Final

Conference Report

STRENGTHENING COLLABORATION BETWEEN HIGHER EDUCATION, GOVERNMENT AND INDUSTRY FOR RESEARCH AND INNOVATION

Higher Education South Africa (HESA)

11-12 MARCH 2010

CSIR INTERNATIONAL CONFERENCE CENTRE, PRETORIA

Foreword

The Department of Education's *National Plan for Higher Education (2001)* emphasises the value and importance of research as follows:

. "Research, in all its forms and functions, is perhaps the most powerful vehicle that we have to deepen our democracy. Research engenders the values of inquiry, critical thinking, creativity and open-mindedness, which are fundamental to building a strong, democratic ethos in society. It creates communities of scholars, who build collegiality and network across geographic and disciplinary boundaries. It makes possible the growth of an innovation culture in which new ideas approaches and applications increase the adaptive and responsive capacity of our society, thereby enhancing both our industrial competitiveness and our ability to solve our most pressing social challenges. It contributes to the global accumulation of knowledge and places South Africa amongst those nations who have active programmes of knowledge generation".

Locally and globally, our society confronts challenges of increasing complexity and magnitude. We need to review the ways in which our economy addresses the polarisation of wealth and poverty, and how it provides for the well-being and fulfillment of growing populations. We must devise technologies that counter pandemics of disease, and the threats to our environment. In short, we must grow our capacity for research, innovation and high-level skills with a view to the future: both short- and long-term.

It is in this consideration that Higher Education South Africa (HESA) hosted the Research and Innovation Conference on 11-12 March 2010, at the CSIR International Convention Centre, in Pretoria. The conference brought together a range of experts and practitioners in the fields of research and innovation from the Higher Education sector, Government and Industry to discuss ways through which these and other sectors could collaborate to advance research and innovation in the country and more widely. This report summarises the deliberations of this conference.

The conference set out to address the following themes:

- Improving research training and research career development;
- Provision of research infrastructure and equipment;
- Strengthening partnerships locally and internationally;
- Promotion of innovation;
- Management of intellectual property, both for public good and for commercialization;
- Funding and resourcing for research and innovation.

The Conference acknowledged that the various sectors and stakeholders bring differing strengths, resources and capacities. For example:

- The government pursues its regulative responsibilities through the development of policies and the allocation of resources with the intention to benefit society.
- Higher Education produces skilled citizens and researchers, and undertakes and disseminates specialized research which addresses both fundamental and applied knowledge priorities.
- Industry specialises in productive, commercial and value-adding activities.

We believe that these distinctive strengths and resources may fruitfully be combined to powerful effect to address problems that are wide in scale, scope and complexity. In general, however, it was acknowledged that our research and innovation resources are limited in strength, patchy in extent and scattered widely in pockets across the sectors. There was consensus that collaboration in research and innovation depends on the achievement of a common view of the priorities of society, shared visions for the future and coherence in policy directed to this end. This convergence may need to be found in the following ways:

i. *Within and across government:* Many national departments of Government (and science and research-funding councils) are segmented in their purposes and functions, and insufficiently observant of overlapping responsibilities with their neighbouring departments. The planning timelines across departments may vary from five years to 25 years, and they may direct their research priorities, policies, skills and resources in compartmentalized ways. We trust the new National Planning Commission will address this, but it may be some while before it gains traction on the endeavours of the various departments.

ii. *Within and across higher education institutions*: Similarly, research in universities continues mostly in the silos of disciplines. While this is still necessary, the need for cross-disciplinary work grows rapidly. It is not always acknowledged how challenging multi-disciplinary collaboration can be, but when it is achieved, it can be very powerful. Working across institutions needs also careful investment in time and political will, but can yield leading-edge research. The imperative for these forms of boundary-crossing grows ever more urgent.

iii. *Across higher education and industry:* The vitality of our socio-economic development requires that these sectors identify shared priorities, and that they accordingly work to club together their research resources (equipment, budget and skills) towards common goals. It was noted that all successful emerging economies that generate high growth rates are characterized by the quality and quantity of their production of postgraduates. Masters and doctoral programmes have spurred innovation and development. This activity needs to benefit from strongly enhanced resourcing, both from within Government and from industry as the chief benefactor of the high-level skills yielded by postgraduate training.

HESA thus takes pleasure in presenting this report, a summary of the proceedings of what was a rare opportunity for these sectors to meet in dialogue and to acknowledge a shared agenda for the future of the country. In a world now increasingly dependent on strong research and vigorous innovation (technical and social), we must not only work to share our intellectual resources, but also recognize that we have shared futures and that we must work to shape these together. We believe this conference and its resolutions thus constitute an important and constructive step towards improving the national research and innovation system in our country.

Prof Loyiso Nongxa
Chairperson of the HESA Research Strategy Group

Acronyms

ASSAf	Academy of Science for South Africa
CSIR	Council for Scientific and Industrial Research
DAAD	Deutscher Akademischer Austauschdienst
DHET	Department of Higher Education and Training
DIRCO	Department of International Relations and Cooperation
DoH	Department of Health
DST	Department of Science and Technology
DTI	Department of Trade and Industry
EU	European Union
FET	Further Education and Training
HDI	Historically Disadvantaged Institution
HE	Higher Education
HEI	Higher Education Institution
HESA	Higher Education South Africa
HSRC	Human Sciences Research Council
IBSA	India, Brazil, South Africa
ICT	Information and Communication Technologies
IEASA	International Education Association of South Africa
IP	Intellectual Property
MRC	Medical Research Council
NACI	National Council on Innovation
NIPMO	National Intellectual Property Office
NPC	National Planning Commission
NRF	National Research Foundation
OECD	Organisation for Economic Co-operation and Development
R&D	Research and Development
RSG	Research Strategy Group
SADC	Southern African Development Community
SANPAD	South Africa Netherlands Research Programme on Alternatives in Development

SANREN	South African National Research and Education Network
SARChI	South African Research Chairs Initiative
SET	Science, Engineering and Technology
THRIP	Technology and Human Resources for Industry Programme
TIA	Technology Innovation Agency
UoT	University of Technology
US	United States

STRENGTHENING COLLABORATION BETWEEN HIGHER EDUCATION, GOVERNMENT AND INDUSTRY FOR RESEARCH AND INNOVATION

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1 Introduction

In accordance with its mandate to strengthen research and innovation in higher education (HE), on 11 and 12 March 2010 Higher Education South Africa (HESA) hosted a conference with the theme 'Strengthening Collaboration between Higher Education, government and industry for research and innovation'. The conference brought together the Minister of Science and Technology, senior departmental officials, a wide range of scholars, HE and business leadership, and representatives of advisory and Research Councils.

The conference took the form of plenary sessions interspersed with panel discussions and parallel sessions. The key topics debated were:

- Government's vision for the research and innovation system for South Africa within the context of a knowledge-based economy
- The legislative and policy landscape governing research and innovation in South Africa, and its implications for the HE sector
- The contribution of industry, the Science Councils, the HE sector, government and other agencies to building and strengthening a research and innovation system for South Africa
- Mechanisms, structures and partnerships necessary for effective facilitation, coordination, planning, implementation and monitoring of inter-sectoral plans for the achievement of the research and innovation objectives
- Allocation of resources for research and innovation

Full details of the programme are given in **Appendix 1**.

2 The plenary sessions

In her keynote address on Day 1, **Professor Cheryl de la Rey, Vice Chancellor and Principal: University of Pretoria**, looked at the changing roles of universities; their 'third mission' to involve themselves more closely with the research and development agendas of government and industry; factors shaping their approaches to this mission; and the implications of the 'third mission' for South African university-government-industry relations.

