities through separate courses for each department and the benefits of economies of scale and greater experience through centralised and inter-disciplinary courses.
Specialist entrepreneurship degrees	Undergraduate or post-graduate degrees majoring in entrepreneurship.	It can be difficult to obtain academic rigour from purely entrepreneurship degrees. It can also be difficult to attract students to these degrees. Practical entrepreneurship outcomes are not guaranteed.
Distance education programmes	Use of electronic media including web-based programmes, interactive DVDs and electronic discussion groups.	Student learning rhythm must be maintained and student isolation avoided.
External partnerships	Creation of entrepreneurship centres with financial support from business and public agencies. Advisory boards with external experts.	It is necessary to maintain academic rigour and HEI independence whilst adapting to the concerns of other stakeholders.
Courses for entrepreneurship teachers	Courses for prospective teachers of entrepreneurship to understand the entrepreneur's environment and behaviour and to develop their teaching approaches.	Ways are required to develop insights on the world of the entrepreneur for teachers who have no entrepreneurship experience and to develop teaching abilities in existing or former entrepreneurs.

Source: Potter, J. (ed.) (2008), *Entrepreneurship and Tertiary education*, OECD Publishing.

Chapter 4.

Building capacity for regional development

The extent to which universities and other higher education institutions engage in regional human resource and skills development and innovation depends greatly on the policy context and the incentives that are in place to encourage such collaboration. It also depends on the willingness and capacity of the higher education institutions, particularly in the top leadership and management, as well as the competencies vested in the regional and local governments.

This chapter examines the current regional development and higher education and training policies in South Africa and their impact in the Free State. It highlights where and how these policies and current practices of collaboration and capacity building could be improved to enhance regional engagement of universities. Drawing from examples in the OECD countries and beyond, the chapter concludes with recommendations for national, regional and institutional policy.

The key message is that if South Africa wants to mobilise its universities for regional and local development, higher education and training policy and funding mechanisms need to support this goal. Closer collaboration should be enhanced between the universities, and between the universities and the provincial and local governments, while educational provision and innovation activities should be aligned more strongly with the regional needs and challenges. Finally, greater decentralisation could unleash the potential of the diverse regions in South Africa.

Introduction

A tertiary education "system" that contributes to the economic, social, cultural and environmental well-being of its region consists of a set of universities and education institutions that have a clearly articulated relationship with one another and contribute actively in different ways to various facets of regional development. Developing and maintaining such a system requires: *i)* a clear articulation of the demand side by the regional government and other stakeholders in the public and private sector as well as mechanisms to guide institutional behaviour; *ii)* mechanisms and incentives to facilitate collaboration between higher education institutions to address local needs and opportunities; *iii)* structures and incentives within individual universities and other tertiary education institutions to mobilise the research and teaching of individual academics to support regional development; and *iv)* actual teaching and research delivered by individual academics, as well as support from university leaders and administrators, that contribute to business and the regional community. These four dimensions – the demand by the regional stakeholders, the higher education collaboration, the capacity within an individual university and people – are inter-related and should support one another.

Currently, South African policies have a lack of incentives for and articulation of demand for universities' regional engagement, and the governments at sub-national (provincial) and local levels remain weak. While South Africa has made progress in developing place-based policies, the regional policy and regional economic agenda remain largely defined and implemented in a top-down fashion, leaving limited leeway for regional initiative and capacity building. The most notable regional policy instrument is the National Spatial Development Perspective (NSDP), which was drawn up in 2003 as an initiative from the Presidency. While it requires provincial governments to define and implement Provincial Growth and Development Strategies that follow the priorities and guidelines of the NSDP, no special national funding has been set aside for these strategies. Furthermore, universities and further education and training colleges do not have a clear role in the development and implementations for these strategies. Other policies, such as the science and technology policy, have a focus of supporting the development of the current growth centres in the country, while higher education policy appears to lack a regional dimension.

Furthermore, the Free State is faced with special constraints stemming from to the province's "organisational thinness", which usually characterises peripheral regions. Tödtling and Trippl (2005) have identified peripheral

regions as less innovative in comparison to more agglomerated regions. The per capita GDP of the Free State ranks somewhat lower than most provinces and the provincial contribution to national GDP has regularly declined over the past 50 years in relative terms. There is a lack of dynamic clusters, support organisations and strong institutions promoting entrepreneurship and innovation. Networks are weakly developed. The low level of R&D reduces the internal innovation activity in the region and leads to a low absorptive capacity of the local firms. As a consequence, local firms – especially SMEs – have difficulties in accessing knowledge inside universities in the region and knowledge outside of the region, which they need for technological upgrading and diffusing such knowledge. Technology transfer offices and organisations have been set up by universities, but they are often not effective due to the lack of absorptive capacity in the regional economy and disconnect between the institutions. The knowledge does not reach the SME, or it does not meet their demand well enough, due to being too sophisticated to support incremental and process innovations.

In order to unleash the potential of its diverse regions and higher education and training institutions, South Africa could consider launching stronger regional development strategies and embedding regional engagement in higher education policy. Moving toward stronger place-based policies would require capacity – skills and resources – at provincial and local governments as well as the universities and further education and training colleges in order to strengthen the regional framework and the higher education sector's capacity to become active players in the discussion, planning and co-ordination of regional development policies.

In the context of a spatial development that is largely centrally defined and implemented, organisational and institutional thinness, and a lack of capacity and clear regional mission for universities, this chapter examines the following questions:

- Does the Free State Provincial Government have the capacity to steer the higher education and training system to meet the needs of the region and does it have a clear strategy for the development of higher education?
- Do the current policies, structures and mechanisms support and incentivise regional and civic engagement of universities in the Free State?
- Are the existing co-ordination, governance and financing mechanisms effective and do they help institutions to play their regional role?
- What lessons can be learnt from the international experience?

4.1 Regional development in South Africa: NSDP

The role of regions in enhancing national economic growth has been relatively absent from South Africa's economic strategies, which have focused on the country's unity and macroeconomic stability. Regional development and particularly the role of urban regions remain controversial also due to the apartheid, which was essentially a race-based spatial strategy (see also Chapter 1). In the post-apartheid period, the challenge has been to create new spatial opportunities, while removing past inequities.[1]

At the same time, the sub-national (provincial) governance levels in South Africa remain today relatively weak. While the creation of provinces in 1994 was a concession to calls for autonomy of regions, in practice, provinces were given minimal powers and limited autonomy. (OECD, 2008a)

As many other countries in the OECD area and beyond (see Box 5.1), South Africa has made a gradual shift towards the implementation place-based economic development policies, particularly through the National Spatial Development Perspective (NSDP). This strategy, first discussed in 1996 and released in 2003 as an initiative from the Presidency (and revised in 2006), identifies regions as reservoirs of growth and the main target for the implementation of poverty reduction programmes. NSDP requires regional governments to define and implement Provincial Growth and Development Strategies that follow the priorities and guidelines of the National Spatial Development Perspective (NSDP).[2] All nine provinces in South Africa have elaborated such strategies covering the period 2005-14. The NSDP aims to: *i*) provide a framework to discuss future development of the "space economy" with the help of a review of sub-national (provincial) levels in terms of deprivation, resource potential, infrastructure, economic activity and trends; *ii*) act as a common reference point for national, provincial and local governments to analyse the local development potential to optimise resource allocation; *iii*) identify key areas of tension and/or priority so as to optimise spatial outcomes with public infrastructure investment and development spending; and *iv*) provide a strategic response for the national government to pick up the challenges identified.

Box 4.1. Move towards place-based policies

Throughout the OECD area there is a general trend of comprehensive regional policies that help generate endogenous growth and development in regions. There is growing evidence of a shift in the regional policy "paradigm": while in the past, regional policy was used to absorb "shocks" caused by rural decline and industrial restructuring or to support regional economies that were lagging or had failed to modernise, today regional policy is focused on developing regional potential for competitiveness.

Common features of the new approach include the following: *i*) focus is on growth-oriented activities, such as innovation, education and employment, in order to strengthen regional competitiveness; *ii*) policies are context-specific, based on the region's particular strengths and challenges; *iii*) comprehensive regional economic strategies are used instead of national sectoral instruments, while the different aspects that affect the development of a region are considered in an integrated way; and *iv*), national, regional and local actors co-operate in the policy process.

Source: OECD (2009), *OECD Territorial Reviews: Chile*, OECD Publishing.

The NSDP principles have implications at the provincial level with focus on actual and potential growth centres. In particular, government spending on fixed investment, other than the constitutional obligation to provide basic services to all citizens (health and education, water and electricity), should be focused on localities of economic growth and/or potential in order to attract private sector investment, stimulate sustainable economic activities and/or create long term economic opportunities.

At the same time, however, efforts to redress past and present social inequalities focus on people, rather than places. Social transfers and human resource development efforts are therefore directed to households or individuals regardless of place of residence. The aim is therefore to encourage people to become more mobile and migrate to localities that provide sustainable employment or economic opportunities.

