NACI annual report
— 2005/2006 —

National Advisory Council on Innovation

Innovation for a better future

Innovation for a better future

Cover page illustration: The Southern African Large Telescope, inaugurated in Sutherland November 2005

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Abstracts of Annual Report - 2005/06

Afrikaans

Die statutêre opdrag van die Nasionale Adviesraad op Innovasie (NACI) is om die Minister van Wetenskap en Tegnologie oor sake rakende wetenskap, tegnologie en innovasie te adviseer. Herdie jaarverslag bied 'n oorsig van NACI se bedrywighede en prestrasies gedurende die 2005/2006 finansiële jaar. Die hoofkenmerke van die jaar se bedrywighede kan in terme van vier oorhoofse ontwikkelinge beskryf word. Eerstens het NACI suksesvol sy strategiese fokuspunte en die toewys van werk aan vyf subkommittees geïmplementeer. Sodoende is voorsiening gemaak vir 'n mate van spesialisering in die bydraes van raadslede. Tweedens is 'n portefeulje van 16 bewys-gebaseerde studies gelanseer en is goeie vordering daarmee gemaak. Die portefeulje dek die volgende prioritieite: menslike hulpbronne vir die nasionale innovasie-sisteem (NIS) (insluitende geslagspesifieke aangeleenthede), die optimalisering van die infrastruktuur en gebruike vir 'n produktiewe NIS, en die uitkoms en impak van beleggings in navorsing en ontwikkeling (insluitend die produktiwiteit van die stelsel). Ministeriële advies, gebaseer op hierdie studies, sal ontwikkel word sodra hulle in die eerste helfte van die 2006/2007 finansiële jaar voltooi is. Derdens is die jaar gekenmerk deur NACI se strewe om met ander organisasies, nasionaal sowel as internasionaal, te skakel en saam te werk. In dié verband kan, byvoorbeeld, verwys word na NACI se deelname aan die werksaamhede van die Joint Initiative on Priority Skills Acquisition (JIPSA) wat deel uitmaak van die regering se Accelerated and Shared Growth Initiative of South Africa (ASGISA) program. Hierdie jaarverslag word afgesluit met 'n oorsig van belangrike ontwikkelings in die nasionale innovasiesisteem wat gedurende die jaar 'n konteks gevorm het waarbinne NACI bedrywig was.

English

The statutory mandate of the National Advisory Council on Innovation (NACI) is to advise the Minister of Science and Technology on matters pertaining to science, technology and innovation. The *Annual Report 2005/2006* offers an overview of NACI's business and achievements during the year. The main features of the year's business can be characterised as having consisted of four cross-cutting developments. Firstly, NACI successfully implemented its strategic thrust system of allocating business to five sub-committees and in this way encouraging some specialisation in the work of the Councillors. Secondly, a portfolio of 16 evidence-gathering studies was launched, and very good progress was made in all cases. The portfolio covered the following priorities: human capital for the national system of innovation (NSI) (including gender-specific issues), optimising the infrastructure and practices for a productive NSI, and the outcomes and impact of investment in R&D (including the performance of the NSI). Ministerial advice will be developed as soon as these studies have been completed, early in the 2006/2007 financial year. Thirdly, the year was characterised as one in which NACI continued to extend its association and collaboration with other organisations, both nationally and internationally. In this regard, NACI is, for instance, actively participating in the work of the Joint Initiative on Priority Skills Acquisition (JIPSA) of the government's Accelerated and Shared Growth Initiative of South Africa (ASGISA) programme. This *Annual Report 2005/2006* concludes with an overview of important developments in the NSI, summarising the context within which NACI operated during the reporting year.

Ndebele

Igunya langokomthetho le National Advisory Council on Innovation (NACI) kuyelelisa uNgqongqotjhe wezeSayensi neTheginoloji eendabeni eziphathelene neSayensi, neTheginoloji kunye nokwakhiwa kabutjha kweensetjenziswa zeTheginoloji. *Umbiko wonyaka ka* 2005/2006 ukhombisa ngokuzeleko umsebenzi kunye nepumelelo ye NACI kilonyaka. Umsebenzi oqakatheke khulu onyakeni kukobana kufunywane iindlela ezine ezilula zokuthuthukisa. Kokuthoma, I-NACI iphumelele ekwenzeni amano wayo msinyazana ngokunikela amakomidi amahlanu imisebenzi godu lokhu kuyindlela yokukhuthaza umsebenzi okhethekileko womkhandlu. Kwesibili, ibuthelelo lomsebenzi eli-16 libufakazi berhubhululo elibuthelelweko elasungulwako begodu kwaba neragelo phambili

kiyo yoke imisebenzi. Ibuthelelo lemisebenzi le limumethe lemisebenzi elandelako: Abasebenzi abanekghono be NSI (kufaka hlangana indaba yobulili), ukusebenzisa umthangala sisekelo kunye nomkhiqizo weNSI, nemiphumela kunye nemithelela ekubulungeni ku R&D (Kufaka hlangana nokusebenza kwe NSI. Abayelelisi bakaNgqongqotjhe bazakuthuthukiswa emva kobana irhubhululo lelenziwe ekuthomeni konyaka weemali ka 2006/2007. Kwesithathu unyaka uthethwe njengonyaka lapho I-NACI iragela phambili ngokusebenzisana nezinye iinhlangano, ezikhona enarheni mazombe kunye neenhlangano zentjhabatjhaba. Mayelana nalokhu I-NACI izibandakanye emsebenzini weJoint Initiative on Priority Skills Acquisition (JIPSA) yehlelo likaRhulumende le ASGISA. *Umbiko wonyaka ka* 2005/2006 uswaphelisa ngokuzeleko ukuthuthukiswa okuqakathekileko kwe NSI ethathwa njengobujamo I-NACI esebenza ngaphasi kwabo ekukhambeni konyaka.

Sepedi

Taelo ya semolao ya Khansele ya Bosetšhaba ya Keletšo go tša Maithomelo (NACI) ke go eletša Tona ya Saense le Theknolotši mererong ya go amana le saense, theknolotši le maithomelo. *Pego ya Ngwaga le Ngwaga ya 2005/2006* e fa kakaretšo ya mešomo le diphihlelelo tša Khansele ya Bosetšhaba ya Keletšo go tša Maithomelo (NACI) tša ngwaga woo. Dikagare tše kgolo tša mešomo ya ngwaga di ka bonwa gore di bile le ditšwelopele tše nne tša go nyalelana. Sa mathomo, NACI e phethagaditše tshepedišo ya yona ya leano le legolo la go aba kgwebo go dikomiti tše nnyane tše hlano ka katlego gomme ka tsela ye e le go hlohleletša mabokgoni a itšego mošomong wa Khansele. Sa bobedi, phothefolio ya dinyakišišo tše 16 tša go kgoboketša bohlatse e tsebagaditšwe gomme tšwelopele e botse kudu e dirilwe ka mafapheng ka moka. Phothefolio e akareditše dilo tše latelago tše bohlokwa: letlotlo la batho la Tshepedišo ya Bosetšhaba ya Maithomelo (NSI) (go akaretša ditaba tša go amana le bong), go diriša methopo le ditiro bokaone go dira gore Tshepedišo ya Bosetšhaba ya Maithomelo (NSI) e tšweletše gabotse, le dipoelo le khuetšo ya peeletšo ka go Dinyakišišo le Tlhabollo (R&D) (go akaretša go šoma ga NSI). Keletšo ya Tona e tla hlongwa ka pela ge dinyakišišo tše di se no phethwa, mathomong a ngwaga wa ditšhelete wa 2006/2007. Sa boraro, ngwaga wo o bonwe bjalo ka woo e lego gore NACI e tšwetšepele go oketša kamano le tirišano ya yona le mekgatlo e mengwe, bobedi ka nageng le ditšhabatšhabeng. Mo lebakeng le, NACI e, go fa mohlala, kgatha tema ka mafolofolo ka mošomong wa Maitekelo a Mohlakanelwa a Go Hwetša Mabokgoni a Bohlokwa a lenaneo la mmušo la Maitekelo a Kgolo ye e Akgofišitšwego ye e Abelanwago ya Afrika Borwa (ASGISA). *Pego ye ya Ngwaga le Ngwaga ya 2005/2006* e fetša ka kakaretšo ya dilo tše bohlokwa tša tšwelopele tšeo di dirilwego ka go NSI tšeo di šomilego bjalo ka lefapha leo NACI e šomilego go lona mo ngwageng.

Sesotho

Taelo ya molao ya National Advisory Council on Innovation (NACI) ke ho eletsa Letona la Saense le Theknoloji ka dintlha tse amanang le saense, theknoloji le boiqapelo. *Tlaleho ya Selemo le Selemo* 2005/2006 e fana ka setshwantsho se phethahetseng sa mosebetsi wa NACI le diphihlelo bakeng sa selemo. Dintlha-kgolo tsa mosebetsi wa selemo di ka bolelwa di na le dikarolo tse nne tsa bohlokwa tsa ntshetsopele. Sa pele, NACI e kentse tshebetsong ka katleho maano a yona a pheello ho fana ka kgwebo ho dikomitjana tse hlano mme ka tsela e jwalo ho kgothaletsa boiphihlelo mosebetsing wa Lekgotla. Sa bobedi, potfolio ya thuto ya ho bokella bopaki e kentswe tshebetsong mme tswelopele e ntle e entswe dintlheng tsohle. Potfolio e fihlelletse dintlhakgolo tse latelang: basebetsi bakeng sa NSI (ho kenyeletswa dintlha tsa bong), tshebediso e ntle ya marangrang le ditlhophiso bakeng sa NSI e sebetsang, le diphetho le sekgahla sa matsete ho R&D (ho kenyeletswa tshebetso ya NSI). Keletso ya Letona e tla ntshetswa pele hang ha dithuto tsena di se di phethetswe, maqalong a 2006/2007 a selemo sa ditjhelete. Sa boraro, selemo se nkuwa jwaloka se seng seo NACI e tswellang pele ho hodisa kamano ya yona le tshebedisano-mmoho le mekgatlo, ka hare ho naha le matjhabeng. Ka mokgwa o jwalo, NACI, ho tea mohlala, e tsohile molota ho bapaleng karolo mosebetsing wa Joint Initiative on Priority Skills Acquisition (JIPSA) ya leano la ASGISA la mmuso. *Tlaleho ya Selemo le Selemo* 2005/2006 ena e phethela ka qeto ya ditswelopele tsa bohlokwa tse ho NSI tse sebetsang jwaloka ketapele eo ho yona NACI e sebeditseng selemo ho pota.

Swati

Ligunya lelisemtstfweni lemkhandlu wavelonkhe wetekweluleka ekwenteni ngalokusha (NACI) kweluleka uMphatsiswa weliTiko leSayensi nebuChwepheshe ngetindzaba letitsintsa isayensi netebuchwepheshe kanye nekwenta ngalokusha. *Umbiko wemnyaka wa 2005/2006* uniketa sibutsetelo semsebenti nekuphumelela kwe NACI emnyakeni wonkhe. Timphawu letimcoka temsebenti wemnyaka tingahlukaniswa ngaletichuketse kutfutfuka lokubanti lokune. Kwekucala, iNACI iphumelele ekusebentiseni luhlelo lwayo lwekuhlohla ngekuniketela emabhizinisi kumakomiti lamancane lasihlanu, ngaleyo ndlela kugcugcutela

kusebenta lokucondzile emsebentini wemkhandlu. Kwesibili, kwetfulwe iphothifoliyo yetifundvo tekubutsanisa bufakati letili-16 kwabuye kwaba nalenkhulu imphumelelo kuto tonkhe tehlakalo. Iphothifoliyo ihlanganisa loku lokulandzelako: basebenti be NSI labangenisa imali (kufaka ekhatsi tindzaba letitsintsa bulili), kwenta kahle umsebenti wekucalisa nendlela yekusebenta letokwenta iNSI ibe ngulekhicitako, kanye nemiphumela nemtselela wekufakwa kwetimali ku R&D (kufaka ekhatsi kusebenta kwe NSI). Kwelulekwa kweMphatsiswa kutawusungulwa nasekucedziwe ngaletifundvo, ekucaleni kwemnyaka wetimali wa 2006/2007. Kwesitsatfu, umnyaka ube ngulowo lowandze ngekutsi iNACI ichubeke nekwandzisa budlelwane nekusebentisana kwayo naletinye tinhlangano, kuvelonkhe kanye nasemhlabeni wonkhe. Ngaleyo ndlela iNACI, ngalokusibonelo, itibandzakanya kakhulu emsebentini wekubambisana ekutfoleni emakhono lamcoka eluhlelweni lwahulumende lwe ASGISA. *Lombiko wemnyaka wa 2006/2007* uphetsa ngesibutsetelo sekutfutfuka lokumcoka kuNSI lokusebente njengesimo iNACI beyisebentela etukwaso emnyakeni wonkhe.