The context of the emergence of the third mission includes the growing significance of knowledge in productivity and competitive advantage, the massification of HE, and changes in research. A metaphor for this mission is the triple helix, which suggests the acceleration of

knowledge generation via overlapping institutional spheres and roles that result in hybrid spin-offs.

There are several possible versions of the helix: in one, government has the dominant role and shapes the relationships between universities and industry; in a second, there is separation of each sphere through circumscribed relations; and, in a third, roles overlap. All of them imply engagement for social justice and community development.

Significant factors shape the way in which the HE institution plays its role in these relationships. These include location, heritage, the needs and interests of the institution, the nature of the industrial base with which it has relationships, the extent to which its policy and strategy are championed, political and economic conditions, funding pressures and cultural issues.

Higher education institutions (HEIs) involving themselves in a triple helix-like relationship with government and industry in order to meet the country's research and innovation needs require flexibility and coherence, diversity of missions, a commitment to the transformation of organizational cultures, and funding.

In her keynote address on Day 2 of the conference, **Minister of Science and Technology, Ms Naledi Pandor** focused on four issues: the dual system of research funding; the National Research Foundation (NRF) rating system; research niches for universities; and expanding the number of science, engineering and technology (SET) graduates.

The dual system provides diversified support for research in universities, with government funding for research flowing to universities in two streams. The first comes from the Department of Higher Education and Training (DHET) and is for 'basic research'. The original idea, borrowed, as is the concept of the dual system, from the English model, was that this stream would fund a basic level of research activity among university academic staff and provide each with "a well-found laboratory". However, as universities grew larger, this was no longer rational, and in 2006 the new funding formula was introduced. This increased research funding substantially, to the current annual figure of approximately R1.5 billion.

The second stream comes primarily from the Department of Science and Technology (DST), and is allocated for what are categorized as 'projects'. This stream flows to the Research Councils and through the NRF to the universities. The original idea was that it would support promising lines of research, provide central facilities and encourage research in particular fields considered to be of national importance. Other departments contribute to this stream. The Department of Health (DoH), for example, does so through the Medical Research Council (MRC), and the Department of Trade and Industry (DTI) through the Technology and Human Resources for Industry Programme (THRIP), managed by the NRF.

The DST and DHET are thus jointly responsible for South Africa's research and development capacity and activities at universities. Now that the DHET has been established, said the Minister, it is time to review this dual system of support. Budget pressures over the medium

term require the departments to discuss a rational framework, and she expressed the hope that the conference would give impetus to this process. It was her opinion that there is little, if any, engagement between the DHET and the universities on the matter of aligning the use of DHET funds with national research priorities, despite the fact that DHET makes a larger annual contribution to the cost of research in the universities than does the DST through the NRF. It was not clear that DHET funds are being fully re-invested in research and development (R&D) support at individual HE institutions.

The point of this observation, she said, is not that the state ought necessarily to increase its control over those funds, but that the DHET, DST and DTI need to have a conversation about the rationality and coherence of the 'dual support' system.

The Minister then turned to her second point, that of the current NRF rating system, for which there was no clear support among academics. She referred to two South African researchers who in 2009 won R1m each from the Gates Foundation's "Grand Challenges in Global Health" programme. These awards were for innovative, early-stage projects. In the same year, Dr Lucas Ntyintyane was the recipient of the 2009/2010 International Clinical Research Fellowship from the Fogarty Institute and Vanderbilt University, Washington, DC. These individual successes on the international stage reflect the excellent basic scientific education in the country. Proceeding from the premise that knowledge is not a zero-sum game, the Minister emphasized that these scholars are not necessarily lost to the country.

However, it is a cause for concern if academics perceive that the economic benefits of investing in R&D are under-appreciated here. There is thus a need to maintain and improve basic scientific training in South Africa's universities. Other countries should not be relied on to do it.

This led the Minister to the issue of ratings. The new elite in South Africa's universities are not the rated scientists but those who win massive project funding from abroad. When the national rating system was created in the early 1980s, it was in an attempt to measure research quality using international benchmarks to evaluate researchers' recent output and reputation and thus to predict the likely scientific outputs, outcomes and impacts of proposed research. Recently, and controversially, the system was extended to the social sciences.

The second stream of funding, under the dual system, was intended to provide A-rated scientists with substantial grants for large projects. However, the report of the 2005 internal NRF review strongly proposed a fully merit-driven competitive process of awarding NRF grants on the basis of proposals, taking track-records into account. This would be an improvement on the current NRF policy of using ratings as a gateway to longer-term and continuing funding. Examining the rating system is therefore one of the matters which the DST and the DHET should discuss with a view towards a stakeholder reassessment.

The Minister's third point was the need for Universities of Technology (UoTs) to develop research niches. Over 75% of HE expenditure on research is spent in six universities. As noted

by the OECD *Innovation Review* (2007), the research component of the funding formula is not targeted at developing research capacity in historically disadvantaged institutions (HDIs) or UoTs. Nor does much of the DTI annual transfer for R&D go to these institutions, although there are dedicated interventions for start-up black economic empowerment (BEE) companies. Even THRIP is skewed towards the research-intensive universities.

The OECD *Innovation Review* suggests a Scandinavian model. In this, research funding for rural or regional universities is ring-fenced, and these institutions focus on setting up small research centres with their own research profiles, typically in concert with regional industry. UoTs must, the Minister said, develop research profiles and research capacity, while also training technologists. The 2001 national plan for higher education rejected the structural differentiation of universities into teaching universities and research-intensive universities. However, it accepted the principle of differentiation, which means that each university should set itself a mission that suits the region in which it is situated and is aligned to national development targets. Most have done this and yet the debate on differentiation goes on.

Research indicates that there are UoTs that have built partnerships in high technology fields, while others focus on excellence in teaching or on sustainable rural or regional development. Since 2007, government has invested large amounts in upgrading infrastructure, and proportionately more has been earmarked for those institutions that have not had a research legacy. The impact of this investment and its support for innovation needs to be reviewed, the Minister said.

Upgrading university infrastructure is not the only component of improving research capacity. Linkages between universities and business, and improving the qualifications of staff at UoTs, are critical. The low numbers of staff with PhD qualifications in the country's HE institutions in general is a concern, and is very significantly so for UoTs, particularly because of their newly attained status as universities and related expectations in terms of research development and innovation. UoTs have to make sure that they develop their human capital and research capacity.

In her fourth point, the Minister indicated that a national, postgraduate, development programme is being considered, with the SET human-capital development strategy of DST, jointly developed by DST and DHET, nearing completion. A key constraint to improving the throughput rate of Masters and doctoral students in the university system is that, although this varies across faculties, only 33% of academics have PhDs and are therefore technically competent to guide research students. This is compounded by the fact that many of the 33% are not actively engaged in research.

A well-formulated, focused and properly resourced national staff development strategy for universities is therefore needed. A staff development levy could be utilized for this purpose, or the DHET could earmark a portion of its HEI subsidy. Currently the DST's interventions make only a small contribution to this challenge.

The capacity of established researchers to take on more Masters and doctoral students, and thus to move closer to the annual SET human capacity development strategy graduation targets of the DST and DHET, is limited by their ability to make sufficient time available for supervision, and by the physical constraints of their environments, particularly in the laboratory-based sciences. Because the research training of these post-graduate students is a joint responsibility of the DST and DHET, intervention would ideally require close cooperation between the departments, and could be implemented through the NRF.

