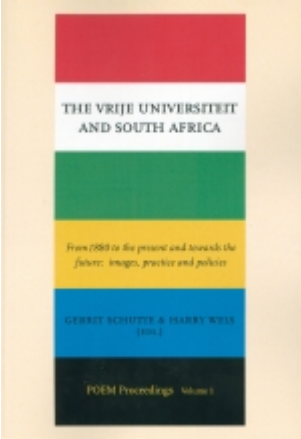
The Vrije Universiteit And South Africa ~ 'New' Scientific Practice In South Africa With Special Reference To Land Reform



...training new generations of scientists and technologists oriented towards the solving of real problems (White Paper on Science and Technology 1996).

The SandT capacity of the country is running as fast as it can, but is still losing ground (National Research and Development Strategy 2000).

Introduction

The landscape of scientific practice and higher education in South Africa has changed drastically since 2 February 1990. The changes that occurred in these fields during the last decade of the 20th century were probably the most incisive in the history of science and higher education in South Africa.

When the democratically elected government came into power in 1994, science was confronted with two main challenges, namely to transform the system so that the welfare of all the inhabitants could be promoted and to make South Africa competitive in a globalising world.

The new government inherited a sound science infrastructure. It was a widely dispersed and uncoordinated system in which scientists enjoyed international recognition for transplanting hearts and for enabling the deepest exploitation of mines in the world. However, the system was mainly directed at the promotion of the welfare of the white community and was strongly focussed on military defence; the provision of energy and food; and the combating of diseases.**[i]**

In this transformation process, South Africa was very receptive to theories,

models and schools of thought. Expertise from abroad was not provided in all instances without direct or subtle influence. There are already indications that certain models, that were applied successfully elsewhere, cannot be transferred without adaptations to the South African situation, where complex issues have to be addressed. The question that arises is whether the government implements the policy documents that were designed by intellectuals who are not part of the bureaucracy.

Two examples are applicable to the aims of this paper. Firstly, the work by Gibbons et al. (1994) entitled *The new production of knowledge: The dynamics of science and research in contemporary societies and also Scott et al.*'s (1995) *The meaning of mass higher education* have had a strong influence on policy formulation regarding science and regarding higher education (Kraak 2000). Secondly, the World Bank has made significant inputs to the establishment of the policy on land reform. There is at present a widespread debate on whether a shift of emphasis from Gibbons' Mode 1 (basic) to Mode 2 (interdisciplinary or applied research) has had a beneficial effect on teaching and research in higher education in particular and on science in general. Older academics and researchers find it difficult to switch from Mode 1 to Mode 2. Younger researchers and some faculties at universities have probably embraced this new paradigm and the pursuit of relevance so strongly that it now threatens to smother them. In this regard there appears to be a great deal of validity in Sheila Slaughter's statement, as quoted by Kraak (2000: 33):
… that the commercialization of the academy will lead to a decline of the canonical tradition itself, the weakening of the professorate and scholarly research and the triumph of a managerial mode of control in the university not unlike that of corporate capitalism.

The new way of creating and disseminating knowledge is an indisputable feature across the world and a new social organisation of knowledge and learning is emerging. In South Africa it has occurred very rapidly and with strong government interference, and therefore it is inevitable that there will be some distortion.

Part I of this paper summarises the strengths and weaknesses of science and of higher education over the past ten years. Part II focuses on the complexity of land reform, which is one of the most important political and socio-economic issues that faces the country en route to ensuring that its society is fair and peaceful to a

greater extent than before. This issue can only be resolved by *new generation* researchers who use a combination of basic and interdisciplinary applied research.

Part I – *Strengths and weaknesses of science and higher education*
Throughout the struggle years, the ANC accorded a high priority to the role that science and technology should fulfil in the reconstruction of the country. After coming to power in 1994, they maintained the science infrastructure to a large extent and approached it with circumspection. The expenditure on military research**[ii]** and on energy independence was reduced. This reduction partly explains why the expenditure on RandD declined from 1,19 per cent of the GDP in 1990 to 0,79 per cent in 2002 (National Research and Development Strategy 2002). It is probable that more expertise could have been retained to convert 'swords into ploughshares'. Some knowledge used in the production of weapons has been applied in industry, while some of the expertise of the former Atomic Energy Corporation is currently being used in amongst other things the new Pebble Bed Modular Reactor at Koeberg in the Western Cape. The establishment of a new ministry for science and technology in 2004 underlines the importance that the government attributes to science and technology.