Tsonga

Ntirho wa le nawini wa National Advisory Council on Innovation (NACI) i ku tsundzuxa Holobye wa Sayense na Thekinoloji mayelana na timhaka ta sayense, thekinoloji na vutumbuluxi. Xiviko xa Lembe na Lembe xa 2005/2006 xi kombisa nkatsakanyo wa ntirho wa NACI na leswi ku humeleriweke eka swona exikarhi ka lembe. Swa nkoka leswi boxiwaka swa ntirho wa lembe swi nga humesiwa swi va swiphemu swa mune swa nhluvuko lowu. Xo sungula, NACI yi humelerile eka makungu ya yona yo avela bindzu eka tikomintsongo ta nthlanu hi ndlela leyi ku humelerisiwa vuswikoti eka ntirho wa Khansele. Xavumbirhi, photifoliyo ya tidyondzo ta 16 to hlengeleta vumbhoni yi tumbuluxiwile naswona ku vile na ku humelela eka timhaka to tala. Photifoyilo leyi yi katsa swilo leswi landzelaka swa nkoka: vatirhi va NSI (ku katsa timhaka ta swa rimbewu), ku tirhisa hi ku hetiseka swilo swo karhi leswaku ku va na ku humelela ka NSI, na mbuyelo na nkoka wo vekisa eka R&D (Ku katsa matirhelo ya NSI). Vutsundzuxi bya Holobye byi ta tumbuluxiwa loko tidyondzo leti ti herile eka sunguleni ka lembe xi mali ra 2006/2007. Xavunharhu, lembe leri ri tekiwa ri ri leri NACI yi ndlandlamuxeke vuxaka bya yona na ntirhisano wa yona na minhlangano yin'wana, kwalaha kaya ni le matikweni man'wana. Hikwalaho-ke, NACI, tani hi xikombiso, yi tikatsile eka migingiriko ya Joint Initiative on Priority Skills Acquisition (JIPSA) ya nongonoko wa mfumo wa ASGISA. Xiviko lexi xa Lembe na Lembe xa 2005/2006 xi hetelela hi ku nyika mbalango wa nhluvuko wa nkoka wa NSI lowu tirheke tani hi ndhawu leyi NACI a yi fanele yi tirha kona exikarhi ka lembe.

Setswana

Taelo ya semolao ya National Advisory Council on Innovation (NACI) ke go gakolola Letona la tsa Science le Botegeniki mo dintlheng tse di amanang le saense, botegeniki gammogo le tsa tlhabololo. Pego ya Ngwaga le Ngwaga ya 2005/2006 ya NACI, e naya tshoshobonyo ya ditiro le bokgoni ba NACI ba ngwageng oo. Dintlhakgolo tsa ditiro tsa ngwaga le ngwaga di ka tlhaloswa gore di na le dintlha di le nne (4) tse di tlhotlheletsang tswelopele. Santlha, NACI e ne ya tsenya tirisong maano a yona a atlegileng a go abela dikomiti-potlana di le tlhano (5) ka dikgwebo, mme ka jalo e ne ya tlhotlheletsa ditiro tse di tlhaolegileng tsa Lekgotla.

Sa bobedi, potfolio ya thuto e e nang le bopaki bo bo kannang 16 e ne ya tlhongwa, mme go ne ga nna le tswelopele e itumedisang matlhakoreng otlhe. Potfolio e ne ya akaretsa dintlhakgolo tse di lateleng: palo ya badiri ba NSI (go akaretsa le boleng ba bong), tiriso e itumedisang ya mafaratlhatlha gammogo le ikatiso ya NSI e tswetseng pele, ditshwetso le tlhotlheletso ya dipeeletso ya R&D (go akaretsa le bokgoni ba ya NSI). Dikgakollo tsa lefapha di tla tlhabololwa morago ga fa dithuto tse di sena go wetswa, mo tshimologong ya ngwaga wa ditshelete wa 2006/2007. Sa boraro, ngwaga ono o ne wa tsewa jaaka ngwaga o NACI e neng ya tswella go godisa kamano ya yona le tirisanommogo le mekgatlho e mengwe, mo gae le moseja. Ka tsela e, re kare NACI, e tsaya karolo ditirong tsa lenaneo la semmuso la Joint Initiative on Priority Skills Acquisition (JIPSA) of the ASGISA. *Pego eno ya Ngwaga le Ngwaga ya* 2005/2006 e re naya tshosobanyo ya ditlhabololo tsa botlhokwa tsa NSI tse di bontshang tema eo NACI e e dirileng ngwaga o.

Venda

Mushumo wa mulayo wa *National Advisory Council on Innovation* (NACI) ndi u eletshedza minisiṱa wa zwa Saintsi na Thekinoḽodzhi kha zwi elanaho na saintsi, thekinoḽodzhi na vhubveledzi. Muvhigo wa ṅwaha nga ṅwaha wa 2005/2006 u ŧetshedza mańweledzo a mishumo na tswikelelo dza NACI kha ṅwaha. Zwiteńwa zwa ndeme zwa mishumo ya ṅwaha zwi nga ŧalutshedzwa sa zwine zwa vha na mveledziso nṉa dzi lungekanaho. Tsha u thoma, NACI yo shumisa

zwavhuḓi sisiṱeme ya kushumele kwayo ya u ṋetshedza mishumo komiti ṭhukhu ṭhanu hu u ṭuṭuwedza vhukonesi kha mishumo ya Khoro. Tsha vhuvhili, phothifolio ya ngudo dza u kuvhanganya vhuṱanzi dza 16 yo rwelwa ṱari nahone ho vha mvelaphaṋa yavhuḓi vhukuma kha milandu yoṱhe. Phothifolio yo vha i tshi katelwa zwiteṋwa zwi tevhelaho zwa vhuṱhogwa: zwiko zwa vhathu kha NSI (hu tshi katelwa zwiteṋwa zwa mbeu), u shumisa thema mveledziso na kushumele u itela NSI i bveledzaho, na mvelelo na masiandaitwa a u vhulunga kha R&D (hu tshi katelwa kushumele kwa NSI). Ngeletshedzo ya minisiṱa i ḓo bveledzwa hu tshi tou fhedzwa nga ha ngudo idzi, mathomoni a ṅwaha wa muvhalelano wa 2006/2007. Tsha vhuraru, ṅwaha uyu wo ṱalulwa sa une khawo NACI yo isa phaṋḓa na u ṱaṋḓavhudza tshumisano na u ḓibaḓekanya na maṅwe madzangano, ngomu shangoni na kha mashangoḓavha. Nga zwenezwi, NACI, i khou shela mulenzhe kha mishumo ya Tshumisano Guṱe ya u Ṱoḓa Zwikili zwa Ndeme (Joint Initiative on Priority Skills Acquisition (JIPSA)) ya mbekanyamushumo ya muvhuso ya ASGISA. Muvhigo uyu wa ṅwaha wa 2005/2006 u fhedzisela nga manweledzo a mveledziso dza ndeme kha NSI dzo shumaho sa fhethu ha u shumela ha NACI kha ṅwaha woṱhe.

Xhosa

Umyalelo osemthethweni weBhunga leeNgcebiso likaZwelonke lokuNgeniswa kweziNto eziNtsha (NACI) kukucebisa uMphathiswa wezeNzululwazi nobuChwepheshe ngemibandela enokuthanani nenzululwazi, ubuchwepheshe nokungeniswa kwezinto ezintsha. I-Annual Report 2005/2006 inikela ubume bokusebenza nezinto ezifezekiswe yiNACI kulo nyaka. Iinkalo eziphambili zomsebenzi kulo nyaka zingaphawulwa ngezinto ezine ezenzekileyo nezixananazileyo. Okokuqala, iNACI iphumeze ngempumelelo isicwangciso-qhinga sayo sokutyalela phambili sokwabela umsebenzi iikomiti ezingaphantsi ezintlanu ngale ndlela kukhuthazwa indlela eyodwa yokwenza umsebenzi weBhunga. Okwesibini, kwasungulwa umqulu wezifundo ezili-16 zokuqokolela ubungqiba ibe kwenziwa inkqubela entle kuzo zonke iimeko. Lo mqulu wagubungela ezi zinto ziphambili zilandelayo: abantu abasebenzayo be-NSI (kuquka imiba engqamene nesini), ukusetyenziswa ngokupheleleyo kwezinto zokusetyenziswa kunye nezenzo ze-NSI enemveliso, kwaneziphumo nefuthe lotyalo-mali kwi-R&D (kuquka indlela eqhuba ngayo i-NSI). Icebiso eliza kunikwa uMphathiswa liza kuqulunqwa kamsinya nje zakuba zigqityiwe ezi zifundo, ekuqaleni konyaka-mali ka-2006/2007. Okwesithathu, lo nyaka uphawuleke njengalowo ekuthe kuwo iNACI yaqhubeka inabisa umanyano nonxibelelwano lwayo neminye imibutho, kokubini kweli lizwe nakumazwe ngamazwe. Kule nkalo, iNACI iye, ngokomzekelo, yathatha inxaxheba ngokuzimisela kumsebenzi wePhulo Elimanyeneyo lokuZuzwa kweZakhono Eziphambili lenkqubo karhulumente iASGISA. Le Annual Report 2005/2006 iqukumbela ngokushwankathela izinto ezibalulekileyo ezithe zenzeka kwi-NSI ezisebenze njengomongo wokusebenza kweNACI ekuhambeni konyaka.

Zulu

Igunya elibekwe ngokomthetho oshayiwe loMkhandlu kaZwelonke oweLuleka ngeziNto eziNtsha (National Advisory Council on Innovation) (NACI) ukweluleka uNgqongqoshe wezeSayensi nezobuChwepheshe ngezindaba eziphathelene nesayensi, ubuchwepheshe kanye nokuvezwa kwezinto ezintsha. I-Annual Report ka-2005/2006 ibheka kabanzi okwenziwe yi-NACI kanye nekufinyelele onyakeni. Izimpawu eziphambili zomsebenzi owenziwe nonyaka zingathathwa njengeziye zaqukatha okwenzekile okune okuvundla ndawo zonke. Okokuqala, i-NACI iye yaqala ukusebenzisa ngempumelelo uhlelo lwayo lokufuqa ngendlela eyisu, lokwabela imisebenzisi kumakomiti amahlanu amancane kwathi ngale ndlela yakhuthaza ukuba ngochwepheshe okuthile emsebenzini woMkhandlu. Okwesibili, kuye kwethulwa iqoqo locwaningo oluyi-16 lokuqoqa ubufakazi futhi kwaba nenqubekelaphambili enhle kakhulu eyenziwe kuzo zonke izimo. Iqoqo liye labheka amaphuzu aphuthumayo alandelayo: abantu abadingekayo ku-NSI (kubandakanya nezingqinamba ezigxile kwezobulili), ukuhlela ngokwezinga eliphakeme izingqalasizinda nezinkambiso ezizoletha i-NSI esebenza ngempumelelo, kanye nemiphumela nemithelela yokutshala izimali ku-R&D (kubandakanya nokusebenza kwe-NSI). Ukwelulekwa kukaNgqongqoshe kuzokwenziwa masishane ngemuva kokuqedwa kwalolu cwaningo ekuqaleni konyaka wezezimali ka-2006/2007. Okwesithathu, unyaka uye wavezwa njegalowo i-NACI eye yaqhubeka ngawo ukwelula ukuhlanganiswa nokusebenzisana kwayo nezinye izinhlangano, ezweni lonke nakwamanye amazwe. Mayelana nalokhu, i-NACI, ukwenza isibonelo, ibambe iqhaza ngokukhuthala emsebenzini wesiNyathelo esiHlanganyelwe sokuTholwa kwamaKhono okuSheshayo sohlelo lwe-ASGISA lukahulumeni. Le Annual Report ka-2005/2006 iphetha ngokubhekwa kabanzi kwezinto ezibalulekile ezenzekile ku-NSI ezisebenze njengesimo i-NACI esebenze ngaphansi kwaso ekuqhubekeni konyaka.

Message from the CEO

Dr Philemon Mjwara

My predecessor, Dr Rob Adam, took up the position of Chief Executive Officer of the Nuclear Energy Corporation of South Africa on 1 March 2006. He had been associated with the National Advisory Council of Innovation (NACI) since its conception, with the drafting of the *White Paper on Science and Technology*, and has played an important role throughout its existence as CEO and member of the Council. I therefore wish to record my appreciation for his contribution to NACI and the national system of innovation (NSI).

Work programme: 2005 / 2006

Like similar bodies elsewhere in the world, NACI is committed to developing evidence-based advice, and that requires accessing the best available information – often, but not necessarily, requiring commissioned research. This report shows that NACI has had a busy year in the preparatory stages of several studies that will be critical to the next stage of the development of the NSI. NACI ended the year with 16 studies on its books, and these should lead to several advices to the Minister later in 2006. In this regard, NACI has set an example of sound prioritisation, planning, application of procurement practices, engagement with the research community and quality control.

A problem inherent in evidence-based policy development is the fact that there is a perceptible lag between the identification of a priority and the rendering of advice. The reason for this is rather obvious, namely the time required for gathering high quality information, very often by means of commissioned research. In the case of NACI, this process has been reduced to a minimum – around ten months. This factor accounts for the fact that the past year produced three Ministerial submissions, while the next year can be expected to yield a much richer crop. This unevenness in the pattern of advice-rendering will be addressed in the current strategic analysis by NACI, as referred to below.