The DST has adopted a pipe-line approach in its own human capital development initiatives, and its current programmes which include bursaries (from Honours to doctoral levels) and fellowships at post-doctoral level are geared to give effect to this approach. The DST's flagship programmes are the Centres of Excellence Programme (physical or virtual centres of research that concentrate existing capacity and resources), and the South African Research Chairs Initiative (SARChI). The major challenge that the Department faces is to scale up these interventions and in particular the size and value of bursaries, the size and number of the Centres of Excellence, and the impact and number of the Chairs in SARChI. The target that the government has set itself of producing 3,000 SET PhDs by 2018 requires the current initiatives to be scaled up.

The NRF currently funds only about 10% of the PhDs enrolled in the universities. Despite a number of initiatives, including that of building the next generation of academics driven by HESA, there is a need to develop mid-career researchers at Senior Lecturer level, so that they acquire a recognised status. This would contribute towards creating a clear path towards their becoming well-established scholars and scientists.

In closing, the Minister referred to key areas under current review. The DST and the DHET are engaging the South African Revenue Service in discussions on the need to reduce tax on bursaries, scholarships and fellowships. They are also engaging the Department of Home Affairs on developing a skills-importation strategy for scarce and exceptional skills. Lastly, she pointed to the fact that the linkages between the seven National Research Facilities and the universities could be significantly enhanced. These Facilities could provide additional laboratory space and equipment to cognate university departments, and their research-active staff could be utilized to extend the capacity of university researchers to enrol Masters and doctoral students.

Dr Molapo Qhobela, Deputy Director-General: Human Capital and Knowledge Systems, DST noted that no plan exists for science and technology development, but that there is a strategy which aims to address inequities and inequalities and to ensure alignment with international best practice and with government policy.

This is a time of unprecedented change, said Dr Qhobela, as attention shifts from areas such as defence to energy, IT and biotechnology. The organizational environment has also changed, with the establishment of bodies such as the National Council on Innovation (NACI) and the Academy of Science of South Africa (ASSaf). All of this requires continued production of highly-

skilled academics and researchers. For this to happen, universities and the state must "come to the party" and explore all possible ways of increasing output and maximizing the use of resources.

Ms Kirti Menon, Acting Deputy Director-General: Universities, DHET referred to the shared responsibility of the DHET and of DST for creating the conditions in which research can take place at universities and in which research skills can be developed. There is a clear need for synchronized and relevant policy, she said.

That the rate of growth in post-graduate numbers is low is a matter of grave concern, as is the fact that just five universities account for over 60% of research outputs. While differentiation between institutions is accepted, this is excessive. The Department is evaluating present policy relevant to the development of research capacity. There is a need for more in-depth information on the institutional and research challenges in a very unequal environment.

Professor Robin Crewe, Deputy Vice-Chancellor for Research: University of Pretoria spoke on the question of whether there is a defined role for the HE sector in the implementation of the national research and innovation priorities. The PhD is a key foundation of the research environment. Enormous opportunities arise from DST's Ten-Year National Innovation Plan, in many areas including 'Farmer to Pharma', space science and energy security. But can they be acted on? The institutional landscape is critical, he said, as is international collaboration with research communities far larger and more highly resourced than South Africa's.

Existing policies have brought about change; the South African rate of academic publishing has increased, for example. But there has been no significant growth in the number of PhDs, and the social sciences are neglected. The role of the HEIs in this context is to develop and retain high-quality human capital and to encourage research entrepreneurialism.

Dr Sibusiso Sibisi, President and CEO: CSIR said that the organization has strong links with HEIs but that these can be improved. Partnerships, skills, diversity, science excellence and leadership are all essential to ensuring a better South Africa. New entities such as the Technology Innovation Agency (TIA), and challenges such as those presented by Eskom, all form part of the current landscape and opportunities for research.

It can be difficult, he said, to measure the impact of research, and to choose between those giving long- and short-term results. Among issues to be examined are the shape and size of the parastatals and the HEIs.

Dr Steve Lennon, Managing Director: Corporate Services, Eskom spoke on the role of industry and parastatals in the advancement of national research and innovation priorities. The work of a very large parastatal such as Eskom, including its technical mission, R&D and skills development, is closely aligned with the Ten-Year National Innovation Plan of the DST. It researches issues relating to coal, nuclear power, petroleum and renewable sources of energy including solar power.

A technology needs to be managed throughout its life-cycle, Dr Lennon said, and some of the organization's projects, such as the Medupi power station, are massive and require a considerable range of skills. Finding these is a challenge, which Eskom assists in addressing through initiatives such as its Tertiary Education Support Programme. Through coordination, he said, the skills needed to develop the economy can be built. Dr Lennon indicated that Eskom is very keen to contribute to achieving the objectives of the Ten-Year National Innovation Plan, and is committed to working with the Science Councils and the HEIs to address the energy research needs of the country. Eskom is open to continuous dialogue with other stakeholders to achieve this.

Mr Derek Wilcocks, Managing Director: Internet Solutions, Dimension Data plc focused in his presentation on the ICT research needs of the country. He referred to the frustration of the fact that South Africa produces research of which it cannot always make use. The standard of the graduates from the learnership programmes supported by his company improves annually, but at the macro-level he lamented that the IT skills base is far behind that of comparable countries.

Partnerships between HE and industry overwhelmingly involve parastatals, with companies such as those driving the ICT behind the service sector being less involved. Technology, he said, is vital to productivity and to the production of wealth, and the primary aim in South Africa should be to use rather than to invent. With human resources at its centre, there is a need for a tight virtuous circle to drive the economy. ICT skills and services are highly mobile. HEIs, he said, should ensure that their research findings become a reality in industry; and the HE sector and the Science Councils should extend their partnerships beyond parastatals to include partnerships with companies with the potential to drive and nurture ICT research work in the country.

Speaking on the needs and targets relating to the NRF's initiatives to support the science base and give effect to the implementation of the research and innovation priorities, **Dr Albert van Jaarsveld, CEO and President: NRF** pointed to South Africa's geographical advantages of which the NRF and DST work to take advantage, and also to the many challenges. The NRF has seven investment areas, including established and unrated researchers, applied research and community engagement. The aims of the organization's support for applied research include enabling its application and brokering relevant relationships. Funding is divided into core (less than R300m) and contract and ring-fenced (almost R600m). Some focus areas are being phased out; those being introduced include 'blue sky' and collaborative research, and competitive support for rated and unrated researchers.

Despite such initiatives, he said, Africa is losing high-end skills. A range of strategies is needed to ensure 'brain circulation' rather than 'brain drain'.

Dr Ali Dhansay, Acting President: Medical Research Council described the organisation's agency role, from its origins in the CSIR. With connections to the DoH and the Department of Sports, Recreation and Tourism (DSRT), the Council is both a performer and a funder. Its focus includes training and capacity building. 40% government-funded, its research expenditure is concentrated in key areas including HIV-Aids, tuberculosis and pneumonia, diabetes, and women's and maternal health.

The MRC supports the development of research capacity through initiatives such as career awards for PhDs, awards to institutions, and its own research activities. These initiatives will be scaled up in order to produce a critical mass of scientists in fields prioritized by the Council. The MRC is keen to enhance its partnerships with the universities and relevant Science Councils to address the medical and health research needs of the country.