Some building blocks in the establishment of a new framework for science and higher education Large-scale restructuring of the science system was required to achieve the main goals of transformation, a better quality of life for all inhabitants and international competitiveness. This discussion is limited to only some of the important building blocks of the process.

The Green Paper and the White Paper on science and technology: Preparing for the 21st century (1996) provided a new framework for scientific practice. It evaluated the existing system and created structures to develop, implement and monitor the policy framework (Bawa and Mouton 2003: 300). The aim was to make South Africa more responsive to restructuring and development needs. Of particular importance was the establishment of a National System of Innovation (NSI). A National System of Innovation can be thought of as a set of functioning institutions, organisations and politics that interact constructively in the pursuit of a common set of social and economic goals or objectives.

The funding of research and postgraduate training in the human and the natural sciences**[iii]**, which was previously managed by two institutions, was integrated

upon the establishment of the National Research Foundation (Act 23 of 1998). It benefited the human sciences, because more funds became available and a system of peer evaluation now identifies top researchers and funds them as generously as in the natural sciences. The total amount of funding has been increased, especially for high-level human resources development. In 2003, '…a total of 5442 students received bursaries, of which 3309 were awarded to black students. It was also the first year in which the NRF supported more than 1000 PhD students…' (Von Gruenewaldt 2004).

The National Advisory Council on Innovation (NACI) was founded and began functioning in November 1998. The institution, which in essence replaced the former Science Advisory Council, advises the Minister of Science and Technology on science and technology, innovation and competitiveness. It is an important guiding mechanism in the establishment of the NSI.

An innovation fund was established in 1998 to promote technological innovation and competitiveness. Up to 2004 the fund has spend R665 million on 106 projects (Von Gruenewaldt 2004). In order to direct the research of the science councils, government grants were pruned so that income has to be augmented by means of contract research. These councils can also apply to the Innovation Fund for funds to do directed research. Thus far the science councils have benefited more from the fund than the universities have. The greater teaching load that lecturers have as a result of a larger number of ill-prepared students is one of the reasons why the universities have been poorer competitors for the funds.
Technological innovation and competitiveness have been strongly promoted by the establishment of the Technology for Human Resources for Industry Programme (THRIP). This programme is the result of a joint initiative undertaken by industry, the Department of Trade and Industry, research and education institutions, the Innovation Fund, and the Department of Science and Technology. From 1992 to September 2004, the fund spent R1,8 billion on research and development projects (Von Gruenewaldt 2004). This is one of the success stories of the past number of years.

An important milestone in the development of the research system was the National Research and Technology Audit (NRTA), which was undertaken in 1997/98. All research councils and national institutes were evaluated. Important weaknesses and strengths were identified. Science councils are evaluated annually to determine whether stated objectives have been achieved.

The National Research and Technology Foresight Exercise (1998/2000) did planning for long-term research on the technological needs of South Africa (Bawa and Mouton 2002: 302). Thirteen focal areas were identified. To a large extent, the NRF's nine focal areas accommodate the focal areas identified by the National Research and Technology Foresight Exercise.**[iv]** The establishment of Centres of Excellence (COE) rewards excellent researchers and enables them to co-operate across disciplinary boundaries and institutions in respect of projects that are locally relevant and internationally competitive. Some examples are: biomedical TB research; excellence in strong materials; invasion biology etc. The research system in higher education, which is an important part of the national research system, was even more unequal and uncoordinated than the science system. In many respects, the higher education system experienced a revolution since 1994. Only some relevant aspects are identified in this context.

The Report of the National Commission on Higher Education (1996) and the *White Paper* (1997) emphasised the importance of research and the development of high-level human resources. The restructuring of curricula, to convert courses into programmes that have clear outcomes, has had a far-reaching impact on higher education. Many of the consequences of this process will only be felt after a number of years. The experience in many countries has revealed that the transformation of higher education always has some unexpected consequences. A number of universities went overboard by instituting programmes that are mainly directed at occupational training and the needs of the market. It was particularly the universities at which student numbers were increasing slowly and which were experiencing financial crises that saw these courses as a means to attract more students. For example, technikons began to offer MBA programmes without having the required human resources, experience and infrastructure. A recent evaluation of the programmes did not accord full accreditation to a number of these programmes.

In my opinion, it was especially the human sciences that considered this programme approach to be an opportunity to stop and reverse the decline in student numbers. The decline in student numbers had a particularly severe effect on the black universities and Cloete (2003: 422) justifiably remarks that 'for historically black universities the new South Africa was a disaster'. In the fields of the human sciences and education, the universities and technikons produce more than 50 per cent of all graduates. Just above one-quarter of all graduates qualify in the fields of the natural sciences and engineering.