According to the NSDP's Provincial Growth and Development Strategy Guidelines, the potential in the province (identified at district and local levels) is defined on the basis of six criteria (The Presidency, 2005): *i)* innovation capacity (R&D levels, percentages of graduates in scientific or technical fields); *ii*) aptitude for the production of high value differentiated goods (GVA in growth sectors); *iii*) aptitude for delivery of labour intensive

mass produced goods (primary & secondary sectors); *iv*) public services and administration (human resources capacity, efficiency, municipal debt); *v*) retail and services (GVA and employment in retail and finance); and *vi*) tourism (number of establishments in sector, employment and GVA of sub-sector).

While no special national funding is set aside for the provincial growth and development strategies,[3] a concerted effort between provinces and national departments is deployed through the government's strategic planning cycle. For example, in the Free State, during the annual exercise between July and September, the province, through the Premier's Coordinating Council, receives and approves municipal priorities as spelt out in their respective Integrated Development Plans (IDPs) within the broader framework of the strategies. This process aims to ensure that local priorities are taken into account when departments prepare their budget allocations for the following year. Social partners and stakeholders (private sector, state firms and universities) are to be informed of the strategic priorities. Annual meetings aim to ensure further alignment to meet the strategic targets and to gain feedback concerning progress made.

The Free State Growth and Development Strategy

The Free State Growth and Development Strategy for 2005-14 is a step towards targeted social development for individuals and households, and economic growth based on local area assets. The strategy identifies both weaknesses and strengths of the province and disparities in development between district/local municipalities. It establishes development objectives for 2014 (economic growth rate of 6-7% per year, reduction of unemployment to 15%),[4] and sets up formal procedures under the responsibility of the Premier of the province to follow implementation and ensure co-ordination. (Free State Provincial Government, 2005)

Bringing together development potential and development needs in education, health, fight against poverty and basic infrastructure, three local/district municipalities emerge as priorities in the Free State Growth and Development Strategy: *i*) Mangaung (Motheo district) with high development potential and high development needs; *ii*) Metsimaholo (Fezile Dabi district) with high development potential but below average development needs; and *iii*) Matjhabeng (Lejweleputswa district) with above average development potential and high development needs. All other localities/districts have below average development potential but high development needs (Maluti a Phofung in Thabo Mafutsanyana) or above average development needs (Moqhaka in Fezile Dabi) or even limited development potential (most of the remaining ones). [5]

The Free State Growth and Development Strategy has also established sector-based priorities with a specific focus on areas with high or above average development potential. In the primary sector, the "nursing" of mining is to continue, and diversification of agriculture (fruit and vegetables, organic food) is to be pursued, since agriculture still has a relatively high labour absorption capacity. In the manufacturing sector, more emphasis will be put on a knowledge-based economy (electronics, ICTs and petro-chemicals), while adding value to agricultural production (agri-food businesses). In the services sector, the tourism potential of certain areas (leisure and business) will be developed.

Moving forward towards inclusive regional development agenda

Despite the focus on sector-based development, on the basis of the six criteria of the National Spatial Development Perspective (NSDP), the Free State features a limited development potential in the South African context. The province lacks a series of collective and public goods that would facilitate a more inclusive regional development, minimise social and spatial exclusion, and maximise economic linkages and value chains. The scale of economic exclusion constrains the distribution of economic growth both regionally and across social groups, and reduces the potential of economic drivers. The fruits of economic growth do not benefit socially and economically marginalised groups while economic growth remains constrained.

Economically more inclusive system would need to take into account the pattern of development in the province with pockets of growth and hardship in order to develop new economic activities in deprived areas such as former townships, and increase the interactivity between multiple sectors. This would have a positive impact on economic competitiveness through a combination of three factors: *i*) international competitiveness depends on cost-based and quality-based advantages that draw on skills, know-how and social participation; *ii*) social inclusion reduces the cost of welfare and the risks associated with crime, corruption and social breakdown; and *iii*) building social capabilities through the development of townships, informal areas and among the socially marginalised, unlocks future economic potential through small-scale entrepreneurship, self-help and the social economy. (OECD, 2008a)

Universities role in the Free State Growth and Development Strategy

The overall development of National Spatial Development Perspective (NSDP) does not make any space for regional roles for universities in promoting provincial growth and development strategies. There is no specific reference to the role of universities and further education and training colleges in helping to set and reach the regional development goals, except a yearly process of information exchange between provincial authorities and a number of stakeholders.

In the Free State, the university expertise (within the Centre for Development Support of the University of the Free State) was initially mobilised for the development of the regional growth and development strategy, but as institutions, the universities have played only a limited role in the development and implementation of this strategy.

International examples from OECD countries and beyond show that closer collaboration can benefit the region. This is not only case in countries with strong regional development agencies but also in countries where regional policies have been largely defined and implemented in a top down fashion. For example, the universities in the Bío Bío Region in Chile have been collectively involved in the development and the implementation of the regional strategic goals, and developing and implementing the *Bío Bío Educates and Innovates Programme for Improvement of Competitiveness.* In addition, universities have provided their intellectual capacity for the preparation of the regional development strategies, as the facilitating role of the Centre of Urban and Regional Studies of the University of Bío Bío shows (see Box 4.2.).

Box 4.2. UBB mobilising knowledge for regional development strategy

The Centre for Urban and Regional Studies (CEUR) of the University of Bío Bío is an interdisciplinary research centre that creates and disseminates knowledge on territorial issues. Founded in 1996 to demonstrate the university's commitment to regional development, while drawing from the experience from the Latin American and Caribbean Institute for Economic and Social Planning (ILPES/ECLAC), the centre has contributed to improving the knowledge base in the regional issues in the Bío Bío Region and also the quality of the regional decision-making process.

Box 4.2. UBB mobilising knowledge for regional development strategy (continued)

In 2008, the centre supported the Regional Government (GORE) in the creation of the Regional Development Strategy for 2008-15 (Estrategia Regional de Desarrollo, ERD). The centre provided active participation and support in collaboration with the German Organisation for International Cooperation (Deutsche Gesellschaft für Technische Zusammenarbeit, GTZ). The strategy process included more than 1 800 people who participated in workshops and interviews throughout the region. The strategy also drew from the initiatives by the Regional Agency for Innovation and Productive Development (ARIDP) and the Regional Council for Science and Technology (CORECYT).

The Centre for Urban and Regional Studies has also participated in a nation-wide study at the Bío Bío Region, which aimed to strengthen regional identities in 15 regions in Chile. The identical regional study was funded by the Under-Secretary for Regional Development of the Government of Chile (SUBDERE) and the Bío Bío Regional Government. The study identified key elements of the Bío Bío identity that need to be promoted to enhance the socio-cultural diversity in the region.

Source: OECD (2010), *Higher Education in Regional and City Development, Bío Bío Region*, OECD Publishing, www.oecd.org/dataoecd/50/5/46340678.pdf.

4.2 South Africa's HE context for building regional capacity

The legal and policy provisions for higher education under the apartheid government were primarily meant to create a system of "separate but equal" elements. The effect of this legal and policy framework was to create a higher education system that was highly fragmented and uncoordinated, fundamentally inequitable and effective only in terms of rigid categorisations imposed by the state.

After South Africa's first democratic elections in 1994, the National Department of Education embarked on the process of restructuring the higher education and training system. This was a challenging task due to the pattern of power struggles complicated by history and by state funding that led to enhanced competition. In 1994, the Office of the President established the National Commission on Higher Education, which two years later issued the report, *A Framework for Transformation* that identified three pillars for a transformative higher education system: *i)* increased participation; *ii)* greater responsiveness; and *iii)* increased co-operation and partnership. In the absence of an explicit regional dimension of higher education policy, these

three pillars continue to provide a framework that can be built on to develop a regional development agenda for partnership between universities and other higher education institutions and other stakeholders in the region for the advantage of the Free State.

Based on what was perceived as geographic dispersion, racial fragmentation, structural inefficiencies and institutional duplication within the system, policy makers and reformers concluded that the field of higher education during the Apartheid rule in South Africa was less of a system and more of a collection of different types of universities or other higher education institutions. This prompted the Department of Education after 2000 to restructure the higher education landscape through mergers and incorporations of institutions and programmes. The number of higher education institutions was reduced from 36 to 24 to establish research-intensive universities, universities of technology, comprehensive universities and two institutions of higher education. While the restructuring has been completed, the institutions are still working to determine what the restructuring means and how to deliver on their mission.

Before 1994, higher education funding was allocated in a fragmented, divisive and inequitable way for the different groups in the country, advantaging the Historical White Universities. From 1995-2003, public higher education in South Africa was financed by the government and its appointed agency, the National Student Financial Aid Scheme. Underlying principles of the funding framework for that period were based on shared costs, equity, and redress and development, whilst the allocation of funds to institutions were done through the South African Post Secondary Education, which was enrolment driven. In 2003, a New Funding Framework for Public Higher Education (NFF) was launched, signalling a move towards stronger central planning and steering of the higher education system.