It is also promising that during the reporting year, NACI made extensive use of the National R&D Survey data, first as inputs to a study requested by Cabinet on the return on investment of public funds invested in research and secondly as key contributions to a peer review of the South African NSI undertaken by the Organisation for Economic Cooperation and Development (OECD). This approach is clearly cost-effective and is an example in its own right of maximising the return on investment.

The future

We are more than ten years into the inclusive South African democracy – a short period in the history of a nation, yet a reasonable phase in the history of a science, technology and innovation system (STI) characterised by its astounding pace of change. It may therefore be appropriate to review the way in which our system has evolved over this period and where any adjustments in its course may be required. Upon taking office, I initiated a review of the STI landscape, the results of which can be expected in the latter half of 2006. At the same time, NACI has been involved in reviewing its own position in the NSI, and the Council is expected to reach conclusions in this regard in the course of 2006. The outcomes of these two parallel processes will be finalised in the latter half of 2006.

Words of appreciation

Firstly, I wish to thank the Chair and members of the Council for the constructive and warm way in which I was welcomed as CEO and Council member – your reception augurs well for our future cooperation.

Secondly, appreciation is due to the chair and all the councillors for the time they have made available for the business of the Council. They are all prominent individuals engaged in full-time professions and a range of other activities in addition to their contributions to Council responsibilities. Thank you for your commitment to help build a better South Africa through science, technology and innovation.

Thirdly, I wish to thank our service providers for their professional inputs, which ensure that NACI can be confident of the information base upon which it develops its advice.

Last but not least, the professional and industrious support rendered by the members of the Secretariat is highly appreciated.

Dr Philemon Mjwara
Chief Executive Officer: NACI
17 June 2006

Dr Philemon Mjwara

Dr Phil Mjwara was appointed director-general of the Department of Science and Technology – and thus also chief executive officer of NACI – with effect from 1 April 2006. He was previously the group executive responsible for Research and Development at the Council for Scientific and Industrial Research (CSIR).

Chairperson's report

Prof Calie Pistorius

The reporting year 2005/2006 can be characterised as one in which the Council implemented a new functional structure and operating procedures and operationalised the medium-term work programme approved in the latter half of 2004/2005. A significant amount of work was done in the course of the year, the visible results of which can be expected in the course of the next reporting year (towards the middle of 2006). This report describes the context within which NACI functioned during the reporting year, offers an overview of the highlights of the past year and concludes with a discussion of challenges over the short term as well as future perspectives.

Context

The programme of the National Advisory Council on Innovation (NACI) over the past year represented an effort to address a number of complex and cross-cutting challenges in the broader environment of the national system of innovation (NSI), namely, the reality of the internationalisation and globalisation of science, technology and innovation (STI), the imperative to address key conditions for promoting innovation in South Africa and the need to guarantee transparent and quality information for advice.

It has become a truism that no institution or country can practice STI as an island unto itself – and that applies to NACI too. We were very conscious of this parameter and tried to account for internationalisation and globalisation in a range of ways, including surveying good practices elsewhere, strengthening our relations with counterparts abroad and deliberately using comparative analyses wherever appropriate. Accounting for internationalisation and globalisation in STI will have to remain part of our orientation in future.

The past year has seen the economy grow at an accelerated pace. In the wake of such growth – perhaps even as partial contributor to it – components of the NSI are becoming increasingly strained. Here one need only refer to the growing shortage in our STI human resource base and, in some case, aging equipment. These factors set the upper limits to the performance of our NSI. As this report shows, these have been priority items on the 2005/2006 agenda.

Operating within an evidence-based mode places a great responsibility on NACI to ensure that the information base is sound and that appropriate procedures have been used. These requirements apply to both the methodological aspect

of information gathering and the administrative aspect of procurement. In this regard, the Council, as well as the Secretariat within the administrative context of the Department of Science and Technology (DST), have endeavoured to conduct their business in an accountable and transparent way throughout the reporting year.

Highlights of the year

Capitalising on the expertise of councillors

As reported in the last annual report, the Council has partitioned the scope of its work into five strategic thrusts, namely, infrastructure for innovation, human capital and the knowledge base, innovation for competitiveness, the social dimensions of innovation and the position and role of NACI in the NSI. NACI has appointed a subcommittee to steer the work within each of these strategic thrusts. This approach has paid dividends with regard to the scope of areas that have been addressed, but makes extraordinary demands on the time of councillors. It is clear that NACI must reflect on its *modus operandi* in order to optimise the inputs of councillors as well as the Secretariat.

Extending the reach of NACI

The past year saw NACI extend the reach of its activities. Firstly, the DST transferred much of its involvement in the theme of women in S&T to NACI. NACI took over four comprehensive studies as well as the drafting of a gender equity policy based on those and other studies. The studies were completed by the end of the year, and the draft policy should be completed by the middle of the next financial year. The term of office of the Reference Group on Women in S&T (which reported to Council) expired at the end of the year, and the last meeting took place on 16 March 2005. The Minister requested NACI to appoint a new advisory committee to assist in this important facet of the NSI. This is expected to be finalised at the Council meeting in July 2006.

Secondly, an Indicators Reference Group was appointed as a national advisory committee of NACI to advise on cross-cutting issues and priorities concerning STI indicators in general, and R&D surveys and innovation surveys in particular. The inaugural meeting took place in August 2005, and it is expected that the committee will add considerable value to the principle of indicators-based monitoring, which is entrenched in the South African STI policy. The members of the NACI subcommittee on Biotechnology would be confirmed at the Council meeting in July 2006.

Professor Calie Pistorius

Professor Calie Pistorius, the chairperson of the NACI Council, has been appointed vice-chancellor and principal of the University of Pretoria for a second term. The decision to offer him a second term was taken at a university council meeting at the end of November 2005.

Advice

In 2005, the Council approved a new procedure of direct advice-rendering to the Minister, instead of the earlier model of doing so via the DST. This led to three advices, previously routed through the department, being updated, reformatted and presented directly to the Minister, namely:

- Improving the utilisation of research findings, which looked at ways of increasing the return on R&D investment
- The shortage of technical skills, which addressed the potential impact of skills shortages on the innovative capacity of major capital engineering projects and considered what could be done about the situation
- Mobility of research workers, which aimed at minimising the negative effects of the mobility of highly skilled workers while capitalising on the positive aspects of mobility

As will be shown further in this report, 2005/2006 was largely spent on preparatory work that should yield at least six advices in the course of 2006.

The main focus of the reporting year was launching a portfolio of studies that would form the evidence base of a series of advices in 2006

Studies

The main focus of the reporting year was launching a portfolio of studies that would form the evidence base of a series of advices in 2006. Each of these studies is dealt with in more detail later in this Annual Report. The portfolio focuses on the following cross-cutting priorities:

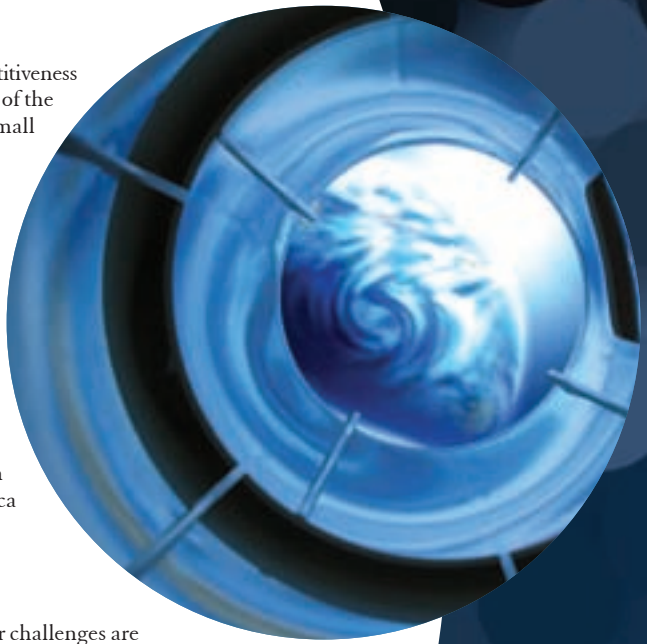
- **Mapping a range of elements of the national system of innovation (NSI) in order to determine their extent and the strengths and weaknesses of the system**

A range of studies was launched in 2005/2006 to ascertain the strengths and weaknesses of the South African NSI. The sum total of the results of these studies would represent the most comprehensive overview of the NSI thus far. It is anticipated that these studies would enable NACI to assess recent initiatives and to identify areas that require further attention and different means of address. These studies should generate a series of advices on ways of further improving the NSI. The studies addressing this priority include:

- A Cabinet-requested study on the tracking of R&D expenditure
- Recommendations on the required physical infrastructure to attain the vision for the NSI
- A mapping of the knowledge base of the country
- A background report to an OECD country review of the NSI.

- **The promotion of innovation and competitiveness in the business sector**

It has become axiomatic that innovation is a necessary condition for increased competitiveness in the business sector, and the Council therefore launched a study towards the end of the reporting year to tease out the dynamics of competitiveness in large, medium, small and micro business enterprises.



- **The better utilisation of human resources in the NSI**

There is general agreement in government, higher education and business that skills shortages are placing an upper limit on the economic growth of the country. The Council continued its past involvement in the field of human resource policy in the reporting year by focusing on gathering information by means of four studies with a view to developing a gender equity policy and developing a dynamic model of the supply of and demand for human resources for a productive NSI. We are convinced that these two initiatives will facilitate planning and more optimal utilisation of available resources. Much of this effort is now being pursued as part of the Joint Initiative on Priority Skills Acquisition (JIPSA) and broader Accelerated and Shared Growth Initiative of South Africa (ASGISA) initiatives.

- **Best practices and learning from others**

As indicated in the introduction, we are conscious of the fact that while many of our challenges are unique to the country, there are also commonalities with other countries and that we could learn from others. In our portfolio of studies, we have given effect to this point of departure by commissioning a study on best practices in STI policy and governance elsewhere in the world and by undertaking a survey of STI advisory bodies in more than twenty countries. I trust that the information from these two initiatives will help us suggest ways of aligning our system with productive systems in comparable countries.

Accountability

The past year saw a significant increase in the number of meetings with the Minister of Science and Technology, the

Deputy Minister and Parliament. The first of these is of great importance to NACI, since we are first and foremost required to advise the Minister. The Minister attended two meetings of NACI in part, received the chairman of the Council four times to discuss matters pertaining to the business of NACI, and twice met with a delegation from SET4W. These meetings were of great value to the Council and strengthened our understanding of the needs of Government in general and of the Minister in particular. A number of discussions were also held with the Deputy Minister, who attended a number of NACI functions.

Although NACI is not a public entity in terms of the Public Finance Management Act, it was twice invited to brief the Parliamentary Portfolio Committee for Science and Technology, first on the previous year's Annual Report and then on the corporate business plan for 2006/2007. In both cases, our briefings were well received by the Portfolio Committee, while the interactions also afforded us a valuable opportunity to learn first-hand what the priorities and expectations of the committee were.

Communication, networking and collaboration

The year produced a relatively rich harvest of external contacts and engagements, as shown elsewhere in this report. Four aspects deserve further comment:

- *Joint Initiative on Priority Skills Acquisition* (JIPSA): NACI was invited to serve on the working group of this initiative, which forms part of ASGISA. Apart from participating in all the meetings of the working group, NACI also made available all its relevant studies, some of which lie at the core of the JIPSA mandate, such as that on technical skills shortages. NACI is committed to supporting this important initiative in all respects.

- *The Organisation for Economic Cooperation and Development* (OECD): The NACI Indicators Unit represents South Africa on two subcommittees of the OECD – Technology and Innovation Policy (TIP) and the Network of S&T Indicators – and has attended four meetings in this regard in the course of the year. An additional facet was added to NACI's interface with the OECD when NACI accepted the DST invitation to draft a background document on the South African NSI as part of a peer review of our STI system to be undertaken in 2006. The report will cover comprehensive overviews of the following themes: economy of the country, policies and structures of the NSI, financial and human capital inputs to the NSI, performance of the NSI, an assessment of the strengths and weaknesses of the system, and uniquely South African issues. The drafting of the background report began at the end of the reporting year and is expected

to be completed in July 2006. In addition, a NACI delegation attended a meeting of the OECD Committee on S&T Policy in Brussels. These interactions are especially useful for NACI, since they not only expose us to very high quality evidence-based policy processes, but also afford us an opportunity to experience from within how the organs of the OECD and other countries work.

- *Global Network for Economics of Learning, Innovation and Competency-building Systems* (GLOBELICS): NACI rendered administrative support to the organisation of the GLOBELICS international conference that was held in August 2005 and participated in the proceedings. This close collaboration with the local chapter of the network and prominent international role-players in the field of national systems of innovation have already defined NACI as an important role-player and given us access to emerging perspectives.

- *Academy of Science of South Africa* (ASSAf): NACI's relationship with ASSAf has been strengthened in various ways during the year. The President of ASSAf addressed a NACI Council meeting, and the chairperson of NACI delivered a paper on NACI's brief at an ASSAf symposium on evidence-based practice in March 2006.