The conversion of courses to programmes caused a large number of departments to close, while other departments were consolidated and new faculties were established. In many cases, imaginative new programmes were instituted, but it is clear that the traditional formative courses have lost ground. The pursuit of relevance eroded the traditional disciplinary boundaries. Outcome became more important than content. The energy that was put into these exercises, together with an increased teaching load, caused many academics to become disheartened and it has had negative consequences for teaching and especially for research. It is also doubtful whether students are better prepared for the workplace. The number of unemployed graduates, especially blacks, continues to increase.

The student numbers at universities and technikons increased at a relatively fast pace. The percentage of black students at universities increased from 32 per cent in 1990 to 60 per cent in 2000. In the same period, the increase at technikons was from 32 per cent tot 72 per cent. However, the number of white students at Universities declined (Cloete 2003: 415). The high growth projections of the National Commission for Higher Education did not materialise. At the historically disadvantaged institutions in particular there were relatively small increases and even decreases in the student numbers. This phenomenon, together with maladministration at a number of institutions, led to financial crises.

Graduation trends were not reflected in the rapid increase in the number of students.**[v]** Therefore the Treasury was no longer prepared to fund ineffectiveness. Mass higher education (that is, the model of mass higher education as advocated by Scott) did not materialise. The consequence was that it was announced in 2004 that student numbers would be restricted. Preliminary indications are that students at several of the larger universities will be restricted and that a quota system will be introduced. Some experts are of the opinion that the universities have been deprived of their autonomy. Programmes dictate what may be taught and now quotas are being introduced that dictate who may be taught.**[vi]**

The merger of the 21 universities and 15 technikons into 22 institutions of higher education is a far-reaching intervention. In 2000, the Minister of Education requested the Council on Higher Education to make concrete proposals on the size and shape of the higher education system. When he received the report, the Minister indicated that the government would respond to it with a national plan. The National Plan for Higher Education was released in 2001.

Although there is general consensus that there are too many universities and technikons and that a number of the institutions can probably not continue to exist independently, there are serious debates on the way in which institutions are being compelled to merge. There are large inequalities between the various universities as well as between the technikons. Many of the historically disadvantaged universities are no more than teaching institutions that have almost no research output or research culture. In this regard, two universities, namely the University of the Western Cape and the University of Durban-Westville are exceptions as they have made great strides in respect of their research output.

The merging of universities and technikons will require much energy and an enormous amount of money. Only R3,2 billion has been set aside for the purpose, but a large portion of these funds will be used to cover the current debt of the institutions. It is quite clear that the cost has been underestimated. It is nevertheless heartening that many academic leaders, who initially raised objections to the process of merging, are now dedicated in their endeavours to make a success of the mergers.

A further drastic step was taken when technikons were granted the status of being a technological university. The important place and role that the technikons fulfil cannot be denied. However, several of these institutions still have a long way to go in terms of performance and the pursuit of excellence before they are worthy of the status of a technical university. Being appointed to a chair has traditionally been associated with postgraduate qualifications, experience in the training of students up to the doctoral level and specialised research that is published in recognised science journals. A great deal of erosion has taken place in the application of these criteria. Right-minded South Africans agree that it was necessary to restructure higher education for the purposes of fairness and accessibility, and to direct it to a greater extent at the need for high-level human resources. The tempo at which the restructuring is occurring, could be debated, and there are real dangers that incalculable harm is being done. The fact that the goalposts are often shifted has a demoralising effect on the staff concerned. The new Minister of Education has a record of success and pragmatism and is prepared to consult widely.

The National Research and Development Strategy, which was published in 2002, provides, in some respects, a new direction for the implementation of the science

policy. It sets out a strategy in terms of which science and technology should achieve the objectives of increasing the quality of life of all inhabitants and of increasing the country's competitiveness with the rest of the world. The strategy presupposes amongst other things '…doubling government investment in Science and Technology over the next three years…' (p. 17).

Have the stated objectives been achieved?
The policy documents that have been produced to establish a framework for science and technology have generally been acclaimed in the national and international arenas. In answering the question whether the stated objectives have been achieved, two provisions should be applied. Firstly, it is probably too soon to evaluate the results critically. Secondly, the statistical basis available for an analysis has serious shortcomings. There can be no doubt that a new science landscape is developing, both nationally and within institutions (Bawa and Mouton 2002: 323). However, at this stage, some of the contours are still too feint or too vague.