The creation of the new Ministry of Higher Education and Training in November 2009 was a significant shift in responsibility and creates a unique opportunity. Formerly, the provincial governments administered the further education and training colleges along with school education; now FET colleges were moved directly under the ministry. The creation of the ministry provides an opportunity to develop a coherent, strategic and co-ordinated single post-school education and training system designed to meet the needs of learners and to ensure that education, training and skills development initiatives respond to the needs of the economy, rural development challenges and the need to develop an informed citizenry.

The role of the universities in regional development

In line with the national policies that identify three tasks for universities teaching, research and community engagement –universities in the Free State as well as students and staff engage in a wide array of collaborative efforts, including knowledge transfer and collaborative efforts with business and industry, community outreach and volunteering.[6] Examples of community engagement include student volunteerism, service learning, engagement with policy-makers, action research, provision of specialist skills and expertise to communities and doing other consulting work.

Some of these activities involve a regional dimension. For example, the Central University of Technology AHA Bakomoso project has been developed in partnership with the Free State provincial government. The project consists of three partnership projects, including the information technology Hub, the Saturday School Project, a human resources training programme and the Regional Innovation Centre. At the University of the Free State, which has won national recognition for its community engagement activities, the longest running community development programme is the Mangaung University of the Free State that has been facilitating development on the Mangaung Community through training programmes, service learning and community service projects.

In general, however, there is limited evidence of universities' regional engagement – as opposed to community engagement. Regional engagement encompasses research, and teaching and learning activities with potential regional (provincial) impact, whether economic or social, and seeks to reach out to all geographical areas of the region concerned. It is embedded within a strategy developed by the university in collaboration with the regional and local stakeholders. Such an approach clearly distinguishes it from mere community engagement that is geographically circumscribed, often *ad hoc*, on the basis of opportunities rather than organised with the goal of developing synergies. In a number of countries, in particular the Nordic countries (Finland, Norway) this so called "third task" is embedded in law and arduously pursued as tertiary education institutions, firms and regional government jointly find benefit in cross-cutting activities, often based on partnerships, that contribute to regional growth. Contrary to the perception in many academic and research circles that regional engagement is an obstacle to the pursuit of world class excellence, universities in these countries combine the two activities successfully[7].

In the Free State, community engagement is also pursued in teaching and research activities that are directly useful to the local society and economy of certain municipalities (Box 4.3.), but could be mobilised to benefit the whole province if regional linkages and applications were sought

ex ante by co-ordination between universities, further education and training colleges and provincial authorities. For example, research in agriculture and arid areas is carried out by the University of the Free State, apparently with greater benefit to many other regions than the Free State. Such impact is recognition of the quality of the research in these fields that is carried out at the initiative of the University of the Free State but it seems that the province itself could better tap into this potential, as well as that of Central University of Technology applied research.

Box 4.3. The Free State universities and regional development: some examples

The Unit for Entrepreneurship (UE) of the Faculty of Economy and Management Sciences of University of the Free State carries out different teaching and training activities for regional SMEs and provides advisory and financial support to young entrepreneurs in lagging areas where enterprise creation is scarce such as Qwaqwa but also Mangaung. This can have important long term impact by providing good examples of successful entrepreneurship albeit at a micro scale. Examples: jewellery made from copper wire, manufacturing school uniforms, grass weaving to producing Venetian blinds or traditional hats, handmade cards etc.

The Centre for Development Support (CDS) of the University of the Free State carries out extensive studies relating to both rural and urban areas (the economy, society), many of these dealing with low-cost housing issues at the request of municipalities such as Mangaung. Examples are studies such as "Socio-Economic indicators and trends for Botshabelo or "The economic linkages between Mangaung and Lesotho" etc. Many of these studies have an operational character, accomplished with explicit economic development aims defined by local municipalities, could also have impact on provincial strategies and outcomes but no robust data about how potential synergies were being developed was available.

Central University of Technology also carries out various activities with (potential) impact on the local economy and society. Entertaining close relationships with the business sector, particularly through its teaching and training activities, it also pursues applied research activities that are of direct interest to the Free State economy. For example, the Faculty of Engineering and Information Technology has developed within its laboratories different "low-tech" innovations that are quite relevant not only in the context of the Free State, but also other parts of the country or even the rest of Africa: simple low cost carts for street vendors, a plough conceived so as to save water for agriculture in dry and semi-arid areas. Identifying such opportunities and helping bring these types of innovations to market are within the scope of the recently restructured Free State Development Corporation.

Despite a large number of initiatives and projects, the work is often project-based, and/or driven by the action on the initiative of an individual or a department and without institutional commitment of support. To a larger extent the action remains supply-driven. Despite dedicated offices that are in charge of co-ordinating community engagement, the action also remains organic, unstructured and undermanaged, with no long-term strategy and sharing of good practice among the key actors. There is often limited evidence base and a lack of monitoring results, which makes it difficult to evaluate the outcomes.

The examples from the University of the Free State and the Central University of Technology (Box 4.3.) illustrate two major obstacles to better leveraging of the regional development potential of the two institutions: little co-operation between the provincial government and the universities; and practically non-existent co-operation between the two universities. The main reason for the lack of collaboration between the provincial government and universities is the fact that regional engagement of universities is not embedded in the Free State Growth and Development Strategy. The lack of collaboration between universities is partly the result of the competitive context for funding and for international recognition, combined with the weight of history. At the same time, there is a growing demand for co-operation in both universities at both faculty and department levels. There is also willingness to collaborate with the provincial government, which seems open to engage in a more regular and formal dialogue with the universities in support of regional engagement.

Another difficulty to overcome is the limited relationship between the business community and the universities and further education and training colleges. Except in the case of centres or departments devoted to entrepreneurship in the University of Free State or in Central University of Technology, the relationship appears sketchy and occasional, as illustrated by difficulties in organising work-based learning opportunities for students, or in promoting curricula and research better attuned to the needs of local businesses, since data on employment needs and opportunities is not readily available. This requires renewed efforts by all partners concerned: business organisations, universities and other education institutions but also provincial government.

4.3 Aligning of higher education with the regional engagement mission

The experience in the OECD countries indicates that it is a challenge for universities and other tertiary education institutions to be engaged with the

regions unless policies at the institutional and national levels are aligned with this objective. Without policies and corresponding incentives, universities and other tertiary education institutions are driven to satisfying their own self-interest. A basic question is whether policies that affect the higher education and training institutions in the Free State support them to play a regional role. Key policies relate to: *i*) quality assurance, particularly institutional accreditation, and review and approval of new academic programmes; *ii)* allocation of funding; and *iii*) criteria and processes for faculty in appointment, promotion, compensation and tenure.

Quality assurance

The South African Council on Higher Education is an independent statutory body that acts as the quality council for higher education, advising the Minister of Education on all higher education issues. It is responsible for quality assurance and promotion through the Higher Education Quality Committee (HEQC). The HEQC's three directorates are responsible for institutional audits of the three core functions of teaching and learning, research, and community engagement, re-accrediting existing programmes in specific disciplines and/or qualification areas and accrediting the learning programmes of public and private higher education institutions.

One way to foster regional development as universities' core activity is to develop a national accreditation system that involves a strand for outreach. This assesses the institutional policies and mechanisms that link the institutions with the local businesses and community and also aim at enhancing the academic and professional development of the staff, and fulfilling institutional goals. In South Africa, this approach has never been fully implemented. While the first cycle of quality assurance (2004-10) focused on three aspects in higher education institutional audits: teaching, research and community engagement,[8] in the second cycle, the intention is to focus solely on teaching and research functions.

The experience from OECD countries suggests that criteria emphasising regional engagement and responsiveness can be included in the programme review and approval and this approach has also been considered in South Africa. In the 1990s, South Africa's higher education policy documents referred to the "regional programme review process". According to the then Department of Education and Council on Higher Education, programme reviews and the consideration of new programmes by institutions would lead to: *i*) the rationalisation of programmes within the regions; *ii*) agreement on areas of specialisation for each institution; and/or *iii*) common and planned teaching platforms of articulated programme offerings providing a greater range of choice for students. These reviews were to include an overview of

regional needs, student supply and demand and also an outline of the similarities and differences in what was being offered in a particular region. The expected outcomes were: *i*) a regional consensus on the form of collaboration and rationalisation, including the areas of specialisations of each institution; *ii*) the rationalisation of programmes in cases where one or more institutions have limited enrolments; *iii*) the programmes to be planned, developed and delivered on the basis of common teaching platform, which could be located at a single site or spread over multiple sites; and *iv*) the programmes to be jointly developed, delivered and accredited by participating institutions and also steps to be taken to implement the proposals, including timeframe. No incentives or earmarked funding was provided to support the regional programme reviews, and the initiative failed within two years. (FSRSC, 2010)

In the Free State, a regional programme review committee was established at the top management level of the two universities to guide collaborative programme planning. In the absence of national level incentives and pressure to adhere to the regional programme review and the lack of capacity of the regional review committee to withstand institutional, faculty and departmental pressures against collaborate programmes and projects, the initiative failed and the regional programme review was ignored by the individual universities. (FSRSC, 2010)

Today, the programme review and approval process gives significantly more weight to national considerations than to the unique needs of the regions. If South Africa wishes to mobilise higher education institutions for regional and local development, regional criteria in the programme review and approval could include:

- Data documenting the specific gaps in access and opportunity for the population.
- Data documenting relevant regional labour market needs and potential future needs arising from regional economic development plans.
- Evidence of the engagement of regional stakeholders (employers, community representatives, provincial leadership) in programme planning and design.
- Emphasis on regional engagement and entrepreneurship (such as internship, community service, student research on regional issues) within the curricula and student experience.

