



Development through Human Capital

The imbalance between the supply and demand of human capital is one of the key priorities of the National Advisory Council on Innovation (NACI), resulting in a relatively extensive knowledge base which can be seen as a national asset. (Human capital and knowledge base is one of NACI's five strategic thrusts, the other being Infrastructure for innovation, Competitiveness, Social dimensions of innovation, and NACI's position, role and functioning in the NSI.)

JIPSA's aim is to facilitate and support accelerated human resources and skills development in priority skills areas to support the national growth strategy. JIPSA will give effect to this aim by:

- Priority setting
- Identification and resolution of systems blockages and constraints
- Monitor and report on progress

The information in this guide is tailor-made for JIPSA. In the true spirit of open source, NACI would like to share this information.

Information available in NACI reports on the provision of high-level skills to promote research and development and the issue of skills shortages in the engineering profession can be found in this guide. Particulars on the methodology, detailed results and recommendations can be found in the original reports themselves.

List of NACI studies:

- *The Potential Impact of Skills Shortages on the Innovative Capacity of Major Capital Engineering Projects.*
- *A Study on the Mobility of Research and Development Workers*
- *A Profile of Postgraduate Higher Education and the Academic Research Community in South Africa.*
- *South African Innovation Key Facts and Figures 2004: Discussion Document.*
- *The Higher Education Human Resources Modelling Project (to be released soon)*

The following table offers a cross-reference between NACI studies and JIPSA priorities.

NACI Study	JIPSA activity		
	Priority setting	Remove constraints	Monitor / report
Skills shortage	X	X	X
Mobility	X	X	X
Post-graduate	X	X	X
Innovation F&F	X		X
HR modelling	X	X	X

Some of the key issues addressed by NACI studies relating to human capital development and retention are given:

The Potential Impact of Skills Shortages on the Innovative Capacity of Major Capital Engineering Projects

NACI's main contribution in the identification of priority skills is a study in which skills shortages and their effect on the innovative capacity of the construction industry were investigated. Although the study focused mainly on the construction industry, some of the recommendations are of a more general nature and therefore definitely apply to other industries as well. The project included studies on

- the supply of and demand for engineers, technicians and artisans (Section 2);
- the issue of scarce skills in South Africa (Section 3);

- an overview of best international and local practices for skills development in the construction industry (Section 4);
- and an overview of the skills development policy framework in South Africa (Section 5).

Mobility of Research and Development Workers

Much of the knowledge in the science, engineering and technology disciplines is tacit knowledge, embedded within people. South Africa has, over the past four decades, experienced a significant outflow of R&D workers, but is also experiencing inflows from other parts of the world, in particular from the African continent. Issues addressed in the study include whether the net result of mobility is beneficial to South Africa and to suggest strategies to be adopted to benefit from global (including South African) R&D mobility.

- Recommendations for the short term include improvement of methodology in gathering data on the migration of research and development workers, terms and conditions of employment of R&D workers, enablement of young researchers through mentorships and networks, improvement of student funding, encouragement of foreign students to study in South Africa, creating opportunities for young people to be trained abroad, and to revise the current approach to fast tracking the issuing of work permits to highly skilled foreign R&D workers.
- Recommendations for the medium term include strategic investment in knowledge capital and policy coordination, while on the long term it is recommended that mechanisms and interventions need to be understood and introduced to encourage career trajectories that reward both technical and management career paths.

A Profile of Postgraduate Higher Education and the Academic Research Community in South Africa

The overall picture emerging from this profile is that the postgraduate sector and academic research community show considerable strengths and potential on the one hand, but also formidable weaknesses, unevenness and problem areas on the other. In order to fulfil its role in producing the next generation of researchers for the HE system and the labour market, the postgraduate sub-sector will have to expand in the required fields and especially at the upper levels, producing graduates more efficiently and equitably, and better prepared for the requirements of the changing labour market.

Meeting the innovation needs of the science system and the rapidly changing labour market entails the attraction of sufficient numbers of enrolments in the required fields, and qualification levels, retaining students to reduce dropouts, and satisfactory success and graduate rates to ensure as economical and efficient time-to-degree as possible.

Field of study: A growth was evident in SET graduates (to 23% of the total) and in Business/Commerce (also to 23%), while those in Humanities and Social Sciences declined (to 30%) and Education (to 24%). These patterns are welcome shifts towards the NPHE goals of a ratio of 40:30:30 in HSS/Education, SET and BC respectively.

Race: While white students dominated among graduates, but their proportion declined between 1995 and 2001, while that of Africans increased. Similar increases were evident among women postgraduate graduates. However, whites and men continued to predominate at the higher qualification levels, with Africans under-represented.

Gender and qualification level: Black women graduates are concentrated in the lower qualification levels and fields still generally associated with the gender and race division of labour shaped by apartheid society. Over time, graduate output is becoming more equitable at all qualification levels in relation to race and gender.

South African Innovation: Key Facts and Figures 2004

Four broad classes of indicators to define South Africa's research and development capacity were reviewed in this report, namely expenditure on R&D, availability of researchers in the workforce, availability of innovating firms in the country and the number of patents issued and the proceeds from royalties and license fees.

The Higher Education Human Resources Modelling Project

The development of the higher education human resources model is based on the premise that there is a discontinuity between the needs of industry and the higher education system. A model was designed and calibrated with actual data to

- identify the implications of various elements on the behaviour of the higher education system
- analyse the impact of pass, fail and quit rates on the system.
- assess the time it would take to develop a comprehensive, sustainable support system for a particular industry
- forecast future HR capacity in the engineering profession.

Further development of the model is focused on how policies can be used to reduce the effect of the major system constraints.

Useful links

NACI: <http://www.naci.org.za/>

- NACI Reports
http://www.naci.org.za/Innovation_gateway/Library.htm

Department of Education: <http://www.education.gov.za/>

- Education Statistics: EMIS <http://www.education.gov.za/emis/emisweb/statistics.htm>
- Higher Education Management Information System: HEMIS
<http://www.education.gov.za/dynamic/dynamic.aspx?pageid=326&dirid=14>

Statistics South Africa: <http://www.statssa.gov.za>

- Employment statistics - Labour Force Survey (LFS):
<http://www.statssa.gov.za/publications/statsdownload.asp?PPN=P0210&SCH=3563>
- Census - national and provincial population, language, education and household goods:
<http://www.statssa.gov.za/publications/statsdownload.asp?PPN=CensusKey&SCH=3109>
- Migration statistics - arrivals to and departures from South Africa:
<http://www.statssa.gov.za/publications/statsdownload.asp?PPN=Report-03-51-02&SCH=3351>
[P0351 - Tourism and Migration, April 2006](http://www.statssa.gov.za/publications/statsdownload.asp?PPN=Report-03-51-02&SCH=3351)

HSRC: <http://www.hsrc.ac.za/>

- R&D Survey Statistics:
<http://www.hsrc.ac.za/RnDSurvey/downloads/2004-05/DST%20R&D%20Booklet%20200405%2022June06.pdf>

Engineering Council of South Africa: <http://www.ecsa.co.za/>

- Engineering student statistics:

United Nations Development Programme: <http://www.undp.org/>

- Human Development Indicators:
http://hdr.undp.org/reports/global/2005/pdf/HDR05_HDI.pdf

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