- NACI's embeddedness in the South African network of STI policy specialists has been consolidated further by its media calls for proposals and committee nominations, and by presentations at conferences in the course of the past year. Formal and informal feedback confirms that NACI has become a salient feature in the STI landscape.

- *National Science and Technology Forum* (NSTF): NACI is represented on the executive committee of the NSTF and undertook a study of the state of ethics in the NSI in collaboration with the NSTF.

There can be no doubt about the necessity of providing science advice to government. That imperative is one of the reasons why NACI was established, almost ten years ago.

Resourcing

As in the past, funding for the programmes and maintenance of NACI was provided by the DST under the SciTES Subprogramme, supplemented by limited amounts earmarked by other subprogammes. The expenditure and the human resource administration and control of medium-term expenditure framework (MTEF) compliance were therefore dealt with by the relevant divisions of the DST.

Challenges and future perspectives

There can be no doubt about the necessity of providing science advice to government. That imperative is one of the reasons why NACI was established, almost ten years ago. Since the inception of NACI, there have been many

developments, including the establishment of the DST, the establishment of ASSAf and a maturing of the national system of innovation. We have learned that the concept of providing 'science advice to government' is a very broad one, and that the field must be covered by a constellation of players. In this context, 'science' covers a field that includes science and technology issues in a manner that constitutes an agreement by experts and practitioners as to the current state of knowledge regarding the 'laws of nature', the impact of science and technology, as well as the broader innovation-related issues. The latter include human resource matters. 'Government' can include the President, Cabinet, the Minister of Science and Technology and other Ministers, Departments, Parliament as well as various provincial and local authorities. This is indeed a very wide space, where many institutions and organisations must contribute.

NACI is specifically mandated to advise the Minister of Science and Technology on issues related to the NSI. In this regard, NACI's own deliberations indicate that it must constantly seek ways of improving its own effectiveness, efficiency and impact to best serve its principal. NACI's advice is evidence-based in that it relies heavily on extensive research. Although very comprehensive, the timeframe for this type of advice tends to be long. The Council has decided that, in addition to this type of advice, it will henceforth also provide the Minister with advice that represents the consolidated opinion of the Council on various issues. This mechanism will allow for more rapid and timely inputs to the Minister.

The issues that NACI is addressing as part of its five thrusts continue to remain relevant, and NACI will pursue these matters with regard to advice to the Minister.

The issues that NACI is addressing as part of its five thrusts continue to remain relevant, and NACI will pursue these matters with regard to advice to the Minister. In order to align NACI's work with the thrust of the ASGISA programme, I believe that NACI should sharpen its focus on the development of a national innovation strategy and analyses of the impact of science and technology and the national priorities with regard to emerging technologies.

Appreciation

Finally, the pleasant task of thanking several individuals and organisations for their contributions to the success of NACI remains. I wish to express my sincere appreciation to the following people and groups:

I wish to thank Minister Mosibudi Mangena for his enlightened interest in the work of NACI and the manifest and also less obvious ways in which he has disseminated information provided by NACI. I also wish to thank Deputy Minister Derek Hanekom for the interest he has shown in our work throughout the year.

A special word of appreciation goes to Dr Rob Adam, who was until the end of February 2006 the CEO of NACI and director-general of the DST, for his support since the launch of NACI in 1997 until his departure for NECSA. I would also like to welcome the new CEO of NACI and director-general of the DST, Dr Phil Mjwara.

I wish to thank all the councillors for their commitment to NACI and the selfless way in which many of them spent many hours on our business. The value of an advisory council such as NACI is first and foremost a function of the individual and collective prominence, reputation, expertise and commitment of the councillors. Thank you for your participation in the year's activities. At the same time, I would be remiss if I did not thank their employers for allowing councillors to spend time on NACI business.

I would like to extend a warm word of appreciation to Ms Luci Abrahams as chair and all the other members of SET4W (SET for Women), who have put gender firmly on the national STI agenda. NACI will make sure that gender receives the attention you have so persuasively shown that it deserves.

Finally, Dr Bok Marais and the Secretariat deserve a word of appreciation and thanks for the managerial, administrative and research support that they have provided.

Prof Calie Pistorius
Chairperson: NACI
17 June 2006

Excerpts from Ministers' speeches

Minister Mangena

Minister Mangena

On international collaboration:

"South Africa's bilateral and multilateral science and technology initiatives are also experiencing spirited growth due to our resolve to keep South Africa and the continent abreast of international developments. By 2001/02, international funding of R&D in South Africa had grown to 6% from near zero in 1994, and by 2003/04, foreign funding stood at 10% of total R&D funding."

A vision:

"It is only when there is no longer a disjunction between science and everyday life that we will be able to say that our fundamental goals for development in science and technology have been sufficiently achieved."

STI and socio-economic development:

"If we want to address the challenges of poverty and disease in our country, we need to ensure that all our people are assisted in functioning in a knowledge driven economy."

"Advancements in science, engineering and technology are the blueprint of any nation wanting to prosper and be globally competitive. We are growing our capacity to generate new knowledge, develop competitive technologies and establish new markets."

On evidence-based policy development:

"The use of evidence-based knowledge is especially vital in developing countries where resource constraints preclude chances of entertaining any dubious solutions and experiments from elsewhere which might result in harmful consequences."

Deputy Minister Hanekom

Deputy Minister Hanekom

On innovation and growth:

"The competitiveness of a country today depends on its capability to create innovations that are based on science and technology, and on its industries' ability to turn them into products and services for the world market."

On policy development:

"In our drive as government to strengthen our regulatory framework, we continuously review our policies to assess whether they are sufficiently robust to address the prevailing circumstances."

On the importance of technology transfer:

"Technology transfer is an important and powerful tool for global development with positive implications, particularly for uplifting the developing world – provided we have an approach based on the development of robust national systems of innovation."

"Too often the need to address developmental priorities is simply associated with alternative and lower level technologies. What our government has managed to show is that it is possible to address our needs in such a way that poverty alleviation and large innovative global projects can be simultaneously managed in complementary manner".

NACI Council

Chairperson
Prof Calie Pistorius
Vice-Chancellor and Principal: University of Pretoria

CEO
1 April 2006
Dr Philemon Mjwara

CEO
until 28 February 2006
Dr Rob Adam

Executive Committee

Ms Luci Abrahams
Director: LINK Centre, University of the Witwatersrand

Dr Johannes Potgieter
Chief Director: Innovation and Technology, Department of Trade and Industry

Dr Nombasa Tsengwa
General Manager: Safety, Health & Environment, Kumba Resources

Councillors

Dr Ntuthuko Bhengu
Executive Director: Africa Biopharma Investments

Prof Cheryl de la Rey
Deputy Vice-Chancellor: University of Cape Town

Mr Alan Hirsch
Chief Director: The Presidency

Mr Fairoz Jaffer
Chief Executive Officer: Abnoba Information Dynamics

Dr Steve Lennon
Managing Director: Resources & Strategy Division, Eskom

Mr John Marriott
Advisor: Sasol Synfuels International

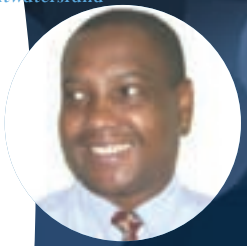
Prof Tshilidzi Marwala
School of Electrical & Information Engineering, University of the Witwatersrand

Dr Khotso Mokhele
President and CEO: National Research Foundation

Dr Nhlanhla Msomi
Chief Executive Officer: ECOBIO, Lifelab East Coast Biotechnology Regional Centre

Dr Francis Petersen
Head: Strategy & Planning, Anglo American Platinum Corporation Ltd

Mr Geoff Rothschild
Director: Marketing, JSE Limited



Mr Thero Setiloane
General Manager: Marketing Department, AngloGold

Dr Sibusiso Sibisi
President and CEO: CSIR

Dr Mala Singh
Executive Director: Higher Education Quality Committee, Council for Higher Education

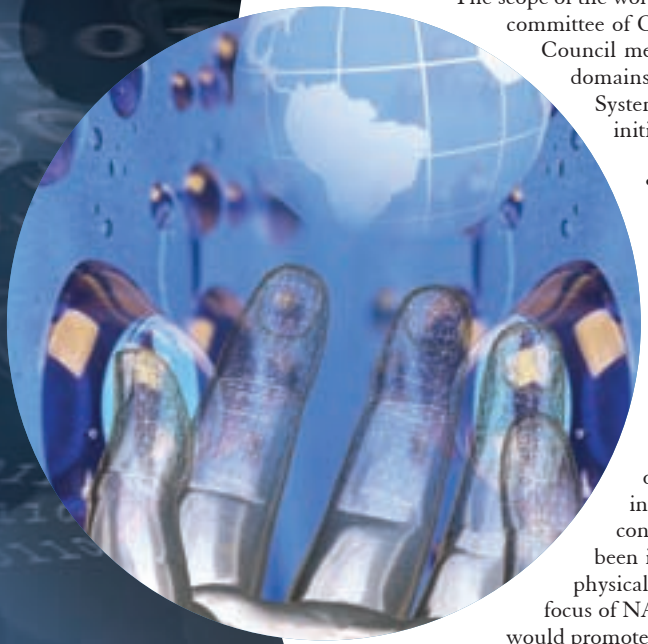
Dr John Stewart
Consultant: Mining Industry and Technology Management

Dr Nthoana Tau-Mzamane
Former President and CEO: Agricultural Research Council

Prof Jennifer Thomson
Department of Molecular & Cell Biology, University of Cape Town

Strategic thrusts and subcommittees

Strategic thrusts and subcommittees



The scope of the work of Council is organised in terms of five strategic thrusts, each attended to by a sub-committee of Councillors who meet before each of the Council meetings and sometimes between Council meetings. The subcommittees are responsible to address critical themes within their domains and develop advice aimed at contributing towards a better functioning National System of Innovation (NSI). Each theme may cover a number of evidence-based advisory initiatives. Sub-committees are responsible to:

- Advise Council on important strategic issues on which advice should be generated
- Approve the scope and operationalisation of evidence gathering under that Strategic Theme
- Guide the drafting of any Ministerial Advice on the particular Strategic Theme

Strategic themes

1. Infrastructure for innovation promotion

Focus

Productive STI systems in developed economies are characterised by configurations of policies conducive to innovation across sectors, access to optimal physical infrastructure and high if not growing levels of expenditure on STI. The key cause for concern for the sustainability of minimum levels of STI in developing economies has been identified as largely the opposite, viz. acceptable policies, but inadequate and aging physical infrastructure and low expenditure. Against this background, an important strategic focus of NACI is advice on necessary dimensions and conditions defining an environment that would promote innovation.

Priorities launched in 2005/2006
The following evidence generating studies are expected to be completed by the middle of 2006.

1. Develop a profile of best practices for the country with regard to the major aspects of the NSI
2. Determine all aspects of the required physical infrastructure to attain the country's common vision of its NSI (secondary school and competitive sectors)
3. Develop a profile of provincial innovation systems

Sub-committee
Dr R Adam, Dr N Bhengu, Mr A Hirsch, Dr S Lennon (convenor), Dr F Petersen, Dr S Sibisi, Dr N Tau-Mzamane

2. Human capital and the knowledge base

Focus
Two of the key elements of any innovation system are human resources and knowledge. Neither can be strategically changed over the short term, but both are very sensitive to the dynamics and consequences of globalisation, e.g. in the form of a net outflow of scientists and discriminating aspects of intellectual property rights. South Africa is especially vulnerable with regard to the provision and spread of its human capital and the challenges posed to its knowledge base by the dual nature of its economy. It follows that NACI should focus on the parameters of an optimal human capital and knowledge base and that this focus should include the optimal use of both.

Priorities
The following evidence-generating studies were launched or extended in the report year and are expected to be completed by the middle of 2006.

1. Modelling of the demand and supply of human resources, including qualitative dimensions, and the development of a strategy for optimising the supply over the medium term
2. Necessary dimensions of the national knowledge base to ensure international competitiveness on the one hand and development of the second economy on the other

Sub-committee
Prof C de la Rey, Prof T Marwala, Dr K Mokhele (convenor), Dr N Msomi, Prof J Thomson

Think Tools 4.1 is an innovative approach to managing decision making processes by visualising complex situations, building alignment among decision makers and supporting the identification of possible courses of action. In terms of a memorandum of understanding concluded between the Presidency, the German Gesellschaft für Technische. Zusammenarbeit (GTZ) and the DST in 2004.

3. Science, Technology & Innovation (STI) for competitiveness

Focus

The key to improved growth in South African industry lies in greater innovation (and technology transfer) and competitiveness. There is a perception that much of the innovation that occurs in South African industry flows from imported technology, and that a large portion of the growth that is experienced does not create the desired number of new jobs. Economic growth and greater levels of employment are fundamentally important national imperatives, and it is thus important for NACI to develop a deep understanding of the dynamics of innovation and competitiveness that are at play in both large and small industrial undertakings in South Africa, with a view to identifying how these might be enhanced to the benefit of the nation.