Funding policy

Funding policy is the most influential policy tool that governments can use to affect the behaviour of tertiary education institutions and their faculty. South Africa's funding policy has gone through a number of changes. The so called *New Funding Framework for Public Higher Education* (NFF), launched in 2003, had two main elements: *i*) block grants, or undesignated amounts to cover the operational costs of higher education institutions linked to the provision of teaching and research-related services (87%); and *ii*) earmarked grants for specific purposes (13%), such as the National Student Financial Aid Scheme, which provides teaching, research and community development; interests and redemption payments of loans approved and guaranteed by the state; institutional restructuring; and the higher education quality assurance framework. (Steyn and de Villiers, 2007)

Block grants are based on student numbers and institutional graduate and research outputs and includes four sub-categories: *i*) teaching input grants (64.1% of total block grant for 2004/2005); *ii*) research output grants (13.1% of total block grant; *iii*) teaching output grants (16% of total block grant); and *iv)* institutional factor grants (6.7% of total block grant) including grants for disadvantaged students, grants related to the size of the institution and grants for multi-campus institutions. (Steyn and de Villiers, 2007)

While earmarked grants can support regional restructuring of higher education through mergers and to a lesser degree community development, in general, the funding mechanism does not provide incentives for regional engagement of higher education institutions or greater institutional differentiation. (For the review of the funding model, see OECD, 2008.)[9]

Experience in OECD countries shows that a variety of design mechanisms can be used to provide funding incentives for regional engagement of universities or other tertiary education institutions, for example:

- Formulae for block grant funding could include higher weights for enrolment of students from within the region, from special populations, or for enrolment in academic programmes related to regional needs.
- Polices governing tuition fees could allow for lower fees for students from region and policies for financial aid to students can provide higher amounts for in-region students and special populations.
- Eligibility for special funding could be contingent on evidence of regional engagement and focus.

- Eligibility for special funding could be made contingent on inter-institutional collaboration. This could provide incentives for universities and further education and training colleges to facilitate mobility of students (credit transfer within the region) and share programmes and resources in efforts to serve the region.
- Special funding could be provided to match funding obtained by universities and further education and training colleges from contracts with regional employers for education and training services.

The Regional Stewardship Initiative of the Commonwealth of Kentucky in the United States illustrates a comprehensive strategy to provide incentives for universities and other tertiary education institutions to support regional engagement (see Box 4.4.) Even if the conditions are different, an application of this approach in the Free State could be through the establishment of a special regional investment fund (funded from public and private resources) to provide funding for building capacity within universities and further education and training colleges for regional engagement. It could also provide incentive funds to institutions and individual faculty members for regional initiatives. For example, these could emphasise increasing education access and opportunity for the region's population (especially target populations), engaging faculty members and students in teaching and learning and applied research projects related to regional priorities.

Box 4.4. Kentucky Regional Stewardship

The goal of the Regional Stewardship Program is to promote regional or state-wide economic development, livable communities, social inclusion, improved P-12 schools, creative governance and civic participation through public engagement activities initiated by university faculty and staff. To help accomplish this goal, campus administrators are expected to design and implement programmes that align institutional resources and infrastructure to support their missions as "stewards of place", and to create partnerships and undertake engagement activities that address regional and state needs.

Box 4.4. Kentucky Regional Stewardship (continued)

The programme provides three forms of funding incentives to institutions: *i)* infrastructure funds to support the development and maintenance of organisational structures, personnel, information systems and community relationships directed toward the identification of regional needs, opportunities and stewardship priorities; *ii)* regional grant funds to support comprehensive university efforts to build intellectual capacity in stewardship priority areas (to qualify for regional grant funds, each institution must submit a strategic plan for stewardship activities and a priority area proposal to the state Council on Postsecondary Education); and *iii)* the stewardship initiatives pool to support specific public engagement activities at the institutions that improve economic prosperity, quality of life, or civic participation in the region or state, while furthering the goals and mandates of the state's public agenda to increase the educational attainment of the state's population.

Source: Kentucky Council of Postsecondary Education "Kentucky Regional Stewardship", *http://cpe.ky.gov/policies/budget/reg_steward_program.htm.*

Examples of national funding mechanisms that have mobilised higher education for regional and local development include the Higher Education Innovation Fund in the United Kingdom. When in place, it contributed to a significant increase in the locally relevant activities of universities and has also generated considerable changes in the institutional management of knowledge exchange (Box 4.5.).

Box 4.5. The Higher Education Innovation Fund in the UK

The Higher Education Innovation Fund (HEIF) was designed to support and develop a broad range of knowledge exchange activities that result in economic and social benefit to the UK. The fund built capacity and provided incentives for higher education institutions to work with business, public sector bodies and third sector partners, with a view to transferring knowledge and thereby improving products, goods and services. In 2007, the UK Government announced a fourth round of the HEIF, from 2008-09, with funding rising to a final year allocation of GBP 150 million for 2010-11. Funds were provided through a formula allocation to all eligible higher education institution. They were released once their knowledge exchange strategy had been assessed as satisfactory.

Box 4.5. The Higher Education Innovation Fund in the UK (continued)

The formula was based on two components:

- The first component (40%) had a focus on capacity-building and higher education institutions' potential and was based on full-time equivalent academic staff number.

- The second component (60%) was allocated on the basis of performance, using various measures of income from business and non-commercial sources as a proxy for the value placed on higher education institutions' activities by users of knowledge in the wider economy and society.

Evaluation of the use of HEIF funds suggested that it had generated significant changes to the institutional management and increases in the scope (type of activity, target sectors, etc.) of knowledge transfer and exchange activities. There had also been investment in development/training for mainstream academic staff and collaboration with one or more higher education institutions in the region.

Source: HEFCE (2009), "Higher Education Innovation Fund 4", HEFCE, Bristol, *www.hefce.ac.uk/econsoc/buscom/heif/*.

Another source of funding for universities' regionally relevant work can come from charitable donations, trusts, persons of wealth and alumni. Both universities in the Free State have taken action to diversify their funding streams through voluntary giving. The University of the Free State has taken steps to mobilise sponsors and the Central University of Technology has received donations, for example, to enhance entrepreneurship activities. The universities in the Free State could make stronger efforts in this domain, for example, by engaging with their alumni and developing other systematic mechanisms that support voluntary giving. Recognising that the investment in the fundraising infrastructure can generate real rates of return, some OECD countries, for example, the United Kingdom have sought to stimulate this activity by matched funding schemes (Box 4.6.)

Box 4.6. The UK matched funding scheme for charitable donations to universities

In April 2008, the UK Government launched a GBP 200 million matched funding scheme for voluntary giving. The matched funding scheme began in August 2008 for a three year period. Funding was available to match eligible gifts raised by English higher education institutions and directly funded further education colleges. There were three levels of funding:

- First Tier: 1:1 private to public: intended for the least-experienced fundraising institutions and those looking to build capacity from a low base. Every GBP 1 raised will be matched in full.
- Second Tier: 2:1 private to public: intended for the majority of institutions with existing development programmes. Every GBP 2 raised will be matched by GBP 1.
- Third Tier: 3:1 private to public: intended for the most experienced fundraisers. Every GBP 3 raised will be matched by GBP 1.

Higher education institutions were able to request their own tier, with the exception of the Universities of Oxford and Cambridge, which were included in the third tier. All directly funded further education colleges wishing to participate in the scheme were automatically included in first tier. Each institution's tier and cap level was confirmed by the Higher Education Funding Council (HEFCE) prior to the start of the scheme.

The following forms of giving were eligible for match funding: actual gifts of cash, gifts of shares, gifts from small/medium-sized charitable trusts and foundations, gifts through higher education institutions own non-consolidated development trusts, corporate gifts, and overseas gifts. Legacies and gifts in kind were not eligible for matching. Higher education institutions had the freedom to decide how match funding was spent.

Source: HEFCE (2008), "Matched Funding Scheme for Voluntary Giving 2008-2011", Circular Letter, No. 11/2008, HEFCE, Bristol, *www.hefce.ac.uk/pubs/circlets/2008/cl11_08/*

Building capacity in universities

Leadership skills among rectors and vice-rectors, and their support teams play an important role in making tertiary education sector more

engaged and entrepreneurial. Their willingness to embrace change, ability to create consensus and agreement on a course of action, short and medium term strategies, and the ability to raise external funding for infrastructure, positions, and services can collectively help to build a progressive culture within the universities or other tertiary education institutions.