Although a great deal has been achieved, many of the objectives have not been achieved. When the effectiveness of higher education is assessed in terms of the number of graduates and research outputs, it appears that it has not increased. *The National Research and Development Strategy* (2002: 73) states that 'the system is working hard … but is going backwards'. And furthermore, '… the total capacity of the system is about one-third to one-half the size that it should be to form the basis of a competitive knowledge-based economy for South Africa in the medium and long term'. There is serious concern that basic research and teaching, which are preconditions for interdisciplinary teaching and research, are being weakened by policy and market forces.

The expenditure on RandD, which represents 0,79 per cent of the GDP, is low in comparison with the 2,15 per cent of GDP of the OECD countries. It should be doubled in the next three to four years. The fact that the universities in South Africa are not adequately equipped and that some equipment is obsolete was stated as far back as 1992 and again highlighted in the National Research and Technology Audit in 1998. The audit emphasised that '… only 10 per cent of the country's equipment base at the time could be considered as state-of-the-art, i.e. less than five years old' (A *National Key Research and Technology Infrastructure Strategy* July 2004). The replacement value of the equipment is R3.7 billion. According to some experts, the new subsidy formula for 2004 provides even less

funds for the purchase of research equipment.

The number of subsidised research outputs is diminishing. Large inequalities exist between ethnic groups and institutions in higher education. There are indications that the differences between universities are increasing rather than decreasing. By the year 2000, whites still produced 91,9 per cent of all outputs, Africans 2,6 per cent, coloureds 1,19 per cent, and Asians 4,4 per cent. (Boshoff and Mouton 2003: 220). Five universities produce 60 per cent of the total research output in the sector. Contract research has increased rapidly. However, the quality of the contract work is often suspect. Some historically disadvantaged universities produce hardly any output at all. The new subsidy formula will encourage all universities, including the new universities of technology, to strive to become research universities. An investigation undertaken in 1997 indicated that '… academic science in South Africa … was conducted within rather confined disciplinary and institutional enclaves' (Mouton 2004).

The ageing of the science population and the fact that there is an inadequate inflow to the system are probably the greatest threats. The research output in the age group above 50 years is increasing, while the output of the age group below 50 years is decreasing (Boshoff and Mouton 2003: 221). Affirmative action is having the effect that some white academics do not see a future for themselves in academia. The composition of the staff has not changed dramatically over a decade. From 1988 to 1998 the percentage of Africans increased from 30 per cent to 38 per cent and that of whites decreased from 55 per cent to 47 per cent (Cloete et al. 2003: 200). Salaries in the higher education sector have fallen significantly behind that of the public and private sectors. It will be indicated in a later section that there is a strong mobility of blacks in the academic sector as a result of shortages and promotions. It is difficult to calculate the extent of the effect of HIV/AIDS, but statistics indicate that it could be extensive.

There is an ongoing debate on the extent and influence of the so-called brain drain. The reason is that statistics on emigration are unreliable and that many highly trained individuals do not leave the country permanently. A recent (2004) investigation, which was undertaken for the National Council on Innovation and entitled *Flight of the Flamingos*, found that 'South Africa is faced with a strong resource constraint surrounding highly skilled individuals', but that there is no proof of a brain drain crisis (p. xvii).**[vii]** It is also not certain how many of the highly trained individuals will return. An important statement that is made is that

if there is a perception that the research system is weak or that it erodes because there are few posts or sources available, an even larger number of individuals will attempt to find opportunities in other countries. As already indicated, there is a large measure of mobility of black scientists between sectors before they make a significant contribution in certain posts. It is especially disconcerting that top scientists leave the higher education and research institutions for managerial posts in the public and private sectors.

Research funding from abroad has increased rapidly since 1994. One research university already receives 20 per cent of its research expenditure from abroad. In summary it can be said that South Africa may eventually have sufficient financial resources for its scientific practice and higher education, but that the human resources may be insufficient.

There is a marked decline in RandD in the private sector. In the four years to 2002, the number of researchers declined by 16 per cent (National Research and Development Strategy 2002: 54).