Priorities

The following evidence-generating studies were launched or extended in the report year and are expected to be completed by the middle of 2006.

1. The dynamics of innovation (incl. technology transfer) and competitiveness in South African large, medium and small business
2. Enhanced use of indicators in monitoring innovation and competitiveness
3. Review and promote the role of IPR in innovation and competitiveness
4. OECD peer review of the NSI

Sub-committee

Mr J Marriott, Dr F Petersen, Dr J Potgieter, Mr T Setiloane, Dr J Stewart (convenor), Dr N Tsengwa

4. Social dimensions of innovation

Focus

It is recognised that the social processes underlying innovation and competitiveness in a country such as South Africa and the social consequences of innovation and competitiveness are not well understood and perhaps not sufficiently accounted for. Social factors (individual, communal, national) are facilitating and inhibiting the adoption of innovation in the second economy on the one hand and facilitating innovation generation in the first economy on the other.

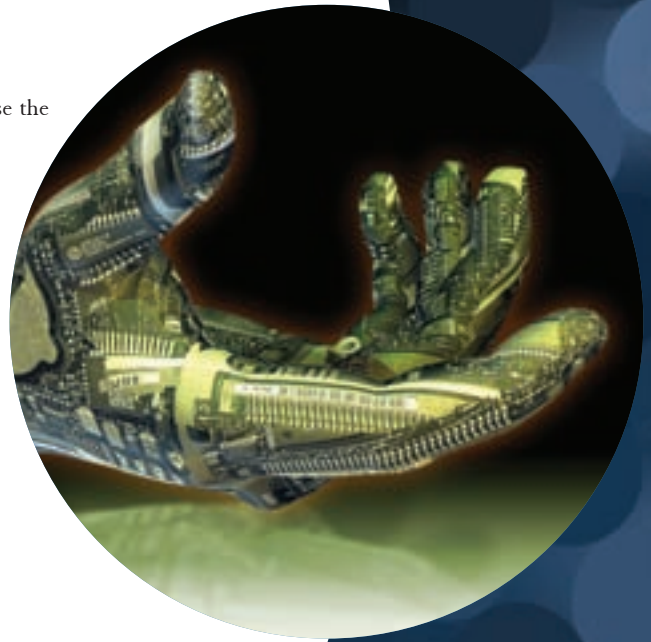
Priorities
A workshop of experts took place in the course of the year in the process to identify the most critical issues in this domain and this led to a draft terms of reference and associated priorities, viz.

1. The formulation of guidelines for accounting for social factors in innovation
2. The effects of the digital divide on development and key priorities to be addressed

Sub-committee
Ms L Abrahams, Prof C de la Rey, Mr F Jaffer, Dr M Singh (convenor)

5. Position and role of NACI in the NSI

Focus
Ensuring that NACI delivers on its mission in the best possible way, namely to advise the Minister of Science and Technology on issues relating to the NSI.



Priorities
1. International 'best practice' with regard to STI advice
2. Current practice in South Africa with regard to STI advice and strengths and weaknesses of NACI in this regard
3. Organisational STI advisory structures and amendments to NACI

Sub-committee
Dr K Mokhele, Prof C Pistorius (convenor), Dr J Potgieter, Mr G Rothschild, Dr M Singh, Dr J Stewart

Professor Jennifer Thomson

Professor Jennifer Thomson, a NACI councillor, received an honorary doctorate from the Sorbonne University in June 2005. Professor Thomson pursues her research interests at the University of Cape Town, specialising in the genetic modification of plants, with the ultimate aim of producing crops with improved tolerance to biotic and abiotic stresses. (She also won the L'Oréal Woman in Science (Africa category) award in 2004).

SET4W

The national reference group on women in science and technology – Science, Engineering and Technology for Women (SET4W) – saw a very productive final year of its term of office. The group was involved in a number of activities, brought to successful completion three studies and completed the first draft policy advice on gender and race equity in the NSI.

Meetings

The SET4W committee met five times during the report year. The last meeting was held in March 2006 and was the final meeting of the term of office of the current SET4W committee, which included international members.

Workshops

SET4W organised two workshops in the course of the year. In August 2005, it hosted a workshop, *Challenges and Successes of Leadership by Women in SET*. The focus of the workshop was on exploring issues and challenges for women in SET leadership, identifying priority issues that should inform policy development in the context of the SET4W mandate and sharing relevant experiences. The workshop was facilitated by Ms Bunie Matlanyane Sexwale. Forty-five delegates from the higher education sector, government S&T institutions and the business sector attended the one-day event. The feedback from delegates was very positive. The second workshop was held in October 2005 in preparation for the drafting of the gender equity in SET policy. The workshop was attended by representatives from National Treasury, the departments of Science and Technology, Education and Foreign Affairs, the Human Sciences Research Council, the National Research Foundation, Eskom, the universities of Pretoria, the Witwatersrand and Stellenbosch, the Agricultural Research Council, Africa Institute of South Africa (AISA), DaVinci Institute and the Office on the Status of Women.

Studies completed

The following studies were successfully completed in 2005/2006:

- Looking at SET through women's eyes, incorporating the study, *Women in SET in industry*, and the final report is due in mid-2006.
    - o Qualitative study consisting of 136 interviews

- Consultative Conferences
- Email discussion

- Gender and Race Monitoring and Evaluation Framework
- Longitudinal Study for Women in Science for Year 1

Policy development

The first draft of the policy advice on gender and race equity was approved at the final meeting of the SET4W committee. The draft policy aims to promote greater participation of women in science, engineering and technology in South Africa and addresses the following main themes:

- Recommendation to increase the participation of women in productive STI
- Recommendation to ensure that women in South Africa benefit from innovative SET research, the production of SET products and the provisions of SET services in particular to transform the lives of black women living in poverty
- To ensure that institutions within the national system of innovation regularly collect data, disaggregated by gender and race, on women's participation in and benefit from the SET sector, and that such data are compiled and used in all relevant decision-making processes in order to promote the aims of the Gender Equity Policy

The final phase of the development of the draft policy is planned for the first quarter of the new financial year and will consist of consultation with key stakeholders. The draft policy is expected to be ready for submission to the Minister by July 2006.

Achievements

Individual members of SET4W were in the news with respect to their academic achievements. At the DST Women in S&T Awards ceremony in August 2005, Professor Sharon Fonn received the Distinguished Scientist Award for Contributions to the Improvement of the Quality of Life of Women. Professor Valerie Mizrahi was a finalist in the National Science and Technology Forum (NSTF) annual awards in the category of Research and its Outputs over the Last Five Years.

New dispensation

In January 2006, the Minister approved a new dispensation whereby SET4W would become a ten-person NACI standing committee. In February NACI called for nominations of suitable candidates, and the process of appointing a new committee is expected to be completed early in the new financial year.

***Ms Luci Abrahams**, NACI councillor and chairperson of SET4W, was appointed to the Board of the National Research Foundation, effective October 2005.*

Financial report

National Advisory Council on Innovation: Budget versus Expenditure for the year ended 31 March 2006

	2005/06							2004/05	
	Adjusted Appro-priation	Shifting of Funds	Virement	Final Appro-priation	Actual Payment	Variance	Payment as % of final appro-priation	Final Appro-priation	Actual Payment
	R'000	R'000	R'000	R'000	R'000	R'000	%	R'000	R'000
Current payment	8 214	(235)	-	7 979	7 459	520	93.48	6 008	6 005
Transfers and subsidies	14	-	-	14	7	7	50.00	19	19
Expenditure for capital assets	-	235	-	235	235	-	100.00	76	76
Total	8 228	-	-	8 228	7 701	527	93.60	6 103	6 100

	2005/06							2004/05	
Economic classification	**Adjusted Appro-priation**	**Shifting of Funds**	**Virement**	**Final Appro-priation**	**Actual Payment**	**Variance**	**Payment as % of final appro-priation**	**Final Appro-priation**	**Actual Payment**
	R'000	**R'000**	**R'000**	**R'000**	**R'000**	**R'000**	**%**	**R'000**	**R'000**
Current payments									
Compensation to employees	**3 730**	**(1 405)**	**-**	**2 325**	**2 325**	**-**	100.00%	1 977	1 977
Goods and services	**4 484**	**1 170**	**-**	**5 654**	**5 134**	**520**	90.80%	4 028	4 025
Financial transactions in assets and liabilities	-	-	-	-	-	-	-	3	3
Transfers and subsidies				-	-			-	-
Provinces and municipalities	**14**	**-**	**-**	**14**	**7**	**7**	50.00%	7	7
Gifts and donations	-	-	-	-	-	-	-	12	12
Payments for capital assets				-	-	-	-	-	-
Machinery and equipment	**-**	**235**	**-**	**235**	**235**	**-**	100.00%	76	76
Total	**8 228**	**-**	**-**	**8 228**	**7 701**	**527**	93.60	6 103	6 100

The National Advisory Council on Innovation was allocated R8,228 million for the 2005/06 financial year to perform its functions. As in the previous financial year the allocation is still integrated with the Department of Science and Technology and all expenditure is still accounted for in the various financial systems of the Department. The main reasons for the saving is due to vacancies that could not be filled during the financial year and tenders that could not be awarded by 31 March 2006.

Mr Alan Hirsch

Mr Alan Hirsch, a NACI councillor, published a book, Season of Hope: Economic Reform under Mandela and Mbeki, through the University of KwaZulu-Natal Press and the International Development Research Center (IDRC) in October 2005. Mr Hirsch has also been appointed director of Denel Corporation.

New evidence-generating studies

An overview of new evidence-generating studies is offered in this section. These studies will be used as the information basis for the development of advice to the Minister.

Tracking public R&D expenditure study

Purpose of project: To respond directly to a request by Cabinet that output measures be introduced to complement the current *National R&D Survey* in order to better inform Cabinet on the effectiveness of the national system of innovation.

Design: Multi-project, multi-method study consisting of eight sub-projects (expert workshop, literature review, case studies, surveys, personal biographies, key informant interviews, quantitative data analysis, bibliometric analysis, pair-wise country comparisons, econometric modelling and benchmarking South African performance against the national performance of European Union countries).

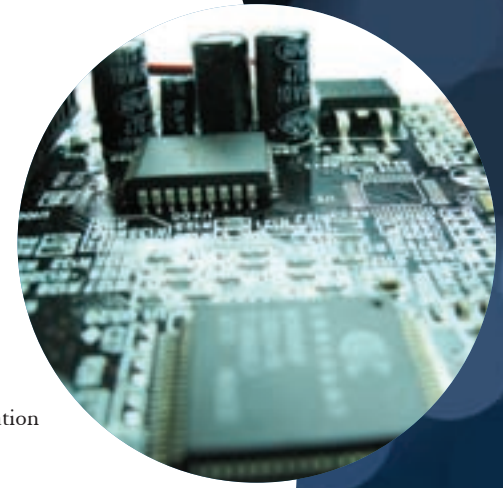
Project management: Professor Michael Kahn (CeSTII, Human Sciences Research Council), who co-ordinates all the sub-projects as well as being responsible for the synthesis report.

Date launched: March 2006

Expected date of completion: September 2006

Potential contribution to the NSI: The project will provide insight into the contribution of R&D to addressing South African national imperatives, given the worldwide pressure since the mid-1980s for publicly funded research to become more accountable, more directed and more explicit with regard to the expected and proven impact of such public investment. Such an approach requires a shift from input to output measures, and more recently to outcome and impact measures.

The South African NSI: Structures, policies and performance



Purpose of the project: To provide a background report for an OECD peer review of the NSI.

Project management: NACI Secretariat

Date launched: March 2006

Expected date of completion: July 2006

Potential contribution to the NSI: Apart from the fact that the report will become one of the key inputs to the OECD review, it will serve as a benchmark for monitoring and future reviews of the NSI.

Profile of local and provincial innovation systems

Purpose of project: To assess the status, potential and needs of local and provincial innovation systems.

Design: Literature review, case studies, stakeholder interviews, secondary analyses of existing data (patent, R&D and scientific publications) and quantitative mapping of innovation and economic clusters by province.

Service provider: Dr Jo Lorentzen (Education, Science and Skills Development, Human Sciences Research Council)

Date launched: April 2006

Expected date of completion: January 2007

Potential contribution to the NSI: The National R&D Strategy calls for proactive measures to support provinces that currently lack innovation infrastructure. The outcome of this project will be to identify areas of potential and the support they require in order to assist provincial governments in creating infrastructure that will attract R&D incentive industries.

The required physical infrastructure to attain the vision of the NSI

Purpose of project: A dual study designed to determine the ideal types of and capacities for scientific and technological infrastructures for a productive and sustainable NSI. The gap between the ideal picture and the existing technological infrastructure for research and innovation in government (including science councils, national facilities and national departments), higher education and the private sector will help design appropriate government intervention.

Secondary school component

Design: Literature review, Internet-based survey and expert interviews.

Service provider: Dr Vijay Reddy (Education, Science and Skills Development, Human Sciences Research Council).

Date launched: March 2006

Expected date of completion: August 2006

Competitive component

Design: Interrogation of current science, technology and innovation policy documents to identify priority sectors; analysis of recent national and international equipment and systems surveys; assessment of stakeholder needs; expert workshops to extract the parameters of an ideal-type NSI.