During the time of the OECD review of Free State (October 2010), the relations between the two universities were strained. As a first step, regular meetings should be organised between the top leadership and management of the two universities in the Free State to build confidence and trust necessary for partnerships.

Regional engagement is not only the task of the top leaders and management of universities. Universities face a series of challenges when they aim to expand the scope of their activities beyond teaching and research into "third mission" activities, such as community development, technology transfer or translational research. Institutions that want to mobilise their staff for regional and local development need to ensure that the regional agenda is taken into consideration in the recruitment, hiring and reward systems as well as human resource development. Rewards and incentives make it possible to change behaviours and ultimately attitudes and values. Employment and human resource management practices need to allow greater segregation of roles among higher education staff, with different kinds of workloads and reward systems. The universities in the Free State could find inspiration in the work of the Universiti Rovira i Virgili, which has not only created incentives to encourage faculty contributions beyond the conventional arenas of research and teaching, but also created methods to evaluate those contributions (Box 4.7.).

Box 4.7. Rovira i Virgili: creating incentives for faculty participation in third mission activities

The University Rovira i Virgili in Tarragona has an active third mission agenda, including entry points for small and medium-sized enterprises (SMEs) to the university knowledge base, social and cultural programming in 22 cities in southern Catalonia and active participation in fostering a knowledge based petro-chemical industry cluster in the sub-region.

Contracts for the university faculty emphasise the importance of and give value to faculty participation in these outreach efforts. The university faculty contract has been re-organised around a system with a ten-point base. All faculty are expected to undertake research and to teach, with the minimum contractual obligations constituting six of the expected ten points. .

Box 4.7. Rovira i Virgili: creating incentives for faculty participation in third mission activities (continued)

To reach the expected ten points, faculty can contribute in a variety of ways, according to their interests and expertise. For some faculty, this may mean giving presentations in programmes in which the university is developing a presence. For others, it may mean working with a small and medium-sized enterprise (SME) to implement a technology transfer or technology commercialisation project. For other faculty, reaching the ten points may mean additional research and publication.

The goal of this governance strategy is to set a base expectation for faculty performance in core activities. This evaluation method also creates the flexibility to allow faculty to contribute in arenas related to the university's goals to expand its third mission activities. All of the criteria for performance constitute a unit contributing to the ten-point base are publicly available and the activities of each faculty member toward achieving the base standard are available to all members of the department. The goal of the university in developing this evaluation programme is to create a more transparent and accountable university. In future, it would be useful to give better visibility for the university expertise.

Source: OECD (2011b*), Higher Education in Regional and City Development: Autonomous Region of Catalonia, Spain*, OECD Publishing.

The current higher education and training policies in South Africa have limited evidence of positive incentives to encourage faculty members to engage in regional development and the integration of research, service and teaching. In the Free State universities, the criteria for staff promotion is increasingly emphasising publications, rather than a broader definition including regional engagement. While the efforts to strengthen the research base in the universities are commendable, they could be effectively linked with the aim to make the R&D activities also relevant for the region. Criteria for faculty promotion and tenure could emphasise, for example: *i)* research on issues relevant to the region, giving more emphasis on application, synthesis and integration than to discovery of new knowledge; *ii)* service to the community, while requiring evidence that contributions to the community and the region are documented and externally validated; and *iii)* collaboration between the institutions in the Free State.

If universities and further education and training colleges want to mainstream the regional agenda, they will require staff who have the capacity to facilitate collaboration with a wide range of regional and local

stakeholders and who can act as "boundary spanners". A tailored human resource development programme would be helpful to develop this capacity. This programme should provide knowledge of regional development in terms of: *i)* the structure of organisations involved in regional development; *ii)* central, regional and local government powers and responsibilities; *iii)* different time scales and drivers influencing these organisations; and *iv)* overlaps between organisations and how these can be used to mutual advantage.

For regional engagement to be effective, it needs to be taken into consideration in the institutional planning, development and resource allocation. International experiences have shown that modern management tools and approaches, such as Balanced Scorecard, can be useful in reorienting the institutional approaches. Currently, the two universities have adopted modern management and governance systems to a varying degree. While the Central University of Technology has already implemented many modern management tools, the University of the Free State seems to have a longer way to go in order to modernise its governance and management structures, including internal planning and resource allocation system.

Influencing and managing the external environment of universities and other higher education institutions includes creating and sustaining strategic regional partnerships, and assuming real and shared responsibility for the prosperity and development of the region. For managing its regional interface, the universities may need to establish a dedicated office (see Box 4.8. for an example at Purdue University, US). Dedicated offices are particularly helpful when the goal is to scale up the institutional capacity from individual good practice to a well-developed system. This requires co-ordination and management of regional links; provision of input to strategic planning, contribution to the marketing of the institutions; development of frameworks for engagement and regional understanding within the institution; and maintaining pressure for mainstreaming the regional engagement through research and teaching and learning (OECD, 2007).

Box 4.8. Purdue University: serving the development of the State of Indiana, US

The Purdue University is a land grant university that has played a central role in agricultural and industrial extension in Indiana. The university has focused on generating technology start-ups and new licenses to advance technology firms. The university has an Office of Technology Commercialization, a research park with more than 100 companies and 2 500 employees and a Virtual Discovery Park that is home to interdisciplinary research centres. Purdue also runs a Technical Assistance programme, which provides technology extension services to Indiana companies and Gateways Program for entrepreneurs. The office of Engagement and the Centre for Regional Development complement the university's regional strategy.

Source: OECD (2007), *Higher Education and Regions: Globally Competitive, Locally Engaged*, OECD Publishing.

The Free State and its universities could consider two options: first, to establish separate, but co-operating liaison offices (the "first stop shop" model) where each university has a single service unit with a formal industrial liaison function or the technology transfer office, support for entrepreneurial activities and community engagement; or, second, to establish a joint unit (the "one stop shop" option) in which the two universities will set up a joint liaison office to systematise their regional/external engagement. The one stop shop would have a matchmaking, co-ordination and quality assurance role and would provide a visible and single access point to the two universities' whole resource base, but would require progress in partnership building between the two universities.

4.4 Partnership building in the higher education sector for regional development

Traditions of partnerships within the region between universities or other tertiary education institutions, businesses, regional agencies and government bodies, acting in concert with each other, is a critical factor in attracting foreign direct investment and partnering with other regions and universities and other tertiary education institutions globally.

In order to overcome the legacy of the racially segregated university system in South Africa, a number of regional consortia of higher education institutions were established in the 1990s. Among these where the Eastern Seabord of Association of Tertiary Education Institutions (esATI), Eastern Cape Higher Education Association (ECHEA), Foundation of Tertiary Institutions of the northern Metropolis (FOTIM), the Adamastor Trust in the Western Cape and the Free State Higher and Further Education Trust. The purpose of these consortia was to eliminate and reduce duplication of programmes, share the use of expensive equipment, share the best practice and co-operate in teaching and research. However, no significant benefits were achieved in terms of rationalising or transforming the higher education sector (Reddy, 1998). The Higher Education Act of 1997 signalled the end of the era for mergers and new stronger central steering of higher education with limited initiative of incentive for regional co-operation.

The Free State features pioneering collaborative efforts in the field of education, such as the Provincial Planning Commission and the Provincial Skills Development Forum. Today, there is a need to build on the experiences of these efforts, to learn from the positive – and negative – experiences in order to build a permanent partnership structure that co-ordinates strategic collaboration between university, industry and the provincial and locals governments. An example of earlier regional bodies is the Free State Education and Training Trust (FSETT).

Free State Education and Training Trust (FSETT)

The Free State Higher and Further Education Trust (or the Free State Education and Training Trust) was created in 1996. In its heyday, it comprised 29 different institutions and was the only consortium in South Africa to include the further education sector as well as the provincial government. The Trust aimed to restructure the further and higher education sectors by addressing the fragmented, inequitable and unplanned higher education sector. An approach of co-operation, rather than competition was seen as a key value of the operations, which included ten different projects, such as a foundation/bridging course for high school entrants to higher education sector, sharing of library resources, staff development project for teaching and learning. The then Free State Technikon (now Central University of Technology) remained a sceptical partner, maintaining that the inclusion of the further education and training sector diluted the purpose of the trust and later withdrew from the trust. By the time of the OECD review visit, the importance of the trust had steadily decreased. While reviving this initiative appears challenging, it would be important to evaluate the work of the Trust and some of its key projects, such as the Tri-Campus Project (see Box4.9.)

Box 4.9. Tri-Campus Project: a failure of national, provincial and institutional collaboration

The Free State Education and Training Trust (FSETT) was established in 1996 to encourage universities and other higher education institutions in regional development activity and regional stakeholders to contribute to Universities and other higher education institutions development. A key project launched by the FSETT was the Tri-Campus Project, which aimed to assess the role of the three sub-campuses of the universities should be playing in the sub-regions of the Free State Province. The three sub-campuses were the Bloemfontein Vista campus and the Qwa-qwa (Phuthaditjhaba) campus of the UFS and the Welkom Vista campus of the CUT.