Dr Mamphele Ramphele, Chairperson of the Board: Technology Innovation Agency, described the mandate of the Agency as being to support a culture of technological innovation. The TIA's mission is to enhance South Africa's global competitiveness and to deliver socio-economic benefits through technical innovation; and its strategic objectives are to coordinate and leverage support. Playing a key role in enabling inbound technology transfer can make the difference between successful local developments and their failure because of a missing ingredient which may be available elsewhere. The innovation eco-system, she said, is part of a bigger world.

Together, the TIA and South Africa's HEIs have the capacity to adapt and adopt known technology. Short courses to encourage innovation are needed and excessive bureaucracy, such as having an Intellectual Property (IP) office in every HEI, must be avoided.

A contradiction which needs to be addressed is that between the country's ability to leverage powerful external partners, and the fact that HEIs are graduating people who do not meet the immediate needs of the economy. She challenged the HE sector to work closely with the TIA to ensure that it successfully executes its mandate and to provide the Agency with ideas about how to improve its performance in line with identified priorities.

The address on the evening of Day 1 of the conference was given by **Mr Kuben Naidoo, Head: Secretariat of the National Planning Commission** in the Presidency. Speaking on the envisaged role of the HE and business sectors in supporting the research needs of the National Planning Commission (NPC), he started by saying that the Commission, a new organisation, has almost no research capacity of its own. However, it can and will draw on the wide expertise in the South African research community, and its twenty Commissioners will include a strong representation from the scientific community.

The NPC has been tasked with drafting a long-term vision and strategic plan for the country, and within eighteen months a Vision 2025 or a Vision 2030 will be tabled for Cabinet's consideration. The Commission will also produce a series of thematic, sectoral and cross-cutting

researched papers on long-terms trends and their policy implications. The areas covered will include climate change, water and food security, energy security, long-term defence capabilities, demographic change, human resource development, infrastructure planning and spatial development. At the rate of four to five a year, over a five-year period twenty sectors will be addressed.

Sound research, a solid body of evidence, and careful examination of local and international best practice is required for this, with the bulk of the research being outsourced to the HEIs and private organisations.

Economic growth and progress, said Mr Naidoo, are almost entirely dependent on technology and innovation and on the institutions that support these. The challenge facing all societies is how to invent new institutions that encourage a higher level of applied, commercially relevant research and development in the private sector. Because the economics of ideas are so different from the economics of things, there has long been a tension in economics about how to support innovation and research. Public funding for research, development and innovation is one method, within a context of well-structured partnerships between universities, HEI and the private sector. Jointly funded research projects between the HEIs and private companies can have high transaction costs and be legally complex, but the benefits of successfully commercialised research outputs outweigh these factors. The old approach was for the state to attempt to 'pick winners'. The new perspective implies a model in which public-private competition and cooperation are important, evolve in distinct ways and present joint organisational options for improving welfare.

The research community, said Mr Naidoo, has a significant role in underpinning the long-term plan for South Africa. A growing research community is essential for sustained growth and social progress, with maximum value being obtained from resources invested in research and development. The country cannot, he said, afford artificial barriers between the public and private sectors.

3 The parallel sessions

Many points made in plenary were re-stated in the parallel sessions. There were, however, additional issues specific to the themes of the sessions, and some of the points previously referred to were mentioned from the perspective of those themes.

Theme 1: Improving research training and research career development

There are a number of national initiatives to attract people into universities and research, and to retain them. These include the DST's SARChI, and the NRF's South African PhD Project. By 2025, this aims to have increased the rate of output of PhDs from about 1200 to around 6000 a year.

Post-graduate training does not relate simply to the production of the next generation of academics but to ensuring that the academic profession, and research careers, are regarded as prestigious and are properly incentivized.

Scene-setting presentations by **Dr Chaya Herman, University of Pretoria** and **Professor Johann Mouton, Centre for Research in Science and Technology**, were followed by discussion.

Issues raised in Theme 1:

- **Funding:** without sufficient funding, it is difficult or impossible to develop significant numbers of high-quality researchers.
- **Students' loan liabilities:** many students have to repay large loans at the end of their undergraduate studies, and this makes it difficult for them to continue with postgraduate work. This is one of the reasons why many South African doctoral students are in mid-career and have family commitments. Ten percent of PhDs are funded by the NRF, but these grants do not cover all of the recipients' expenses, and they can be taxable.
- **Definition of doctorate:** the present policy of recognizing only one type of doctorate limits options and modes of enquiry.
- **Small numbers of potential doctoral students:** the pool is small, and shrinking. Too few undergraduates move into Honours, the starting point for Masters and PhDs. The average time to complete a doctoral degree in South Africa is 4.8 years although this compares quite well with international standards, considering that two-thirds of these students are studying part-time.
- **Late entry into academic life:** many South African students embark on PhDs late in their academic lives. The high average age of doctoral graduates means that they are left with relatively little time for publishing after graduation.
- **Low participation rates by black and women students:** there is an increase in black students but many are from elsewhere in Africa. Southern African Development Community (SADC) students are admitted on the same financial terms as South African students.
- **Motivations for pursuing a doctorate:** it is important to know to what extent having a doctorate is perceived as an aspect of personal development rather than as a contribution to knowledge and the economy.
- **Limited supervisory capacity:** only one-third of South African academics have PhDs. A similar percentage, mostly in UoTs, does not have Masters degrees and thus cannot supervise. The professoriate is ageing, and the low rate of production of PhDs has long-term implications for the numbers of people available to supervise and for the quality of supervision.
- **Financial rewards for publishing:** supervisors need to have a record of academic publication. Government funding has increased to R 117,000 per article published in an approved journal. Some of this goes to the researcher, and this is a significant incentive.
- **Loss of senior academics to management:** these productive researchers are lost to academic work and to postgraduate supervision.

- **Untapped supervisory capacity in research councils and national research facilities**: more advantage needs to be taken of this.
- **Joint supervision and structured internships:** these are perceived not to work well.

Recommendations: Theme 1:

1. **Increase funding for post-graduate students**, **to incentivize students to pursue post-graduate work.** To produce a critical mass of PhDs in South Africa, post-graduate research funding from DHET, DST and DTI should be rationalized and maximized. HESA is tasked with convening a meeting with the Directors-General of the three departments to bring this issue to their attention, and to lobby strongly for rationalized and maximized research funding for the universities in order to achieve the policy goals and targets set by the departments. The basis of this engagement could be the envisaged HESA report on building the next generation of academics.
2. Support **fewer students** but give **more funding to each.** Many students have great difficulty in funding post-graduate study. If the current Masters and PhD drop-out rates are to be reversed, more funding is required for full-time students.
3. Encourage **academic entrepreneurship**, and search out funds linked to cooperation opportunities with industry or other sectors. HESA should engage the public and private sectors on the issue of funding post-graduate studies. Systematic engagement with big business, and with government departments other than DHET, DST and DTI, on funding these studies through bursaries, scholarships and fellowships related to their own areas of interests should be encouraged.
4. **Move away from the "one size fits all" doctoral model** towards the US-type research and course-work model. Given the challenges that the sector faces in producing sufficient PhDs, HESA should advocate a change to the present policy so that course-work PhDs can also be subsidized. Currently, the institutions that offer these fund them from their own resources, and they are limited in what they can afford. Such a policy change would assist in promoting professional as well as academic doctorates, project-based degrees and competency modules. This would have a major impact on the system's ability to produce more PhDs.
5. **Increase the number of high school matriculants qualifying for university entrance**, especially in science and mathematics. To increase the number of students interested in pursuing post-graduate studies in SET, it is important for the DST to press ahead with its initiatives to increase public understanding of science and to create awareness amongst high school graduates about careers requiring higher degrees in SET. HESA's National Information System for Higher Education Project and Science, and the Youth Initiatives of the DST, should work collaboratively to increase the number of students interested in pursuing SET degrees.
6. **Strengthen undergraduate teaching** to ensure a wider pool of Masters and PhD

students. Currently, weak first-degree qualifications prevent many from proceeding to postgraduate study.