Service provider: TechnoScene (Pty) Ltd

Date launched: March 2006

Expected date of completion: July 2006

Potential contribution to the NSI: The outcome of the project will be to develop advice on infrastructural needs and related interventions to reposition the NSI on a higher, sustainable growth trajectory.

Linkages between competitiveness and science, technology and innovation

Purpose of project: To identify interventions to improve the contribution of science, technology and innovation to the competitiveness of South African industry and to enhance the use of indicators to monitor innovation and competitiveness.

Design: Survey investigation of the dynamics of innovation and competitiveness in large, medium, small and emerging South African businesses; review of the role of intellectual property rights.

Service provider: Isambulo AMI

Date launched: March 2006

Expected date of completion: August 2006

Potential contribution to the NSI: The project will help understand the linkages between science and technology, technology and innovation, and innovation and competitiveness, and how these might be enhanced to contribute to national economic growth and increased employment levels.

Developing a framework to incorporate qualitative factors to the human capital model being developed by NACI

Purpose of project: To upgrade the human capital model, completed earlier in the year, by incorporating qualitative features.

Design: Adding the following features to the model: framework for qualitative factors, forecasting features, inclusion of other national objectives and alignment with the knowledge base project.

Professor Tshilidzi Marwala

Professor Tshilidzi Marwala, a NACI councillor, has been appointed to the Carl and Emily Fuchs Chair of Systems and Control Engineering at the University of the Witwatersrand, as well as chair of the Local Loop Unbundling Committee. He has also been appointed a board member of the State Information Technology Agency (SITA).

Dr Steve Lennon

NACI councillor Dr Steve Lennon was appointed director of the board of the Electric Power Research Institute (EPRI) in Palo Alto, USA as from December 2005. In May 2005, Dr Lennon received the National Science and Technology Forum (NSTF) award for his exceptional contribution to science, engineering and technology in South Africa. He presented the Hendrick van der Bijl Memorial Lecture to the Academy of Engineering in June 2005. Another achievement was his appointment to the executive committee of the Coal Industry Advisory Board to the International Energy Agency in December 2005.

Service provider: Dynamic Strategies

Date launched: January 2006

Expected date of completion: September 2006

Potential contribution to the NSI: The outcome of the project will be to integrate the four components of the human capital model to produce a single model that will better serve the purpose of forecasting national human capital needs.

Human capital and the knowledge base

Purpose of project: To identify the critical centres of gravity in South Africa with respect to the core fields of science, engineering, mathematics and technology.

Design: Extract data mainly from existing sources (HSRC R&D indicators database, NRF grants database, NRF rating systems, NRF centres of excellence and the South African Research and Innovation Management Association) and map in terms of institutions.

Service provider: Centre for Research on Science and Technology (CREST) in partnership with the Centre for Science and Technology Studies (CWTS), University of Leyden, the Netherlands.

Date launched: March 2006

Expected date of completion: September 2006

Potential contribution to the NSI: The outcome of the project will be the identification and accessibility of knowledge concentrations for S&T policy-makers, technology and innovation promoters and knowledge brokers in general.

A profile of best practices in the NSI

Purpose of project: To summarise national and international best practices that account for a significant portion of the productivity, efficiency and effectiveness of national systems of innovation.

Design: Analysis of literature and consultations with local and international experts.

Service provider: Institute of Technological Innovation, University of Pretoria.

Date launched: March 2006

Expected date of completion: June 2006

Potential contribution to the NSI: The outcome of the project will be recommendations on the applicability and transferability of best practices to the South African context in the areas of governance, monitoring and technology transfer that could be considered for application in South Africa.

Selected NACI achievements: 2001 - 2006

Looking back

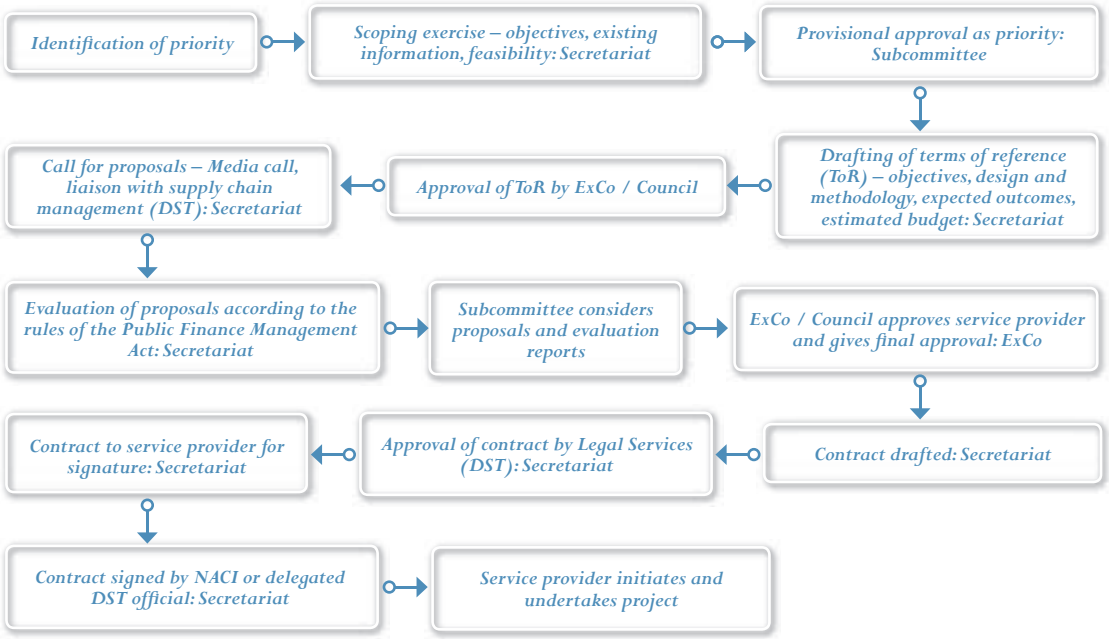
- Twelve advice documents were submitted between October 2001 and November 2004; 17 evidence generating studies were completed in that period
- Three advice documents were submitted in 2005/2006
- 2006/2007 is expected to yield a harvest of at least six advice documents
- The mean time between commissioning a study and the submission of the final report was about ten months

Mr Fairoz Jaffer

Mr Fairoz Jaffer, NACI councillor and CEO of Abnoba, was named one of the finalists for the Top ICT Businessman in Africa Award for 2005. As the premier ICT awards programme event in Africa, the African ICT Achievers' Awards honour and reward excellence in ICT from both a company and individual perspective. These awards aim to reward growth, innovation and self-sustainability among African entrepreneurs and to create role models in the industry.

The NACI Project Process

NACI follows an extended process in approving evidence-gathering studies and procuring the services of outside specialists if the Secretariat lacks the resources to undertake the work internally. The following diagram illustrates the main elements of the process.



International liaison

NACI's international relations programme consists of four dimensions, namely, international peer-evaluation of final reports, briefing of visiting fact-finding missions, contributions to international conferences, and NACI fact-finding missions to counterparts abroad. This section reports on the latter two modalities.

Internationalisation of R&D conference, Brussels, 29 March - 2 April 2005

A small NACI delegation attended an OECD conference in Brussels on the internationalisation and globalisation of R&D, and used the opportunity to meet with Belgian counterparts, as well as experts and officials from other countries. The visit proved valuable in that the delegation was exposed to the latest thinking on policy issues raised by the globalisation of R&D (including the international mobility of human resources, research infrastructure, national/local attractiveness for foreign R&D investment, international alliances and partnerships), and improved measurement approaches to international flows of science and technology. At the same time, the conference afforded the delegation an opportunity to share with other delegates the challenges faced by developing countries.

Aichi World Expo 2005 and the Science and Technology Forum, Tokyo, Japan, 6 - 10 June 2005

NACI was involved in developing the programme of the Science and Technology Forum that formed part of the bilateral agreement between South Africa and Japan. A councillor and a member of the NACI Secretariat, respectively, chaired a session and presented a paper at the conference. The conference was preceded by a visit to the South African S&T section at the World Expo and was followed by a number of official meetings with government, higher education and business units and institutions. The visit proved especially useful, since it afforded the NACI representatives first-hand insight into the structure and functioning of the Japanese STI policy system. Some of these insights are being introduced into the NACI system.

Ms Luci Abrahams

In the 2005/2006 financial year, Ms Luci Abrahams, a NACI councillor, was appointed advisor to the Premier of Gauteng Province on the issue of 'Gauteng as a Global City Region'.

National Experts on Science and Technology Indicators (NESTI), 15 - 17 June 2005

A meeting of the OECD's National Experts on Science and Technology Indicators (NESTI) was held in Iceland from 15–17 June 2005 and included a workshop on the revision of the *Oslo Manual*, which is important for the South African National Innovation Survey in that the revised *Manual* includes new definitions and classifications. The NACI Indicators Unit is monitoring the implementation of these revised definitions and classifications in South African surveys.

UNU INTECH, Maastricht, the Netherlands, 24 - 28 October 2005

NACI representatives participated in a training course on the Design and Evaluation of Innovation Policy in Developing Countries, organised by the United Nations University Institute for New Technologies (UNU INTECH). Apart from a certificate for the successful completion of the course, another important outcome is that the new knowledge is being implemented in NACI's approach to the development of policy advice.

US Ambassador in SA, at a SET4W workshop, October 2005

Technology and Industrial Policy (TIP) Working Group meeting, 12 - 14 December 2005, Paris, France

A NACI representative participated as a member of the South African delegation in the following three aspects of the visit: a thematic workshop (on business strategies and drivers of innovation activities), a work session with the OECD Secretariat (to finalise the terms of reference for the peer review of the South African NSI) and the TIP working group meeting focusing on a range of salient and current issues in the area of innovation policy. Information and perspectives encountered in these three sessions have been directly incorporated into a range of NACI activities, including the preparation for the OECD peer review and studies such as that dealing with innovation and competitiveness.

South Africa Day, Royal Society of London, 30 January - 3 February 2006

NACI representatives visited the Royal Society as part of a DST delegation in order to showcase science in South Africa and stimulate closer links between South African and UK scientists by means of a workshop. Prof Pistorius made a presentation. Visits to a number of key science, engineering and technology-based (SET) institutions in the UK complemented the experience.

The motivation for the visit was to establish specific SET collaborative initiatives, promote interaction between SET stakeholders in South Africa and the UK, increase South African participation in the UK's Department for International Development (DfID) Research Framework and strengthen co-operation in SET in general.

Delegates at a SET4W workshop

Workshop on the development of Indicators for the Globalisation of R&D, Finland, 2 - 3 March 2006

A workshop organised by Statistics Finland on the development of indicators on the globalisation of R&D was attended by a NACI representative. The workshop formed part of the ongoing OECD project on the globalisation of R&D and aimed to take stock of the state and development of the globalisation of R&D and to improve the measurement of the globalisation of R&D through the development of new indicators. The proceedings of the conference were especially important for South Africa, since the South African NSI is an open system, requiring the country to be well informed about developments in the global policy arena. One of the outcomes of participation in this workshop is that the development of such indicators has been placed on the NACI agenda.

Breakaway group at a SET4W workshop

Handover of previous NACI annual report to Minister Mangena (Dr Rob Adam, Minister Mangena and Prof Calie Pistorius)

87th Session of the OECD Committee for Scientific and Technological Policy (CSTP), Sydney, Australia, 20 - 24 March 2006

A NACI representative attended the 87th Session of the OECD CSTP meeting, as well as the Knowledge Intensive Service Activities (KISA) Conference organised by the Australian Department of Education, Science and Training.

The KISA Conference provided insight into the potential ways in which knowledge intensive service activities improve the ability of private and public sector organisations to develop, absorb and apply knowledge in their innovation processes.

The associated site visits (for example, to the Centre for Autonomous Systems – Field Robotics at the University of Sydney, and the Centre for Quantum Computing and the Centre for Advanced Silicon Photovoltaics and Photonics at the University of New South Wales) showcased excellent examples of leading Australian S&T research and innovation.

The CSTP meeting provided the South African government delegation with an opportunity to engage with colleagues from other OECD countries on pre-determined science policy issues.

Ms Lebo Lebese thanks the leader of the Zambian delegation

Visits to Singapore and Australia, 23 March - 6 April

The Chairperson of NACI, Prof Pistorius, visited ASTAR in Singapore and The Australian CSIRO, the Department of Education, Science and Training, and the Australian Research Council. First-hand information gained from the visits to these institutions proved very useful as inputs to the review of NACI's position, role and functioning in the NSI.

The 2005 / 2006 diary: Selection of meetings organised by NACI

Events that were organised by NACI are listed in the table. External events attended by members of NACI, such as participation in conferences and institutional visits, are not included here.