The Tri-Campus Project hoped to maximise collaboration between further education and training colleges and University of Free State and Central University of Technology in an effort to meet the educational needs of these campuses in sub-regions of the province in programmes such as life orientation skills, lCT, language proficiency courses and entrepreneurial skills (*i.e.* the "Skills for a Changing World" component of the Tri-Campus Project), all with a view to self-employment.

The three campuses were planning to design broad higher education foundation programmes within extended degree programmes in strategic areas at first-year level that might continue to second and later years of undergraduate study on these campuses. The issue of training and re-training of public servants in the government services, and the role that the Tri-Campus Project could play in this regard, was also seen as important and collaboration with the provincial government in fostering such an endeavour was considered. The general outline of the proposal was accepted by the Ministry. While, the Ministry clearly indicated that they did not have funds available to facilitate and support the change needed for the different sub-campuses in the Tri-Campus project, but that they were prepared to support proposals for donor funding for this Tri-Campus project.

The Tri-Campus project failed because more active engagement was constrained by the lack of human resources at the national level of education. There were also uncertainties in national policies for further education and training colleges/higher education that negatively influenced the support for the Tri-Campus project. Other factors included: unstable politics leading to inconsistency in higher education policy implementation, inadequate funding and incentives for change (transformation), a lack of ownership in the university leadership, a lack of capacity and insight of provincial and local stakeholders to engage in collaborative work that required visionary thinking and planning "outside the box".

Source: Free State's Regional Steering Committee (2010), "Free State, Self-Evaluation Report," *OECD Review of Higher Education in Regional and City Development*, IMHE, *www.oecd/edu/imhe/regionaldevelopment.*

A more recent collaborative action within the Free State included the self-evaluation process linked to the OECD review, which, albeit at a late stage, brought together different stakeholders from the business sector, government and the universities and other FET-colleges. By focusing attention on universities' contributions to regional development the review process has benefited the region and the institutions through: *i)* shared analysis of strength, challenges, and opportunities in the region; *ii)* better understanding of the need for robust evidence and open sharing of knowledge and experience; *iii)* the identification of key individuals in the region to drive a regional agenda; and *iv)* the need for collaboration to bring about the change needed in the Free State.

In order to enhance regional development and to encourage collaboration and common initiatives, there may be a need to build capacity among local leaders. A regional plan for action would facilitate stakeholder mobilisation and increase citizen participation.

Focusing collaboration on key challenges in education, the environment and health, the region could help bring local and regional leaders together. The region and its population would also benefit from challenge-driven research and development conducted by universities, which should seek to increase the economic and social impact of universities.

Regional competitiveness framework

A regional competitiveness framework is often seen as the key to regional development. The regional competitiveness approach argues that regional capacity can be nurtured and developed by identifying the competitive advantages. For this purpose there is a need to supply a framework to unite public, private and non-profit leaders (including university leadership) for the development and implementation of regional development strategies. Furthermore, public investments must be aligned with economic niches (Porter, 1998 and 1999). Table 5.9 shows the progress made in the Free State in terms of the four essential elements for competitiveness in the global economy: strategy, governance, innovation and entrepreneurship. It identifies the universities current role and a number of gaps that would need to be bridged.

Table 4.1. The Free State competitiveness framework and HEIs' role

Essential ingredient	Target (Ideal)	The Free State (Actual)
Strategy	To identify the region's distinct competitive advantage. To align public and private actions necessary to seize it.	Nationally-driven provincial growth and Provincial Growth and Development Strategy with limited alignment of public and private actions at the local and regional levels. Sector-based development activities with limited focus on collective and public goods that minimise social and spatial exclusion. Lack of focus on enabling conditions: *i)* labour market and skills, *ii)* innovation capacity, *iii)* built environment and *iv)* sustainability and liveability.
Governance	To supply a framework to unite public, private and non-profit leaders as a collective guide and owner of the strategy.	Lack of capacity at the regional and local government. No effective collaborative mechanisms to bring together HEIs, business and government.
Innovation	To link the region with new technologies and new ways of working and living that can transform the region's social and economic assets.	The UFS has developed a cluster-driven research agenda with potential for regional development. CUT has a more limited R&D base, but closer alignment with regional needs. Universities' limited, albeit increasing innovation activities with growing alignment to the economic assets and needs of the Free State. FET colleges with low RDI capacity.
Entrepreneurship	To provide a fertile climate in which new ideas can be transferred successfully into the marketplace.	Lack of entrepreneurial tradition and activity among Black Africans as a legacy of the apartheid era. Entrepreneurship activities at early stages in universities.

Source: Adapted from Drabenstott, M. (2008), "Universities, Innovation and Regional Development: A View from the United States", Higher Education Management and Policy, Vol. 20, No. 2, OECD, pp. 43-55.

Conclusions and recommendations

The challenges in the Free State are complicated, ranging from poverty, low skills and educational attainment levels, unemployment and underemployment, poor health outcomes and exodus of skilled population. No single university, organisation or agency has the capacity to address these issues alone. Broad-based collaboration among provincial and local governments, business and industry, universities or FET-colleges, businesses required. By working together, these regional stakeholders could generate a greater dynamism and create change in the local economy and society.

There is evidence of past innovative programmes and projects, growing civic leadership and engagement of individual universities with the key stakeholders. The National Spatial Development Perspective with its requirement for Provincial Growth and Development Strategies has opened a window of opportunity for more collaborative action in the Free State. But despite its formal high-level status, the impact of NSDP has remained limited; it is not a master plan but a planning instrument that helps sub-national (provincial) co-ordination, and has not been effectively integrated into the national policy and prioritisation of budget processes. (OECD, 2008a)

Critical framework conditions must be developed to move towards more inclusive regional development in the Free State. These include: *i*) an inclusive labour market and an educational system that generates skilled workers; *ii*) a regional innovation system that matches the needs of the regional firms and is able to absorb the new skills; *iii*) public transportation and communication that help eliminate spatial and social mismatches; and *iv*) an improved environmental conditions that enhances the region's capacity to attract and retain talent and direct investments.

The current South African higher education and training policy does not recognise or reinforce initiatives by universities and further education and training colleges to relate their missions to regional issues. While some aspects of national policies, for example, the obligation for community engagement, may support regional engagement, there is no explicit regional development task assigned to higher education. Regional engagement is left to the initiative of the individual institutions. The funding policies do not give explicit consideration to providing incentives for regional engagement of institutions. As a result, the current incentive structures for institutions and individuals appear insufficient. Furthermore, education policies are inadequately aligned to support regional engagement of universities.

In the Free State, despite community engagement obligation of the universities, there is currently a lack of integration of regional engagement within the core teaching/learning, research and service missions. Good practice examples are driven by individual academics or departments, without institutional commitment and support. Collaborative mechanisms among universities and between them and further education and training colleges to build capacity and foster joint efforts remain limited in scope, and burdened by historical and personal tensions. Modest resources are spread thin and there is a lack of critical mass to develop projects that would generate multiplier effects at the local and regional level. There is a lack of institutional and regional level information and robust data, particularly in the fields of skills gaps, graduate employment outcomes, business formation and productivity, which undermines opportunities for evidence based decision making and make it difficult to evaluate the outcomes of local policies. There is also a need to strengthen the capacity to design concise and targeted strategies to address the opportunities and challenges of the region.

The experience in OECD countries shows that it is essential to develop a common understanding of the mutual interests of regions and universities. To open a new era of collaboration between universities and their regional stakeholders in the Free State the OECD review team makes the following recommendations:

Recommendations for the national level

- Consider launching stronger regional development strategies and to enhance capacity building in regions. Experience in OECD countries shows that increased decision-making power at sub-national (provincial) levels of government combined with co-ordination mechanisms can unleash the potential in the regions. As regional capacities are built through "learning by doing", increased responsibilities at the regional level are necessary to build skills and develop problem solving approach.

- Strengthen the links between the regional development and higher education and R&D to unleash the potential of South Africa's diverse regional assets and characteristics. Achieving this goal would require: *i*) human capital policies that are sensitive to the characteristics of the regional environment; *ii*) greater participation of education institutions in regional development matters; and *iii*) stronger collaboration and links among higher education institutions, research centres, regional and local authorities, local businesses and regional development agencies. The goal should be to raise the quality and relevance of education,

training and R&D, making them relevant to the local and regional economic and social needs of the Free State and oriented towards achieving the region's potential.

- Make explicit in higher education and training legislation and policy, the regional and local engagement and, more specifically, its wide agenda for economic, social and cultural development. Regional engagement should be encouraged through strengthening the funding policies and incentives. Community engagement should be redefined to promote civic university that provides opportunities for the region, actively engages with the region, partners with other FET-colleges in the region and operates on a global scale while using its location to form its unique identity.