7. Increase the progression of Honours graduates to Masters and PhD levels through **Masters-doctorate linked scholarships**. Note, however, that the Honours-Masters-doctoral scholarships offered by the NRF appear to have quality issues at transition points. Matters of this kind must be addressed if this recommendation is to be pursued.
8. Intervene to ensure that **black and women students** move to Masters and doctoral levels. Earmarked funding for academically deserving black and women students is needed.
9. Utilize **untapped supervisory capacity in research councils and industry**. Encourage **retired senior academics** to move back into the system. Rules on the taxation of pensions currently make this difficult, and this issue should be addressed. Attract **academics who are in management** back into teaching, especially mid-career black academics. HESA should develop a framework of guidelines for HEIs and Science Councils to collaborate on this.
10. Find solutions to problems relating to the **division of subsidies between HEIs.** These currently inhibit joint supervision. HESA should develop a framework for fostering a culture of joint supervision of post-graduates between two or more HEIs.
11. Consider adopting the US model of **teams of supervisors**, thus increasing the intellectual reach of supervision.
12. Promote the idea of **postgraduate mentorship** to complement formal supervision. Build postgraduate capacity at sectoral levels with partners such as the South-Africa Netherlands Research Project on Alternatives in Development (SANPAD).
13. Explore and implement concepts such as an **academy for supervisors.**
14. Improve the **salaries of academics**. Engagement with the DHET on this issue is long overdue, and HESA should take advantage of the impending funding review to put the matter firmly on the agenda of the DHET. Again, the basis of HESA's engagement on this matter is the final report on building the next generation of academics.
15. Insist on the achievement of **higher degrees, especially PhDs, for all academic positions advertised in universities.**
16. An integrated **national planning strategy for expanding doctoral production** is required. HESA's project to build the next generation of academics is a contribution to this. Within the national strategy, ensure that issues such as maintaining the quality of doctorates are addressed.

Theme 2: Research equipment/infrastructure as an enabler of thriving research and innovation in South Africa

Research equipment and infrastructure are generally expensive. Dwindling financial resources and infrastructure backlogs are among the biggest challenges facing HEIs. The state can intervene when there are perceptions of failure in governance, but should it not also do so when the academic project is at risk due to lack of resources? It can be argued that it should not be the responsibility simply of individual institutions to ensure that researchers have the research tools that they need for their work. This can be seen as penalizing individuals and as detrimental to the national research and innovation effort.

Scene-setting presentations by **Ms Rakeshnie Ramoutar, Strategic Platform Programme Director: NRF, Dr Prins Nevhutalu, Deputy Vice Chancellor, Research Partnerships: Tshwane University of Technology,** and **Professor Colin Wright, Head of Research: Centre for High Performance Computing, Meraka Institute, CSIR** were followed by discussion.

Issues raised in Theme 2:

- **Research equipment** is not only a practical element in research but promotes intellectual companionship between institutions.
- There is a need for a country-wide **audit of large and state-of-the-art equipment**, including that held within industry and by Research Councils. Such an audit should not only identify what exists but also where there are significant gaps. HESA's *Infrastructure and Equipment Study* of HEIs can provide a basis of such an audit.
- Policies and instruments for **equitable research funding** are needed in order to build a coherent South African research landscape and to level the playing field.
- The fact that rural HEIs are not connected to the **South African National Research and Education Network (SANREN)** is a serious problem. On their behalf, HESA should consider requesting that they be included in the network.
- The **total cost of ownership of research equipment** should be taken into account when funds are allocated. This includes the capital cost, maintenance, training in the use of the equipment, and mobility grants to enable travel to use it.
- There has been an improvement in the allocation of research equipment to university researchers, and the number of black male grant holders is now on a par with white males. However, there are still **comparatively few female grant holders**.

Recommendations: Theme 2

1. **Tap the research resources of the Science Councils** more effectively by the wider research community. HESA should formalize its engagement with the Councils and other national facilities to promote this.
2. **Collaborate through research equipment**. This can focus common research

interests and promote collaboration through, for example, planning and commissioning workshops, mobility grants, creating an equipment database and establishing regional and national equipment centres.

3. **Investigate the funding of equipment for collaborative units or teams across institutions**. The current subsidy policy discourages such collaboration. HESA is tasked with leading discussions with DHET and DST to address this.
4. **Increase broadband connectivity** in order to create a more equitable research community and provide the more isolated research institutions with access to the full resources of the system.
5. **Create and maintain a national database of research equipment**. This is the intention of the NRF. It should include information about equipment at HEIs and Research Councils and in the private sector, and indicate gaps that need to be filled.
6. **Fully cost and fund research equipment grants**. These should include the cost of using and maintaining the equipment, insurance, technician training, and mobility grants to enable access by researchers at a distance.

THEME 3: Strengthening partnerships and internationalization efforts

There are many reasons why mutually beneficial partnerships should be one of the pillars of HE's research, innovation and development strategy. The South African research community is comparatively small; many academics are not research-active; and those who are may have diverse and divergent interests. South Africa's 'academic isolation' because of its location, the academic boycott in place until 1994, relatively poor telecommunications connectivity, limited access to the international knowledge-base and financial constraints all have potentially negative effects on the country's research environment and on individuals' productivity.

Partnerships enable sharing of resources and exchange of ideas. Students often learn better when they are in a team, with higher completion rates than for those working in isolation. Sharing, and forming partnerships, may not however come naturally to academics and HEIs, and there can be competition for prestige, resources and talent. The HE sector should identify obstacles to beneficial partnerships and collaboration, and work towards removing them. The relatively small South African research sector cannot afford unnecessary fragmentation and competition.

Since 1994, a number of bi- and multi-lateral agreements have been established, many envisaging research, with staff exchanges, student mobility and joint research programmes. Little advantage, however, has been taken of these agreements, even though many relate to issues identified as research priorities for the country. HESA should examine why its member

institutions have failed to take advantage of these opportunities, and work to rectify the situation.

The presentations by **Professor Adam Habib, Deputy Vice-Chancellor: Research, Innovations and Partnerships, University of Johannesburg, Dr Chris Nhlapo, Deputy Vice-Chancellor: Research, Technology Innovation, Partnerships and Academic Planning, Cape Peninsula University of Technology** and **Professor Alfred Terzoli, Computer Science Department, Rhodes University** were followed by discussion.

Issues raised in Theme 3:

- The **South African diaspora** represents a partnership resource of enormous potential, including for the appointment of Research Chairs (although the diaspora is not homogenous, and after one or two generations involvement with the country of origin tends to decrease.) South African universities are encouraged to use short-term contracts when appropriate. The academic benefits for academics in the diaspora in working on research and innovation with South African HEIs should be stressed.
- The **relocation outside the country of some companies' head offices** means that less research and innovation is taking place here.
- South African universities should **prioritise collaboration between neighbouring institutions**, such as that in the Rhodes/Fort Hare case study presented in the session. This collaboration is comparatively easy to achieve, and can also strengthen university-community relationships.
- **Partnerships** can broker access to resources and technologies. South Africa is still a developing country, and needs access to new and evolving technologies and to the global community generally. Partnerships can also help institutions and systems to move away from provincialism. Universities involved in partnerships should differentiate their needs, strengths and interests in teaching and research, and identify the related levels of investment required.
- Should collaborations be **Africa-focused or global-focused**? Partners should be chosen strategically. There have been unsuccessful partnerships on the continent; a range of south-south partnerships should be considered.
- There is no **structured support for international partnerships from government or the private sector**, and there can be a tendency to politicize rather than to focus on the research issues.
- There is a perception of **competition between institutions** within South Africa. This may be understandable, but it can undermine or prevent valuable partnerships.
- The Department of International Relations and Cooperation was established without reference to or involvement of the HE sector. This reflects a **fragmented approach**.
- **Developments in all relevant government departments should be monitored**. For example, Treasury has launched a new development assistance fund for Africa. Can this become part of the research agenda?