As far as the science councils are concerned, the Human Sciences Research Council and the Agricultural Research Council should be highlighted. Human sciences research has never figured relatively strongly in the research system. Poor methodology, insufficient statistical grounding, a variety of schools of thought, ideological differences and divides (English, Africans, black, white) together with the academic boycott in the apartheid years had a detrimental effect on the system for several decades. Nevertheless there can be no doubt regarding the important role that research in the human sciences can fulfil by analysing changes in the socio-economic and political fields and by communicating relevant knowledge efficiently through information and communication systems.**[viii]**

There has been an ongoing debate on whether the Human Sciences Research Council should continue to exist (Bawa and Mouton 2003: 325). Its personnel complement has been reduced and significant changes have been made to the course that it was taking. Certain research divisions were closed down or transferred to universities. It could be accused of too much direct competition with universities and technikons for research funds. However, the universities do not have the infrastructure to do the national surveys that the Human Sciences Research Council undertakes successfully. My personal observation is that a new

generation of human science researchers is emerging who analyse issues fearlessly, objectively and critically.

The Agricultural Research Council (ARC), which was established in 1992, has undergone major changes and crises (Liebenberg et al. 2004; Thirtle, Van Zyl and Vink 2000). The focus has been shifted from large commercial agriculture to emerging black farming units; and from highly subsidised agriculture and price protection by marketing councils to competition within world markets. A combination of factors, including the lack of leadership, has had the effect that the number of research personnel at the ARC decreased from 761 in 1996 to 634 fte researchers in 2000. The number decreased further to 400 by April 2003. Large numbers of highly qualified researchers left the ARC precisely during a period when research could have contributed in respect of the structural problems in agriculture and the land reform process.

Finally, some international benchmarks could be considered. Bundlender (2003: 257) says that 'Given its relative wealth, South Africa performs less well in HRD indicators, education, health and labour'. According to the World Competitiveness Index (2001), South Africa holds the 42nd position among 49 countries.

It is in the fields of Mathematics and Science that the performance at the school level is especially poor. Of the 440,267 candidates that wrote the school-leavers examination (grade 12) in 2003, only 82,010 (18.7 per cent) passed with exemption to enrol for higher education. The number of candidates that obtain exemption has remained reasonably constant over the past few years. Of the candidates that obtained exemption, only 23,088 (28 per cent) passed Mathematics and 25,972 (31 per cent) passed Science on the higher grade. Many experts are of the opinion that the large increase from 1999 to 2003 in the number of grade 12 candidates that passed, ostensibly without a drop in standards, is simply too good to be true. The pass rate of grade 12 pupils was 48.9 per cent in 1999 and it increased to 73 per cent in 2003. The number of poorly prepared candidates that enter the tertiary institutions is increasing. In 2004 it was announced that 40 per cent of students fail their first year.

Part II – *Land reform: a complex issue that requires interdisciplinary, applied research*

Few topics in these countries (South Africa and Zimbabwe) have been more widely discussed but less understood than land reform (International Crisis Group

2004)

Introduction

Land reform has been chosen as a focal area because it has far-reaching consequences. These consequences encompass the following crucial areas: Political (race restructuring), economic (alleviation of poverty and job creation in rural areas) and social (change in the communal land ownership system that has a radical effect on the social order of traditional communities, as well as the moving of millions of people, which may be even more extensive than the social engineering of the apartheid years). Furthermore, more than 20.4 million people (46.3 per cent of the total population) live in the rural areas (Strategic Plan for the Department of Agriculture 2004: 11). More than 70 per cent of the rural population is poor and approximately 27 per cent live below the bread line. In a broader African context, it is said that NEPAD (New Partnership for Africa's Development) '… believes that agriculture will provide the engine of growth in Africa' (Comprehensive Africa Agriculture Development Programme 2003). Land reform may have major national and international consequences and it may influence the food security of the poorest of the poor in Southern Africa.

Contextualising the place and role of agriculture

In order to gain a clear understanding of the land reform process, it is necessary to put into perspective the place and role of agriculture in the South African economy. Although agriculture contributes just more than 3.9 per cent to the GDP, it has important backward and forward links with the national economy. As a consequence of low rainfall and relatively poor soil, only 13 per cent of the surface of the country can be used for crop production and of this area only one-fifth is high-potential arable land. A little more than 1.3 million hectare (1.19 per cent) are under irrigation (Strategic Plan for Agriculture). Between 50,000 and 60,000 commercial (mainly white) farmers farm on 87 per cent of the total agricultural land, which is highly developed, and they account for more than 95 per cent of the total agricultural production. As in many countries, agriculture is not very kind to farmers. Since 1965, commercial agricultural production increased slower than the national economy with the result that the 9.129 per cent contribution to the GDP in 1965 decreased to 3.2 per cent in 2002. Various structural changes in agriculture and globalisation have been the cause that many farmers have lost their farms and that the agricultural debt increased by more than 3 per cent per annum from 1991 to reach R31 billion in 2003.