- Provide incentives for higher education and training institutions' regional engagement in the form of long-term core funding and strategic incentive-based funding schemes on a competitive basis. Consider following incentives*: i)* formulae for block grant funding that could include higher weights for enrolment of students from within the region, or for enrolments in academic programmes related to regional labour market needs; *ii)* policies governing tuition fees that could provide for lower fees for students from the region and policies for financial aid to students that could provide higher amounts for students from the region and special populations; *iii)* eligibility for special or "categorical" funding that could be contingent on evidence of regional engagement and focus; *iv)* requirements that institutions collaborate in order to obtain funding; *v)* special funding that could be established to provide matching of funding obtained by universities and FET-colleges from contracts with regional employers for education and training services; *vi)* public-private regional investment fund that could help build capacity for regional engagement and provide incentive funds to institutions and individual faculty members for regional initiatives; and vii) competitive funding schemes that could boost challenge-driven research projects.

- Strengthen universities' accountability to society by developing indicators and monitoring outcomes to assess the impact on regional performance. Include the contribution to local and regional development in their annual evaluations.

- Ensure that the universities programme review and approval process is streamlined to allow for responsiveness to regional needs. The process should be adapted to emphasise regional engagement through efforts to seek the advice of regional leaders (employers, community leaders, regional economic development officials) in the review process.

Criteria emphasising regional engagement and responsiveness should be included in the review and approval process, for example: *i)* data documenting the gaps in access and opportunity for the population and important sub-groups; *ii)* data documenting relevant regional labour market needs and potential future needs arising from regional economic development plans; *iii)* evidence of the engagement of regional stakeholders (employers, community representatives and representatives of under-served sub-populations) in programme planning and design; and *iv)* emphasis on regional engagement (internships, community service, student research on regional issues) within the curricula and student experience.

Recommendations for the sub-national (provincial) level

- Establish a high level forum bringing together university leaders and regional stakeholders to foster co-operative projects in regional development and to facilitate closer co-operation between the public and private sector and academia by presenting a holistic regional development approach in which key stakeholders would be called to co-operate. Develop a regional strategy platform to complement the current project-based approaches with a more system-based approach.

- Analyse regional engagement opportunities within universities and further education and training colleges on the basis of the Free State Development Growth Strategy (FSGDS) priorities. Consider drafting a regional development sub-strategy within the FSGDS harnessing higher education and training institutions potential to help in achieving its goals. Mobilise the joint resources of the universities for the preparation and implementation of regional and urban strategies and substantive collaborative projects and programmes that address regional needs and opportunities.

- Improve the capacity for regional engagement among key public and private stakeholders, universities, further education and training colleges through forums for communication where good practices can be fostered and through targeted training programmes with focus on practical problem solving.

- Invest jointly with universities in programmes which bring benefit to regional businesses and community, for example translational research facilities which are aligned with the needs and opportunities of the region, advisory services for SMEs, professional development programmes, capacity building programmes for public and third sector employees, graduate retention and talent attraction programmes.

- Strengthen evidence-based decision making in the province by focusing on a dashboard of key indicators that the key regional stakeholders can monitor over time. This can result in a shared local knowledge base, which could galvanise the development of a strong local strategy for change.

Recommendations for institutions

- Review recruitment, hiring and reward systems to include regional development agenda. In order to strengthen the research base, to make universities more relevant for the region and to provide stronger incentives for regional engagement, criteria for faculty promotion and tenure could emphasise: *i)* research on issues relevant to the region, giving more emphasis on application, synthesis and integration than to discovery of new knowledge; *ii*) service to community, while requiring evidence that contributions to the community and the region are documented and externally validated; and *iii*) collaboration between the institutions in the Free State. Create mechanisms to monitor and evaluate the activities in this area, to share good practice within their institution and benchmark this experience with other organisations and localities.
- Building on existing links and initiatives that align higher education and training institutions with the regional needs, develop a common vision of local and regional development among the higher education and training sector in the Free State, support this vision with a strategy and milestones and funding in order to ensure that regional and local engagement is part of institutional activities and reflected in the development plans.
- Develop senior management teams to deliver the corporate response expected by regional and local stakeholders without disincentivising entrepreneurial academic. Establish modern administration with human resources system and financial resources management system.

Notes

1. OECD (OECD Territorial Reviews: Cape Town, South Africa, 2008) notes that: "The creation of homelands confirmed colonial possession of prime territory for whites, including the most productive agricultural land. Apartheid also secured the major cities and their industries for white domination. Within urban areas, race-based spatial strategies entrenched racial segregation in the interests of the ruling minority."

2. The NSDP is not a master plan, but rather a planning instrument to guide national government departments, provincial and local governments in the spatial prioritisation of their planning and to ensure adequate co-ordination between different government levels. The NSDP requires that government at all levels should use categories of development potential to identify the comparative advantage of localities in terms of infrastructure and development investment and spending and to report annually on how their expenditure relates to the NSDP.

3. Operation Hlasela, a Free State Government initiative launched in 2009, focuses on public investment priorities (rail networks, public transport, health and education infrastructure, housing, public works and public employment).

4. These ambitious goals were defined long before the present world economic crisis that started at the end of 2008. No interim results concerning the implementation of the strategy were supplied to the review team.

5. The two local municipalities with high innovation potential are Mangaung (Bloemfontein) and Metsimaholo (in Fezile Dabi District, location of Sasolburg). Four towns – Kroonstad, Virginia, Bethlehem and Harrismith – have above average potential and all others are below average. Concerning the production of high value goods, Sasolburg and Bloemfontein are the leading localities. For labour intensive mass produced goods, the municipalities of Mangaung, Moqhaka and Matjhabeng rate high, followed by four others – Metsimaholo, Masilonyana, Dihlabeng and Setsoto – while all others are below average. These municipalities have significant primary sector activity, for example, mining in Matjhabeng/Welkom and agriculture in other parts, as well as

small manufacturing, particularly in Mangaung, but there is little agri-food production . Concerning retail and private services, seven towns contribute to 75% of the provincial GVA: Bloemfontein (45.8%), Welkom (11.5%), Sasolburg (7.7%), Kroonstad (over 3%), Thaba Nchu and Puthaditjhaba (2.3% each). For tourism, resource-based tourism is located in and around the Drakensberg area and the Golden Gate Park but also around the Xhariep dam and Vredefort (Fezile Dabi), whereas events and business tourism are concentrated in Bloemfontein.

6. Community engagement is here defined as a mission pursued in the general interest and generally relating to the municipality or wider area where the university (campus) is established. Such engagement can range from health promotion and services dispensed in certain townships or distressed neighbourhoods, to support of secondary school pupils, social and economic research with direct impact on the local economy, or support and training in favour of local SMEs.

7. See OECD Territorial Reviews, Finland (2005) and Norway (2007).

8. According to the Council of Higher Education (2011), there is wide variation in the ways in which community engagement is conceptualised in institutional vision and mission statements. While most institutions have a range of activities, including regional development, that can be categorised as community engagement, most of these activities are driven by individual academics or departments without institutional support and ownership. While most institutions have some organisational structure that takes responsibility for community engagement, there are usually no formal systems for the quality assurance and monitoring of community engagement. Generally, there is little integration between research and community engagement.

9. The OECD review of education (2008) pointed out that no funding was made available for residences and for additional fixed assets in the case of student growth, no funding for capital projects. The funding model makes no structured provision for inflation. Development grants channel money away from institutions producing the research that the high standards are supposed to encourage. OECD review also pointed out that the division of National Student Financial Aid Scheme (NSFAS) among the HEIs is based on the racial composition of student enrolments at the respective institutions and not on the actual numbers of students with financial needs. There was also an assumption that universities would experience economic of scale as they become larger.

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Annex A: Review visit team

Jaana Puukka leads the OECD work on Higher Education and Regional and City Development. She joined the OECD Programme on International Management in Higher Education (IMHE) in 2005 to co-ordinate and manage the first round of OECD Reviews of Higher Education in Regional Development, which took place in 2005-07 and embraced 14 regions in 12 countries. She led the second round of reviews in 2008-11, which reached out to 14 regions and city-regions in 11 countries, and is also leading the third round of reviews. She is the co-author and editor of the OECD publication "Higher Education and Regions – Globally Competitive, Locally Engaged" (OECD, 2007). Before joining the OECD, she had experience in higher education and regional development in Finland as a national and local government adviser, programme manager, practitioner and evaluator. She has management experience from both the university and polytechnic sector, and has been the head of in university internationalisation, PR & communication and stakeholder management functions. In addition, she has experience in the corporate sector in the pharmaceutical industry.

Patrick Dubarle, former Principal Administrator at the OECD Public Governance and Territorial Development Directorate (GOV), has co-ordinated and contributed to a number of OECD territorial reviews at the national and regional level and has recently participated in the regional innovation reviews in Italy and Mexico. In 2004-07 he represented GOV in the OECD project on supporting the Contribution of Higher Education Institutions to Regional Development and coordinated the review of the Mid-Norwegian region. Patrick Dubarle is a graduate from the French "Ecole des Mines", and holds a Master's degree in Economics from the University of Paris Sorbonne. He joined the OECD in 1978 as Administrator in the Directorate for Science Technology and Industry. He was appointed Secretary of the OECD Working Party on regional development policies in 1992, where he was responsible for country regional policy reviews and horizontal programmes. He has worked with national governments in many OECD countries and has spoken at several international conferences. He is

the author of documents on high technology policies and sectoral questions including space industry, technological change, technology fusion, innovation and higher education in regional development.