- With **e-communications**, it is not always necessary for those involved in collaborations, including students and supervisors, to meet in person.

Recommendations: Theme 3

1. Given that South Africa cannot ensure genuine endogenous and sustainable development, its HE system must **share knowledge and new technologies, and co-operate with counterparts in other parts of the world**. HESA, in collaboration with DHET, DST, the Department of International Relations and Cooperation (DIRCO) and other government departments should develop and implement an *South African Higher Education Internationalisation Framework* for the sector informed by the National Research Strategy and Ten Year Innovation Plan and current institutional initiatives under way.
2. To **strengthen partnerships between South Africa and other systems in the world and to identify gaps**, HESA in collaboration with DHET, DIRCO and DST's Oversees International Cooperation Chief Directorate should conduct a study of available funding mechanisms such as NRF, India, Brazil, South Africa (IBSA), South Africa-Japan University Forum (SAJU), Deutscher Akademischer Austauschdienst (DAAD) and the European Union (EU). Such a study should then be used as the basis for lobbying government for more funding.
3. In the medium to long-term, HESA, government and industry should **carry out a study of the significance of the international mobility of talent from and to South Africa**, including students, academics and skilled workers.
4. In order to assess areas where Masters, doctoral, post-doctoral students and researchers should be brought into South Africa, HESA should **develop and maintain a database of all post-doctoral students and Fellows in the country**, indicating their country of origin and areas of specialization.
5. In order to increase the number of incoming post-graduate students to South Africa, working with the International Education Association of South Africa (IEASA) and individual institutions, HESA should **promote, through publications and other appropriate media forms, the post-graduate programmes available in South Africa** to the untapped market in other African countries and within the African diaspora.
6. Recognising that South African HE is small by international standards and to increase the core of experienced and productive researchers in the South African system SARChI should **prioritise the recruitment of Chairs from the African diaspora**.
7. HESA should **engage with the National Treasury and DIRCO about the envisaged South African Development Partnership Agency**, and establish the extent to which

such a funding agency's work will depend on HE research.

THEME 4: Obstacles to innovation: procurement, intellectual property rights, investment and innovation

There can be a perception that innovation necessarily involves developing new and advanced solutions, particularly to meet a sophisticated and wealthy demand. However, innovation importantly also means finding new or improved approaches to existing products and processes. Even so-called low-tech industries provide the potential for innovation, and the economic benefits of this may be substantial.

Innovation is intrinsic to international competitiveness and economic growth, and is essential to escaping the trap of low development.

Obstacles to innovation can include, for example, procurement policies. Paragraph 13(5)(a) of South Africa's *Preferential Procurement Policy Framework Act No 5, 2000* states, "Preference points may not be awarded to public companies and tertiary institutions". Universities tendering for government projects are therefore at a disadvantage compared with competing institutions, and this can limit the application of innovative solutions. Similarly, the *Intellectual Property Rights from Publicly Financed Research and Development Act, 2009* has been criticised as excessively controlling research findings, products and processes. The unintended consequence of such legislation can be to slow down research and to trap potentially productive knowledge in a gridlock, unusable by scientists or industry. The regulatory environment should enable scientists to contribute to the knowledge commons by promoting open access to knowledge, open innovation policies, collaboration and the philosophy of open source.

The presentations by **Professor Mohammed Jeenah, Vice-President, Agricultural Research Council** and **Professor Anastassios Pouris, Director: Institute for Technological Innovation, University of Pretoria** were followed by discussion.

Issues raised in Theme 4:

- **Bureaucracy, and policies with unintended consequences**, can be obstacles to, rather than enablers of, innovation by universities.
- In the context of fully funded projects, researchers may "go underground" when required to register **patents**.
- Ownership of **intellectual property** (IP) by universities needs to be clarified. Although IP legislation is seen by some as the "death of science", it has positive aspects for the HE sector. These include ownership by HEIs of IP, and benefit-sharing among the inventors of the IP.

Recommendations: Theme 4

1. **HESA should establish a monitoring mechanism** to assess the impact of policy instruments on HEIs. A quarterly or semi-annual report should be produced and discussed at the HESA Board, and shared with the member institutions.
2. **Review the national research and innovation agenda**: as part of a systematic review of all issues relating to the national research and innovation agenda, HESA should draw up a position paper on the Technology Innovation Agency (TIA), given its potential impact on national research funding priorities.
3. **Review IP legislation and regulations**: some regard these as contentious. HESA should appoint an expert-driven task team to analyse the implications of these regulations on the sector, and facilitate the sector's engagement and ultimately the development of a position paper for consideration by government.
4. **Consolidate the proposed regional National Intellectual Property Offices (NIPMOs)**: this would reduce costs and duplication.
5. HESA and its stakeholders should continue to make constructive inputs to ensure that **legislation** is in the interest of HE and of the public generally.
6. To ensure that policy assists and does not hinder research and innovation, HESA should **establish a system for monitoring the impact of policy on HE**, including the establishment of the TIA, and procurement policies.

Theme 5: Research and innovation funding

It is widely asserted that research and innovation in South Africa are grossly under-funded. It is vital that the country realises that funding is central to a vibrant, innovative and creative research community. Funding from government is highly fragmented, with departments having their own research funding streams, and there is a need to consolidate some of these for greater impact.

In a situation of shrinking budgets where universities have to prioritise expenditure, research budgets tend to be cut. As institutions have autonomy in spending their income, researchers at different institutions thus receive different levels of funding. This leads to highly varying research environments and levels of productivity.

The scene-setting presentations by **Professor Belinda Bozzoli, Deputy Vice-Chancellor: Research, University of the Witwatersrand** and **Dr Neo Molotja, Senior Research Specialist: Knowledge Systems, Human Sciences Research Council** were followed by general discussion.

Issues raised in Theme 5:

- **Surveys by the Human Sciences Research Council (HSRC)** are being used to advise government on the allocation of research resources. This should be taken seriously by the HE sector.
- **Aligning the perspective of funders and researchers:** funders generally have a short-term view, focusing on skills and training and on the range of skills relating to Further Education and Training (FET), and being prepared to fund marginal costs. Researchers tend to have a longer-term perspective, to assume a broad definition of education, and to be based at universities which offer a full range of disciplines. A bridge is needed between these perspectives.
- Research and development surveys suggest that the South African research system is operating reasonably well, although some projects and activities may not **focus on solutions needed within the country**.