11 May 2005	NACI lunch seminar: *Strategies to promote the transformation of knowledge into innovation* – Prof Russ Lea (University of North Carolina)
24 May 2005	Meeting with an official Zambian delegation
26 May 2005	22nd Council meeting
13 June 2005	Presentation of Annual Report to the Minister
14 June 2005	SET4W 10th Board meeting
21 June 2005	Parliamentary Portfolio Committee for S&T: Briefing on NACI Annual Report
12 July 2005	Subcommittee 1 (Infrastructure) meeting
19 July 2005	Meeting with an official Mozambican delegation
21 July 2005	44th NACI ExCo meeting
4 August 2005	Operationalisation workshop on the development of a dynamic model for human resources
11 August 2005	45th NACI ExCo meeting
10 - 11 August 2005	SET4W 11th Board meeting
12 August 2005	SET4W Workshop on leadership
25 August 2005	23rd Council meeting
9 September 2005	NACI Secretariat strategic workshop

15 September 2005	46th NACI ExCo meeting
13 October 2005	47th NACI ExCo meeting
14 October 2005	SET4W Workshop on gender equity policy
18 October 2005	Indicator Reference Group meeting
25 October 2005	Operationalisation workshop on the social dimension of innovation
25 November 2005	24th Council meeting
19 January 2006	SET4W 12th Board meeting
26 January 2006	48th NACI ExCo meeting
27 January 2006	NACI Secretariat planning workshop
9 February 2006	25th Council meeting
15 February 2006	NACI lunch seminar: *Indicators as evidence base for policy development* – Professor Anastassios Pouris, University of Pretoria
17 February 2006	NACI lunch seminar: *R&D expenditure and economic growth: Nordic paradoxes* – Dr Per Koch, NIFU STEP, Norway
21 February 2006	Subcommittee 3 (Competitiveness) meeting
09 March 2006	49th NACI ExCo meeting
13 March 2006	Operationalisation workshop on tracking R&D expenditure
14 March 2006	NSI peer review: task team meeting
16 March 2006	SET4W 13th Board meeting
22 March 2006	Operationalisation meeting on NSI peer review
24 March 2006	Science and Technology Portfolio Committee for S&T: Briefing on NACI corporate business plan

Overview of selected developments in the national system of innovation

This section offers an overview of some of the important developments that have taken place across the NSI over the last year or so. As such, these developments give an indication of the context within which NACI functioned during the year. The overview is of necessity highly selective, but should nevertheless offer a sample of the diversified and dynamic nature of the concept of a national system of innovation in general, and the South African system in particular. The overview is based on Internet searches and annual reports and is organised under the following headings: size of the system, new policies and strategies, collaboration, monitoring and evaluation, national recognition, appointments, achievements, other events and selected policy outputs.

Size of the NSI

The following summary table gives an overview of the size of the NSI.

Sector	Number of institutions	R&D expenditure[1]	Human Capital		
			Total R&D staff[1]	Undergraduates[2]	Postgraduates[2]
Business	651[3]	45%	14 337	NA	NA
Higher Education	23	21%	237 93[4]	597 609	123 704
Science Councils	9	17%	6 170	NA	NA

Notes:
1 Data from 2004/2005 R&D Survey (CeSTII)
2 Data supplied by the CHE
3 Businesses that provided data for the 2004/2005 R&D Survey
4 Excluding doctoral students and postdoctoral fellows

The objective of the national interns programme was to provide a platform for recent graduates from diverse academic backgrounds to enhance their educational and professional experience through participation in seminars, workshops and practical work assignments.

New policies and strategies

- The Department of Education, through the National Student Financial Aid Scheme (NSFAS), announced an increase in its support to R1.3 billion for 2006; this is complemented by a further approximately R1.3 billion made available by various other government departments, private sector companies, local and international foundations as well as universities themselves. In 2005 alone, public institutions collectively administered more than R1.3 billion for funding undergraduate and postgraduate students.

- Higher Education South Africa (HESA) was established in May 2005 when the separate bodies representing the vice-chancellors of technikons and universities merged. Dr EM Malaza was appointed chief executive in January 2006.

Launch of the Indicators Reference Group

- The new governance system for public research, approved by Cabinet in 2004, was implemented at the beginning of 2005. In terms of this new system, the DST obtained a cross-cutting and steering function for areas such as S&T liaison, large-scale and broad-scope new S&T platforms and challenges and system-wide oversight functions. Other government departments retained responsibility for sector-specific S&T activities.

- In June 2005, the Minerals and Mining Development Board was launched. The board is tasked with advising the Minister of Minerals and Energy on sustainable development of the nation's natural resources.

- The DST drafted the *Youth in Science Strategy (2005–2009)* in partnership with the Department of Education. Other recent DST strategies include *Indigenous Knowledge Systems* and the *National Nano-Technology Strategy*.

- In October 2005, the Department of Trade and Industry completed a draft Chemicals Strategy, which has been released for public comment.

- The Department of Trade and Industry launched a new *Regional Industrial Development Strategy* in November 2005.

- The Department of Health collaborated with other departments and the private sector to develop an avian flu preparedness plan, which has been approved by Cabinet.
- The Department of Agriculture launched a range of policy and strategic initiatives in the course of 2005, including a draft policy on indigenous crops.
- The Department of Minerals and Energy launched the National Energy Regulator of South Africa (NERSA) in 2005, which will regulate petroleum pipelines and piped gas in addition to electricity.
- The launch of South Africa's Designated National Authority (DNA) took place in October 2005. DNA is a clean development mechanism agency, which countries are expected to establish in order to participate in clean development mechanism (CDM) activities.

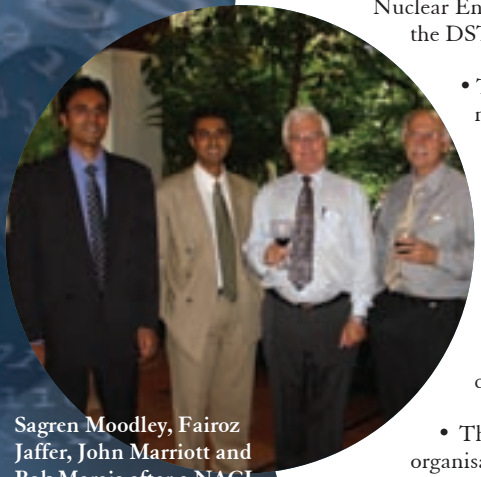
International guest speaker, Prof Russ Lea at a NACI lunchtime seminar

Collaboration

- Late in 2005, the National Research Foundation, with the support of the DST, launched the South African Research Chairs Initiative, which will initially create 55 research chairs, with the ultimate goal of creating 210 chairs by 2010. The aims of this initiative include an increase of the number of world-class researchers in South Africa to help reverse the systemic decline in research outputs, focus and capacity in the NSI.
- The DST embarked on a course of structured cooperation with other entities. The following are examples of this strategy:
    - In 2005 South Africa signed memoranda of understanding on scientific and technological cooperation with Botswana, Indonesia, Lesotho and Senegal.
    - A tax credit of 150% for research and development expenditure was announced by the Minister of Finance on 15 February 2006, following close consultation with the private sector. The package was developed jointly by National Treasury and the DST. This tax credit represents a windfall estimated to be in excess of R1 billion.

SET4W project meeting

Prof Pouris, ITI, University of Pretoria, at a NACI lunchtime seminar



Sagren Moodley, Fairoz Jaffer, John Marriott and Bok Marais after a NACI Council meeting

• Under the auspices of the Department of Trade and Industry, South Africa and the European Union reached an agreement to include most of the automotive products under the free trade area agreement that has been in place since January 2000.

• The Department of Minerals and Energy, in conjunction with the DST, established the National Energy Research Institute (NERI).

• The DST participated in high-level co-operation with the Department of Environmental Affairs and Tourism (DEAT) on a range of fronts, including climate change issues and biodiversity. The Conference on Climate Change held in October 2005 was an example of the DST and DEAT working together.

• The DST has been successful in finalising the case for revitalising the fluoro-chemicals research capacity at the Nuclear Energy Corporation of South Africa (NECSA). Government partnerships in this industry sector include the DST, the Department of Minerals and Energy and the Department of Trade and Industry.

• The Aerospace Industry Support Initiative (AISI) was launched by the Department of Trade and Industry, modelled on the successful Automotive Industry Development Centre. Industry partners and science councils clustered together to jointly develop work on R&D projects to improve the competitiveness of the South African aerospace industry.

This initiative is closely linked to breakthroughs in collaboration between international industry leaders and South African companies and STI role players. A notable example has been the provision of ongoing training to personnel by Boeing and its expansion of manufacturing facilities at Denel (15 000 composite parts per month) and Aerosud (50 000 composite parts in less than two years).

• The Council for Geoscience agreed to establish a National Data Centre to provide real-time seismic data to the International Data Centre as part of the Indian Ocean Tsunami Warning System.

• The Council for Scientific and Industrial Research (CSIR) joined forces with eight other international organisations to develop a super-sorghum with improved nutritional properties.

• In 2002 an underwater cable network comprising 28 000 km of optical fibre cable connecting Africa to Europe and Asia was inaugurated, and in 2005 a French group won a contract to upgrade it. It is envisaged that the cable will

provide Internet access to the world's poorest continent. This joint project is funded by 36 countries in Africa and spearheaded by South African telecommunications utility Telkom (TKG). The New Partnership for Africa's Development (NEPAD) has envisaged a regional underwater network, called the Eastern African Submarine System Cable (EASSy), to address the imbalance in access between Africa's west and east coasts. EASSy, to be connected to SAT-3/WASC/SAFE, will connect South Africa to Sudan, while passing through Mozambique, Madagascar, Tanzania, Kenya and Somalia. NEPAD is hoping to have the network completed by the end of 2007.

Monitoring and evaluation

- The Higher Education Quality Committee (HEQC) of the Council on Higher Education (CHE) granted full accreditation to 19 MBA programmes from 17 higher education institutions. The HEQC process of institutional audits also kicked off in 2005 with audits of the universities of Cape Town, Rhodes and Stellenbosch, as well as the Helderberg College and the Centurion Academy.

- The second system-wide review of science, engineering, and technology institutions, (including all the science councils), was commissioned by the DST in the latter half of the reporting year. The final report of this review is scheduled to be released by the middle of the new financial year.

Council members of NACI and SET4W meet with Minister Mangena

National recognition of South African scientists

Many South African scholars received recognition in 2005. The following is a selection of some of these awards:

- Order of Mapungubwe (Silver): Professor Frank Nabarro, Emeritus Professor of Physics, University of the Witwatersrand (physics).

- The NRF gave A-ratings to the following researchers, acknowledging their recognition by their peers as world leaders in their fields: Professor Len Barbour, University of Stellenbosch (supramolecular chemistry); Professor Diane Hildebrandt, University of the Witwatersrand (engineering); Professor Emeritus David Lewis-Williams, University of Witwatersrand (cognitive archaeology).

Facilitating the SET4W Social dimension workshop

Breakaway group – Social dimension workshop

- Royal Society of South Africa: Professor Johann Lutjeharms (John Herschel Medal for multidisciplinary research in oceanography).

- Academy of Science of South Africa (Gold Medal): Professor George Ellis, Emeritus Professor of Mathematics, University of Cape Town (cosmology); Professor Tom Bothwell, Emeritus Professor of Clinical Medicine, University of the Witwatersrand (understanding of iron metabolism).

- Golden Jubilee Award of the Colleges of Medicine of South Africa: Professor YK Seedat (science and practice of medicine).

- Department of Science and Technology Women in S&T Awards: Professor Anusuya Chinsamy-Turan (Distinguished Woman in Science for Zoology); Professor Judith Bishop (Distinguished Women Scientist for Innovation).

- The film *Tsotsi,* partly funded by the Department of Trade and Industry, won nine international awards, including an Oscar in March 2006.

- National Science and Technology Forum (NSTF) awards: Professor S Priscilla Reddy (capacity building award); Professor Vikash Sewram (junior black researcher award).

- JD Roberts Award: Dr Sharon Biermann, CSIR Building Technology.

- The following companies received Technology Top 100 awards: Innovation – Bell Equipment; Research and Development – Anglo Technical Division; Marketing – Bell Equipment; Commercialisation – Nimue Skin Technologies; Empowerment – Breathetex Corporation; Portfolio Management – Allied Technologies Limited (Altech); Design – Truck Engineering; and Social Innovation – Timbali Technology Incubator.

Significant appointments

A number of senior management appointments were announced in the course of the year, as the following list shows.

- Professor Saleem Badat, former CEO of the Council on Higher Education, was appointed the new vice-chancellor of Rhodes University.

- Prof Calie Pistorius, chairperson of the NACI Council, was appointed for a second term as vice-chancellor and principal of the University of Pretoria.
- Dr Ihron Rensburg was appointed vice-chancellor of the University of Johannesburg.
- The inauguration of both the chancellor of the University of KwaZulu-Natal, Dr Frene Ginwala (former Speaker of Parliament), and the vice-chancellor, Professor Malegapuru Makgoba (former CEO of the Medical Research Council and a member of NACI) took place in October 2005.
- In August 2005, the new vice-chancellor of the Tshwane University of Technology, Professor Errol Tyobeka, took office.
- Dr Rob Adam, director-general of the DST, resigned his position in February 2006 to become the new CEO of NECSA. He was succeeded as director-general of DST by Dr Phil Mjwara, former group executive responsible for R&D at the Council for Scientific and Industrial Research (CSIR).
- Dr Alistair Ruiters resigned as director-general of the Department of Trade and Industry and Tshediso Matoana was appointed acting director-general.
- The new president and CEO of the South African Medical Research Council is Professor Anthony Mbewu.
- Dr Olive Shisana is the new president and CEO of the Human Sciences Research Council (HSRC).