Holly Hart McKiernan is the Senior Vice President, General Counsel and Secretary for Lumina Foundation. Before joining the foundation, McKiernan was executive director and counsel for Alpha Chi Omega and practiced law at Baker & Daniels and Leagre & Barnes law firms, concentrating on non-profit and tax-exempt organisations. McKiernan also serves on the boards of foundations and other organisations such as the Stetson Universities College of Law Center for Excellence in Higher Education Law and Policy. McKiernan is a magna cum laude graduate of DePauw University in Greencastle, Indiana, and received her law degree from Indiana University. She frequently speaks on university governance and other higher education issues.

Jairam Reddy is the former Vice-Chancellor of the University of Durban Westville. In 1995 he was Chair of the National Commission on Higher Education of South Africa whose report provided the basis of the White Paper on Higher Education and the Higher Education Act. In 1998, he was appointed by the Secretary General of the United Nations to serve on the Council of the United Nations University, Tokyo, Japan and was subsequently elected to chair the Council for a two year term (2000-02). He served as a member of the Board of the Higher Education Quality Committee in South Africa (2002-05) and was Auditor of the Australian Universities Quality Agency, a member of the Board of ACCORD and Chair of the Board of the Durban University of Technology, South Africa. During 2004-08, Reddy was Director of the United Nations University International Leadership Institute, Amman, Jordan. He currently works as a Consultant to the World Bank and UNESCO for the Ministry of Higher Education, Kabul, Afghanistan.

Akilagpa Sawyerr is the former Secretary-General of the Association of African Universities (AAU), and Vice-Chancellor of the University of Ghana (1985-92). He studied law at the Universities of Durham, London and California (Boalt Hall), and held teaching and research positions at universities and research institutions in Africa, Europe, the US and the Pacific. He serves on the governing bodies of several national and international institutions, including Ghana Research and Advocacy Programme, Ibrahim Index of African Governance, The Commonwealth of Learning, as well as The Human Sciences Research Council and University of the Free State, both of South Africa. With research interests covering globalisation, African higher education and international negotiations, Sawyerr's publications include African Higher Education and Industry: What Are the Linkages? (2009) and Challenges Facing African Universities:

Selected Issues (2004). Sawyerr is a Member of the Council of State and Companion of the Order of the Volta in Ghana.

Philip Wade, retired (2007) OECD Administrator, is an expert in regional and rural development, with specific knowledge in Information and Communication Technologies (ICTs). In OECD, Philip Wade was responsible for several national territorial reviews in Europe, which objective is to identify and analyse the factors of disparity between regions and the implementation of regional policy, so as to formulate recommendations aiming to improve its delivery and increase its impact. He also carried out specific regional tasks and authored several rural case studies, and before that, the OECD report "ICTs and Rural Development". Presently, Philip Wade is one of two experts, co-ordinating and supervising, under the aegis of the Government of Finland, a pilot rural development project in Mozambique. Prior experience in such countries was acquired in the field of technical assistance in Peru and Ethiopia. Philip Wade is a graduate in political science of Paris Sorbonne and ENA (economics, law and public administration). He holds a degree in Higher Latin American Studies (IHEAL). Before joining OECD, he worked in various international positions in the public and private sectors in France. Besides OECD publications, he is the author of several books on broadcasting, ICTs and tourism development.

Annex B: Programme of the review visit

OECD review visit to the Free State
3-9 October 2010

Sunday 3 October 2010

18:00 **OECD Review Team Internal meeting**

19:00 **OECD Review Team Meeting with Regional Co-ordinator and panel of experts**

- Dr Khotso Mokhele (Chairperson of the Regional Steering committee)
- Dr Ian Goldman (Rural Development Consultant)
- Prof Lochner Marais (Centre for Development Support, University of the Free State and Regional Coordinator)

Monday 4 October 2010

8:30 – 10:30 **Department of Higher Education**

- Kirti Menon, Acting Deputy Director-General, University Education
- Thandi Lewin, Chief Director, Policy and Development
- Diane Parker, Teacher Education and Development
- Jody Cedras, Director Special Projects
- Brenda Swart, Acting Chief Director: Financial Planning and Information System

11:30 – 13:00 C**ouncil on Higher Education**

- Judy Backhouse (Director: Advice and Monitoring)
- Beata Mtyingizana (Research Manager)

14:00 – 16:00 **Department of Science and Technology**

- Selby Modiba

- Johann Strauss
- J Patel

20:15 – 22:00 Dinner with Vice Chancellor at the University of the Free State

- Jonathan Jansen

Tuesday 5 October 2010: Meetings at the Central University of Technology

08:15 – 08:45 Corporate Governance

- TZ Mthembu

8:45 – 09:15 Institutional training for access and success

- CA van der Merwe

09:15 – 09:45 Research Development at the CUT

- LOK Lategan

09:45 – 10:15 Innovation and Manufacturing at CUT

- L Barnard

10:40 – 11:10 2010 Partnership Interventions

- M Ralekhetho

11:15 – 12:15 Site visits to FabLab, CRPM, Technology Station

Wednesday 6 October 2010

08:00 – 10:00 Free State Provincial Government

- James Moses, Treasury
- Maboreng Maharswa (Department of the Premier)
- Mafole Mokalobe (Department of the Premier)
- T Ramakarane (Department of the Premier)

10:30 – 12: 00 Mangaung Local Municipality

- Amos Goliath (Director, Corporate Services)

13:30 – 15:00 Rural development

- George Masubi (Mangang: Rural Development)
- William Barnes (Rural Development Consultant)

16:00 – 17:30 Meeting with non-governmental organisation

- Willem Ellis (Lebone House)
- Billyboy Ramehlele (University of the Free State)
- Mabel Erasmus (University of the Free State)
- Linda Mathibi (Dedi)
- Benedict Mokoena (University Centre of the Free State Community Partnership Programme (MUCPP))

19:00 Dinner with Regional Coordinating Committee

- Kalie Strydom (Free State Education and Training Trust)
- Hendri Kroukamp
- Maboreng Marashwa (Chief Director: Department of the Premier)
- Lochner Marais (Centre for Development Support, University of the Free State and Regional Co-ordinator)

Thursday 7 October 2010

08:00 – 09:00 University of the Free State Senior Management

- Ezekiel Moraka

09:00 – 10:00 Meeting with University of the Free State Deans

- Lucius Botes (Humanities)
- Gert van Zyl (Health)
- Hendri Kroukamp (Economic and Management Sciences)
- Johan Henning (Law)
- Francois Tolmie (Theology)

10:00 – 11:00 Knowledge transfer

- Glen Taylor
- J Brussouw

11:00 – 12:00 Student recruitment and management

- Francois Strydom
- Merridy Wilson-Strydom
- Pearl Seakemela

12:00 – 13:00 Lunch with UFS students

13:30 Thematic meeting on entrepreneurship

- Johan v Zyl
- Annemarie van Noordwyk
- Benedict Mokoena

15:00 Thematic meeting on Health

- Dingie van Rensburg
- Christo Heunis
- Willie Molensky
- Carina Welsch

17:00 Meeting with FET college sector

- Kalie Strydom
- Tsatsi Montso

Friday 8 October 2010

08:00- 14.00 OECD Review Team Internal Meeting

14.00 - 16:00 Feedback session to the local and regional stakeholders and higher education institutions.

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

The OECD is a unique forum where governments work together to address the economic, social and environmental challenges of globalisation. The OECD is also at the forefront of efforts to understand and to help governments respond to new developments and concerns, such as corporate governance, the information economy and the challenges of an ageing population. The Organisation provides a setting where governments can compare policy experiences, seek answers to common problems, identify good practice and work to co-ordinate domestic and international policies.

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Higher Education in Regional and City Development

THE FREE STATE, SOUTH AFRICA

The third largest of South Africa's nine provinces, the Free State suffers from unemployment, poverty and low skills. Only one-third of its working age adults are employed. 150 000 unemployed youth are outside of training and education. Centrally located and landlocked, the Free State lacks obvious regional assets and features a declining economy.

How can the Free State develop a more inclusive labour market and education system? How can it address the long-term challenges of poverty, inequity and poor health? How can it turn the potential of its universities and FET-colleges into an active asset for regional development?

This publication explores a range of helpful policy measures and institutional reforms to mobilise higher education for regional development. It is part of the series of the OECD reviews of Higher Education in Regional and City Development. These reviews help mobilise higher education institutions for economic, social and cultural development of cities and regions. They analyse how the higher education system impacts upon regional and local development and bring together universities, other higher education institutions and public and private agencies to identify strategic goals and to work towards them.

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ISBN 9789264169142
892012041E1