Recommendations: Theme 5

1. Serious and sustained **collaboration** and engagement between all role-players are needed. HESA should promote this, not only between government, industry and HE but with those state finance institutions, such as the Development Bank of Southern Africa and the Industrial Development Cooperation, with a mandate to fund research and development.
2. As there is duplication of funding by state institutions, **a dialogue within government on rationalization of funding resources should be initiated**. As part of its advocacy work, HESA should engage all relevant government departments on this matter.
3. Given the urgent need to develop the next generation of academics and researchers in South Africa, and subject to the recommendations of the HESA Working Group on **building the next generation of academics**, HESA should **strongly advocate new, ring-fenced, funding** for this. Engagement with all relevant government departments and Ministries, and with the National Planning Commission and the Human Resources Development Council, should be prioritized.
4. To assist with meeting the national research and innovation policy targets, an **international benchmarking study of research and innovation funding** is needed.

4 General Recommendations

1. The **five grand challenges** from the Ten-Year Innovation Plan for South Africa released by the DST in 2008 should be a blue-print to guide research activities in HEIs. Post-

graduate training should thus be concentrated in these five areas in order to produce a critical mass. Linked to this, a mechanism should be found by the DST to conduct a mid-term review of the National Research Strategy and Innovation Plan as part of its policy monitoring and evaluation function.

2. The **South African Research Chairs Initiative** (SARCHi) should be massively scaled up (including the grant values and number of Chairs) if PhD production is to be increased. HESA should engage the DST to lobby for new funding for this. While SET disciplines are important, in awarding the Chairs attention should also be paid to the humanities.
3. The **Centres of Excellence** initiative should also be scaled up to foster regional and national collaboration between the country's HEIs. This should also ensure alignment between HEIs' research activities and national priorities.
4. In light of the impending **review of the national funding framework** for HE, HESA should engage the DHET to underscore the importance of making available adequate funding for research. Consideration should also be given to how the National Skills Fund can augment the funding of research activities in HEIs, particularly in relation to post-graduate training.
5. In collaboration with ASSAf, HESA should develop a strategy on the **rejuvenation of vulnerable disciplines** and those faced with a possibility of extinction. These include Philosophy, Statistics and Computational Mathematics, and should be promoted as important building blocks of the academic and research enterprise.
6. HESA should facilitate joint engagement with the DHET, DST and DTI about the rationality and coherence of **the 'dual support' system**.
7. HESA should establish a **task team to develop a position on the TIA**, with recommendations on how its funding could assist in improving the research and innovation outputs of the HEIs.
8. HESA should find ways of **reaching out to organized business** to ensure that the business and HE sectors share research resources, including equipment such as laboratories.
9. HESA should engage the DST and DHET and **lobby for the revival of the COHORT (CEOs of Science Councils) and HESA Board interactions** to ensure greater coherence and collegiality between government and the sector in the area of research and innovation.
10. HESA should address the issue of **self-differentiation within the sector** to ensure that universities that are not research-intensive are not financially disadvantaged due to their small research outputs. Robust discussion is required within the sector to develop policy options on differentiation for consideration by the DHET.
11. In order to improve the governance structure of the research and innovation system in South Africa, and to **strengthen cross-departmental and cross-agency cooperation and coordination,** consideration should be given to the creation of a high-level committee under the leadership of the Minister responsible for the National Planning Commission. This could be a sub-committee of the National Planning Commission.
12. Given that initiatives to promote internationalization of the South African HE system have had uneven success, in the medium to long-term HESA should carry out **an analysis of bilateral and multi-lateral agreements** between the South African and other

governments and/or multi-lateral organizations. It should assess the extent to which these agreements have cooperation implications for HE, and engage government to make funding available for cooperation and collaboration between South African universities and their counterparts in other parts of the world. This could lead to the development of a sector position paper on how South Africa can take advantage of these agreements to promote student and academic exchanges and generally collaborate with other institutions internationally.

13. In order **to give practical expression to the implementation of these resolutions**, HESA is advised to:
    i. **Establish a formal HESA Task Team** under the auspices of the Research Strategy Group (RSG) to **engage key stakeholders** including government, organized business and other relevant HEIs, jointly or separately, about the resolutions.
    ii. Stage a **bi-annual HE, government and industry conference** to review progress on the implementation of the 2010 conference and to discuss emerging priorities in the research and innovation landscape. The next conference is thus proposed for March 2012.
    iii. Establish a **joint Task Team** involving HESA (driven by the RSG), government (DHET, DST and DTI) and industry (including parastatals, Business Unity South Africa and Business Leadership South Africa) to meet semi-annually between conferences with a mandate to **drive and monitor the implementation of the resolutions of the conference** and generally to identify and pursue research and development partnership initiatives.

Appendix 1: Conference programme

THEME:
STRENGTHENING COLLABORATION BETWEEN HIGHER EDUCATION, GOVERNMENT AND INDUSTRY FOR RESEARCH AND INNOVATION

DAY 1 – THURSDAY, 11 MARCH 2010

09h00 – 09h45: Refreshments upon arrival; Registration

SESSION CHAIR: PROF LOYISO NONGXA

10h00 – 10h10: Opening and welcome – ***Prof Errol Tyobeka, Chairperson, HESA Board***

10h10 – 10h20: Purpose of the conference – ***Prof Loyiso Nongxa, Chairperson, HESA Research Strategy Group***

10h20 – 10h40: Keynote address – ***Prof Cheryl de la Rey, Vice Chancellor and Principal, University of Pretoria***

10h40 – 10h45: Questions and Answers

10h45 – 11h15: Tea Break

SESSION CHAIR: PROF BELINDA BOZOLLI

A panel discussion on the sub-theme: A review of the research and innovation policy landscape focusing on functions and mandates of various role players, achievements, challenges and prospects

11h15 – 11h30: The (re)conceptualisation of the Research and Innovation policy for South Africa: A reflection on the system's performance in relation to policy intents, targets, and challenges and how to address them – ***Dr Molapo Qhobela, Deputy Director-General: Human Capital and Knowledge Systems, Department of Science and Technology***

11h30 – 11h45: A reflection on the Department of Higher Education and Training's initiatives to support research by the Higher Education sector with special reference to successes, challenges and plans to address them – ***Ms Kirti Menon, Acting Deputy Director-General: Universities, Department of Higher Education and Training***

11h45 – 13h00: Panel discussion – the two Directors-General will be joined by **Prof Arnold van Zyl**, Vice-Rector: Research, University of Stellenbosch and **Prof Robin Crewe**, President of the Academy of Sciences of South Africa (ASSAf) and **Prof Nelson Ijumba,** Deputy-Vice-Chancellor: Research, University of Kwazulu-Natal.

13h00 – 13h45: Lunch

SESSION CHAIR: PROF ARNOLD VAN ZYL

Sub-theme: The roles of government, higher education and industry in the implementation of the national research and innovation priorities

13h45 – 14h00: Is there a defined role for the Higher Education sector in the implementation of the national research and innovation priorities? An overview – ***Prof Robin Crewe, Deputy Vice-Chancellor: Research, University of Pretoria***

14h00 – 14h15: An overview of the science councils' contribution to the national research and innovation needs: towards strengthening partnerships with the Higher Education Sector – ***Dr Sibusiso Sibisi, President and CEO, Council for Scientific and Industrial Research***

14h15 – 14h30: The role of industry and parastatals in the advancement of national research and innovation priorities – ***Dr Steve Lennon, Managing Director: Corporate Services, Eskom***

14h30 – 14h45: Meeting the ICT sector research and innovation priorities and needs: Proposals for a strengthened partnership between higher education sector, industry and government – ***Mr Derek Wilcocks, Managing Director: Internet Solutions, Dimension Data plc***

14h45 – 15h35: Panel discussion

15h35 – 15h55: Tea Break

SESSION CHAIR: PROF ADAM HABIB

Sub-theme: The contribution of funding agencies in support of the implementation of research and innovation priorities of South Africa