Construction of the new DST office building

Scientific achievements

The year has seen a range of scientific breakthroughs and achievements, only a selection of which are mentioned here to show the scope and variety:

- The Southern African Large Telescope (SALT), was inaugurated by President Thabo Mbeki in Sutherland in November 2005. It is the largest optical telescope in the southern hemisphere and can detect objects as faint as a candle flame on the moon. SALT forms part of the National Research Foundation's national facilities.
- Mr Olihile Sebolai, an MSc student in the Department of Microbial, Biochemical and Food Biotechnology at the

John Stewart, Per Koch of NIFU STEP Norway (guest speaker), Susan Koch and Johannes Potgieter at a lunchtime seminar. NIFU STEP is the leading Norwegian research institute for studies in Innovation, Research and Education

University of the Free State, discovered a series of new compounds that may in future be used to lubricate man-made nanorobots.

- Scientists at the University of Cape Town are exploiting the nanoscale properties of silicon to develop a super-thin disposable solar panel poster that may offer rural dwellers a cheap, alternative source of power.

- The Sunspace Satellite Project at the University of Stellenbosch was announced in October 2005 and is expected to result in quality of life improvements for African countries in monitoring land, water and vegetation; and in enhancing the capacity to deal with issues such as health, resource management and poverty.

- The National Experts in S&T Indicators, a committee of the OECD, announced that the quality of the South African *National R&D Survey* was such that the data would in future be included in its *Main S&T Indicators*. This followed soon after Statistics South Africa had declared the data as official national statistics.

- The CSIR provided support for the first Ka-band Telemetry, Tracking and Command satellite in the world, launched in April 2005.

- An innovative safety monitoring device, Smartbolt™, was designed and developed for the mining industry by Mintek in collaboration with the Safety in Mines Research Advisory Committee to warn of changing mine roof conditions, caused by gas explosions, rock falls, breaches of health and safety regulations, and seismic activities.

- A new earth observation methodology combining point sampling frame and earth observation methodology, aimed at improving the accuracy of crop forecasts and estimates in South Africa, was implemented for the 2005/2006 summer crop season in several regions of the country. It was developed by a consortium comprising the Agricultural Research Council, Spatialintel and GeoTerraImage and has put South Africa in the international forefront of high-technology eye-in-the-sky methodology for estimating crops.

- In a post-9/11 world beset by sustained high fuel costs, concerns over energy security and growing environmental pressures, Sasol finds itself alone as the market leader in the conversion of both coal and gas to liquid fuels. Sasol estimates that it will have at least four years' advantage before its competitors produce workable commercial plants.

The development of more environmentally benign coal-based technologies, combined with the potential for the commercial storage of concentrated carbon dioxide, now allows coal-rich countries to benefit from their coal reserves.

- The Meraka Institute was launched in May 2005 and is expected to play a key role in equipping people with world-class ICT skills, while focusing on needs-based research programmes in conjunction with South African higher education institutions (HEIs). The Meraka Institute is expected to contribute towards stimulating the development of the local ICT industry through its provision of intellectual and human capital. The institute will contribute to government's drive to enhance both the scale and scope of R&D in the sector and the impact of the R&D interventions through focused, needs-driven research in a number of key areas. In association with the private sector, Meraka is engaged in the following projects: Wireless Africa, Human Language Technologies, National Assembly Portal, Digital Doorway, Open Source Software and the Centre for High Performance Computing.

- A biofuels initiative was launched during the year. The initiative will cover at least five provinces. It focuses on efficient technologies in this area, with the involvement of broad-based black economic empowerment partners.

- The Coega Development Corporation (CDC) commenced with developing a new harbour in the industrial complex in the Eastern Cape. It is directly connected with the world's information highways through high-speed links. In the course of the year, the Coega Development Corporation (CDC) appointed Accenture, the world's largest management and technology consulting company, to develop the framework and road map for the Coega Industrial Development Zone's ICT systems. One of the projects of this initiative is the development of the Coega Technology Park.

Other events

Two of the science councils, the CSIR and the South African Bureau of Standards (SABS), celebrated their 60th birthdays during 2005. Celebrations at the CSIR were accompanied by a broad spectrum of changes, ranging from a new corporate strategy (including a structural reorganisation) to a new logo. The SABS launched a new business model to mark its 60th anniversary.

In November 2005, Mintek commissioned a scanning probe microscope (SPM) for nanoscience and nanotechnology research in South Africa. This makes Mintek the only facility on the African continent with such comprehensive capacity for nanoscale research. The SPM was funded by the DST to build capacity for nanoscience and nanotechnology research in the country.

Selected policy-oriented outputs

Andrew Kaniki (NRF) and André Buys (University of Pretoria) at the launch of the Indicator Reference Group

The following is a short list of significant publications:

- *The Higher Education Monitor: The Impact of Changing Funding Sources on Higher Education Institutions in South Africa* and *Towards a Framework for Quality Promotion and Capacity Development in South African Higher Education* were published by the Council on Higher Education.

- The Centre for Higher Education Transformation published *Developing Performance Indicators for Higher Education: A South African Case Study and Higher Education and Development: Reflecting on the Challenges*.

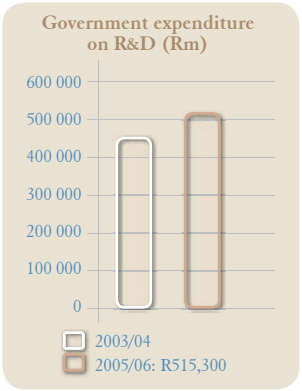
- The HSRC released the report *South African National HIV Prevalence, HIV Incidence, Behaviour and Communication Survey* in November 2005.

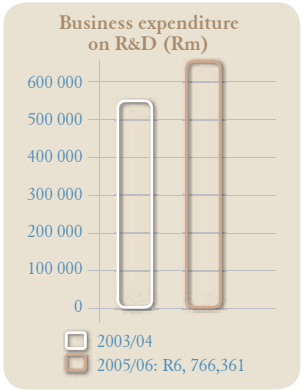
- The Academy of Science of South Africa released its comprehensive study on the state of scientific journals in the first quarter of 2006, *Report on a Strategic Approach to Research Publishing in South Africa*.

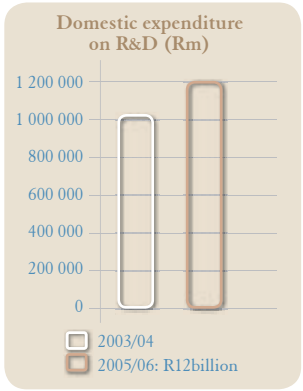
- In March 2006, the international barometer, *The ScienceDirect*, classified two South African science articles among the top 25 'hottest' publications worldwide (2nd and 13th respectively). The articles by Ekambaram, Patil and Maaza, in the field of materials sciences and nanotechnology, entitled 'Synthesis of lamp phosphors: facile combustion approach' and 'Combustion synthesis and luminescent properties of Eu ^ 3 ^ +- activated cheap red phosphors' were published in the *Journal of Alloys and Compounds*.

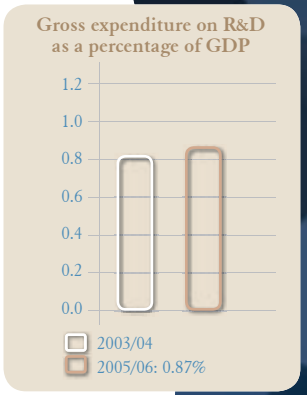
- The Agricultural Research Council published a reference work, *Descriptive Land Type Information in English and Seven Indigenous Languages*, an inventory at the 1:250 000 scale of the soils, terrain and macro-climate resources of South Africa. It includes an inventory of each of the more than 7 000 land types identified in South Africa.

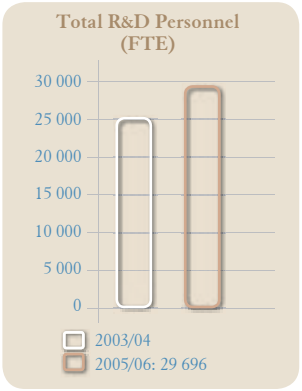
Indicators

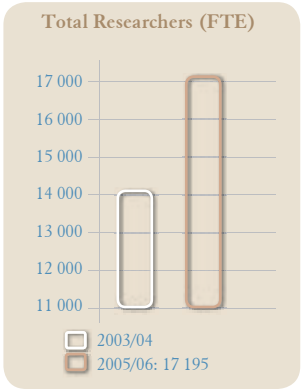

Government expenditure on R&D (Rm)
600 000
500 000
400 000
300 000
200 000
100 000
0
2003/04
2005/06: R515,300

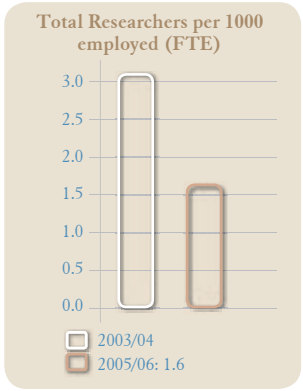

Business expenditure on R&D (Rm)
600 000
500 000
400 000
300 000
200 000
100 000
0
2003/04
2005/06: R6, 766,361


Domestic expenditure on R&D (Rm)
1 200 000
1 000 000
800 000
600 000
400 000
200 000
0
2003/04
2005/06: R12billion


Gross expenditure on R&D as a percentage of GDP
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2003/04
2005/06: 0.87%


Total R&D Personnel (FTE)
30 000
25 000
20 000
15 000
10 000
5 000
0
2003/04
2005/06: 29 696


Total Researchers (FTE)
17 000
16 000
15 000
14 000
13 000
12 000
11 000
2003/04
2005/06: 17 195


Total Researchers per 1000 employed (FTE)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
2003/04
2005/06: 1.6

Secretariat

The staff complement of the NACI Secretariat at the end of the reporting year was as follows:

- Six permanent employees (one resignation)
- Two medium-term contract employees
- One short-term contract employee
- Two interns

[Dr Bok Marais (head), Mr Charles Mokonoto, Dr Sagren Moodley, Dr Hermi Boraine, Mr Simon Mpele, Ms Charlotte Mzolo, Ms Ria Vogel, Mr Edward Rakate, Ms Cynthia Kgethe, Ms Mavis Masia, and Ms Emily Mangale]

NACI places a high premium on the professionalism of its staff and therefore again encouraged its staff to participate in a wide spectrum of relevant conferences, seminars and training courses:

- Four scholarly papers were read at national and international conferences
- Twenty-one short courses were attended by eight staff members
- An internship mentoring programme was developed and implemented

The Secretariat further administered and managed:

- Thirteen formal NACI meetings, for which more than 196 documents were produced
- Seven new contracts (entailing advertising, selection, drafting and implementation of the contracts)

Acronyms

AISI	Aerospace Industry Support Initiative
ASGISA	Accelerated and Shared Growth Initiative of South Africa
ASSAf	Academy of Science of South Africa
CDC	Coega Development Corporation
CDM	Clean Development Mechanism
CEO	Chief Executive Officer
CeSTII	Centre for Science, Technology and Innovation Indicators
CHE	Council on Higher Education
CREST	Centre for Research on Science and Technology
CSIR	Council for Scientific and Industrial Research
CSTP	Committee for Scientific and Technological Policy
CWTS	Centre for Science and Technology Studies
DEAT	Department of Environmental Affairs and Tourism
DNA	Designated National Authority
DST	Department of Science and Technology
ExCo	Executive committee
GLOBELICS	Global Network for Economics of Learning, Innovation and Competency-building Systems
HEI	Higher Education Institution
HEQC	Higher Education Quality Committee
HESA	Higher Education South Africa
HSRC	Human Sciences Research Council
ICT	Information and Communication Technology
IPR	Intellectual Property Rights
JIPSA	Joint Initiative on Priority Skills Acquisition
KISA	Knowledge Intensive Service Activities
MTEF	Medium-term Expenditure Framework
NACI	National Advisory Council on Innovation
NECSA	Nuclear Energy Corporation of South Africa
NEPAD	New Partnership for Africa's Development
NERI	National Energy Research Institute

Acronyms (Continued)

NERSA	National Energy Regulator of South Africa
NESTI	National Experts on Science and Technology Indicators
NRF	National Research Foundation
NSFAS	National Student Financial Aid Scheme
NSI	National System of Innovation
NSTF	National Science and Technology Forum
OECD	Organisation for Economic Cooperation and Development
R&D	Research and Development
S&T	Science and Technology
SABS	South African Bureau of Standards
SALT	Southern African Large Telescope
SET	Science, Engineering and Technology
SET4W	Science, Engineering and Technology for Women
STI	Science, Technology and Innovation
TIP	Technology and Innovation Policy
ToR	Terms of Reference

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