15h55 – 16h10: National Research Foundation's Initiatives to support the science base and give effect to the implementation of the research and innovation priorities: needs and targets – ***Dr Albert van Jaarsveld, CEO and President of the National Research Foundation***

16h10 – 16h25: The agency role of the Medical Research Council (MRC) in supporting the national research, innovation and science base needs and development – ***Dr Ali Dhansay, Acting President, Medical Research Council***

16h25 – 16h40: Walking together to strengthen human capital in science and technology – ***Dr Mamphele Ramphele, Chairperson of the Board, Technology Innovation Agency (TIA)***

16h40 – 17h20: Panel discussion

17h20 – 17h30: Summary of proceedings and closure – ***Prof Duma Malaza, Chief Executive Officer, Higher Education South Africa***

18h30 – 20h30: **GALA DINNER**

SESSION CHAIR: PROF ROBIN CREWE

Keynote Address: The envisaged role of the higher education sector, business sector and science councils in supporting the research needs and priorities of the National Planning Commission – ***Mr Kuben Naidoo, Secretariat, National Planning Commission, The Presidency***

DAY 2 – FRIDAY, 12 MARCH 2010

07h00 – 07h45: Refreshments upon arrival; Registration

SESSION CHAIR: PROF DUMA MALAZA

08h00- 08h05: Opening and welcome – ***Prof Irene Moutlana, Deputy Chairperson of the HESA Board***

08h05 – 08h25: Keynote address – ***Ms Naledi Pandor, Minister of Science and Technology, Republic of South Africa***

08h30 – 12h30: **FIVE PARALLEL DISCUSSION SESSIONS**

Theme 1: Improving research training and research career development

Moderator, Prof Tinyiko Maluleke, Executive Director: Research, University of South Africa

a Reflections on the challenges facing the production of Masters and PhDs in South Africa and initiatives to address them – ***Dr Chaya Herman, University of Pretoria***
b Increasing the production of postgraduate students in South Africa: Options and solutions – ***Prof Johann Mouton, Centre for Research in Science and Technology, University of Stellenbosch***

Theme 2: Research equipment / infrastructure as an enabler for the thriving of research and innovation in South Africa

Moderator: Prof Liesbeth Botha, Executive Director: CSIR Materials Science and Manufacturing, Centre for Scientific and Industrial Research

a A reflection on key issues and trends emerging from the current state of research equipment and national facilities – ***Ms Rakeshnie Ramoutar, Strategic Platform Programme Director, National Research Foundation***

b Are there opportunities for collaboration amongst universities on research equipment: practical proposals of fostering a collaborative culture – ***Dr Prins Nevhutalu, Deputy Vice Chancellor, Research Partnerships, Tshwane University of Technology***

c Cyber infrastructure and the knowledge triangle – ***Prof Colin Wright, Head: Research, Centre for High Performance Computing (CHPC), Meraka Institute, CSIR***

Theme 3: Strengthening partnerships and internationalization efforts

Moderator: Prof Aldo Stroebel, Director: International Affairs, University of the Free State

a A review of existing internationalization platforms (SAJU, IBSA, DAAD, EU etc) to advance National Research and Innovation Effort: Distilling Key Lessons and best practices for the sector – ***Prof Adam Habib***, ***Deputy Vice-Chancellor: Research, Innovation and Partnerships, University of Johannesburg***

b Strengthening diaspora networks to contribute to the National Research and Innovation System in South Africa – ***Dr Chris Nhlapo, Deputy Vice-Chancellor: Research , Technology Innovation, Partnerships and Academic Planning, Cape Peninsula University of Technology***

c Creating partnerships for research and innovation: the case of the Computer Science departments at Rhodes and Fort Hare Universities – ***Professor Alfredo Terzoli, Computer Science Department, Rhodes University***

Theme 4: Obstacles to Innovation: procurement, intellectual property rights, investment and innovation

Moderator, Dr David Phaho, Chief Executive Officer, Tshumisano Trust

a Intellectual Property Rights in South Africa: obstacles, opportunities and implications for Higher Education Sector Research and innovation – ***Prof Mohammed Jeenah, Vice-President, Agricultural Research Council***

b Obstacles for the creation of an Innovation Society: Higher Education Research and Innovation in South Africa – ***Prof Anastassios Pouris, Director: Institute for Technological Innovation, University of Pretoria***

Theme 5: Research and innovation funding

Moderator: Prof Amanda Lourens, Vice-Rector: Research and Planning, North-West University

a A critical review of the research and innovation funding framework in South Africa – ***Prof Belinda Bozolli, Deputy Vice-Chancellor: Research, University of the Witwatersrand***

b Improving research and development expenditure in the Higher Education Sector: Trends from R&D and innovation surveys – ***Dr Neo Molotja, Senior Research Specialist: Knowledge Systems, Human Sciences Research Council***

SESSION CHAIR: PROF NELSON IJUMBA

12h30 – 13h20: Reports from the five theme moderators (*10 minutes per group*)

13h20 – 13h30: Summary of the proceedings, proposed way-forward and closing remarks – ***Prof Loyiso Nongxa, Chairperson of Research Strategy Group, Higher Education South Africa***

Lunch & departure

Appendix 2: Conference participants

NAME	DESIGNATION	INSTITUTION
Ms Yolanda Davids	Director: Scholarships	National Research Foundation
Mr Anthony Khatle	Chief Executive Officer	APPETD
Mr Theo Schoeman	Chief Executive Officer	Centurion Akademie
Dr Michael Booth	Director: Information	Chemical & Allied Industries' Association
Prof Rolf Stumpf	Acting CEO	Council on Higher Education
Mr Mlungisi Cele		Department of Science and Technology
Mr Mandla Khoza	Deputy Director	Department of Trade and Industry
Dr Nadene Slabbert	Director: Resource Quality Services	Department of Water Affairs
Prof Annelie Jordan	DVC: Technology & Innovation	Durban University of Technology
Prof Howard Roy Du Pré	Vice-Chancellor	Durban University of Technology
Prof Nomthandazo Gwele	DVC: Academic	Durban University of Technology
Dr Jeffrey Mabelebele	Director.: Operations & Sector Support	Higher Education South Africa
Dr Bernice Nonkwelo	Programme Director	National Research Foundation
Dr Ndanduleni Nthambeleni	Director: International Research Grants	National Research Foundation
Ms Rakeshnie Ramoutar	Programme Director	National Research Foundation
Dr Romilla Maharaj	Executive Director	National Research Foundation
Dr Blanche Pretorius	Director: Research Capacity Dev.	Nelson Mandela Metropolitan University
Dr Pieter Van Breda	Research Director	Nelson Mandela Metropolitan University
Ms Jacqueline Barnett	Director: Technology Transfer	Nelson Mandela Metropolitan University
Prof Tokozile Mayekiso	DVC: Research	Nelson Mandela Metropolitan University
Prof Jan Kroeze		North-West University
Dr Theuns Eloff	Vice-Chancellor	North-West University
Prof Linda Du Plessis		North-West University
Mrs Imelda Koen		North-West University
Prof Frederik Van Niekerk	Executive Director: Research	North-West University
Prof Amanda Lourens	Vice-Rector: Research and Planning	North-West University
Dr Peter Clayton	DVC: Research & Development	Rhodes University
Ms Carline Kriel	Office Manager	SARIMA
Ms Khathutshelo Khashene	Lecturer	Stellenbosch University
Mr Fankie Monama	Lecturer	Stellenbosch University
Dr Thean Potgieter	Director	Stellenbosch University
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