Events preceding the land reform programme

Land occupation by indigenous groups in southern Africa occurred over many centuries. With the arrival of white settlers, the conflict intensified. In 1655 the indigenous people had already built their huts near the Fort at Table Bay and were requested by the colonists '… to go a little further away' (Davenport and Hunt 1974: 11). The first division of land occurred in the Western Cape when the Salt River and the Liesbeek River were accepted as the dividing line between the indigenous people and the colonists (Davies 1971: 5). Over a period of 300 years it eventually lead to South Africa having '… one of the most unequal land distributions in the world' (Binswanger and Deiniger 1993: 451). The problem of land reform is currently a topical issue in virtually all the countries in Southern Africa. Both the previous government and the ANC paid a great deal of attention to land reform during the struggle. After 2 February 1990 various national and international conferences were held on this issue.

The current land reform process commenced with the acceptance of the Interim Constitution in 1993. It was essentially aimed at correcting the wrongs that were brought about by the Natives Land Act of 1913 and the Natives Land and Trust Act of 1936 in terms of which blacks' land rights were limited to approximately 13 per cent**[ix]** of the country. Besides these two acts, a host of other laws were also promulgated over the years, which lead to the blacks being dispossessed of their land rights and to population shifts. It is estimated that '… 3,5 million people were forcibly removed from their land between 1960 and 1982' (Aliber and Mokoena 2004: 330). The limitation of blacks' land rights and subsidies granted to commercial farmers supplied labour to the mines and lead to large-scale distortion in agriculture (Thirtle, Van Zyl and Vink 2000: 6-21).

The intricate legislation passed to set the land reform programmes in motion, such as the Restitution of Land Rights Act No. 22 of 1994, and the Land Claims Court that was established, are not discussed in this context. (In this regard see The Law of S.A. Vol. 14 1999). Land reform comprises three basic processes, namely:

– Restitution or return of land that was expropriated and that led to, for example, large-scale removal of people or communities;

– Redistribution of land directed at assisting the poor, farm workers and especially black women to obtain land; and

– Changing the land ownership system, mainly in the former homelands where

communal land ownership is the most general form of land ownership.

Land claims could be instituted from 1994 to 31 December 1998. In total, 79,649 claims were registered. It is a comprehensive task to evaluate the validity of the claims, identity documents, title deeds etc. Corruption is also inherent in the process.

Of the more than 55,000 claims that have already been concluded, approximately 80 per cent concerned urban areas. By March 2004, 2.9 per cent of the agricultural land (former homelands excluded) was transferred to blacks at a total cost of R4.6 billion (Hall and Laliff 2004: 1). Thus far restitution has received the greatest attention. Although a great deal of land in urban areas has been returned to former owners, criticism has been expressed that the easy route was taken by giving the claimants cash instead of land (Business Day 18 August 2003). Land reform on farms is more complex. Changing the communal land ownership system has vast political and social implications.

Land reform, which is protected by the Constitution, is one of the great achievements of the government. Thus far the process has proceeded very slowly. Research is revealing how complex the issue is. Much criticism has been expressed, especially of the unrealistic expectations that are being created (Walker 2004). Researchers do, however, agree on one matter, namely that those countries that do not undertake land reform successfully, run the risk of paralysing civil unrest and violence. The land reform process gained new momentum in July 2004 when the Department of Agriculture released a document entitled AgriBEE, Broad-Based Black Economic Empowerment Framework for Agriculture. The most important aims of the document are summarised below.

The Established Industry (Agriculture) undertakes to:
– Contribute to the realisation of country's objective of ensuring that 30 per cent of agricultural land is owned by Black South Africans by the year 2014;
– Contribute to an additional target to make available (20 per cent) of own existing high potential and unique agricultural land for lease by Black South Africans by year 2014;
– Make available 15 per cent of existing high potential and unique agricultural land for acquisition or lease by 2010;
– Support legislative and development initiatives intended to secure tenure rights to agricultural land in all areas;

– Make available 10 per cent of own agricultural land to farm workers for their own animal and plant production activities.

The Sector undertakes to:
– Eliminate by 75 per cent the rate of illiteracy**[x]** within farming communities by year 2008;
– Eliminate completely the rate of illiteracy within farming communities by year 2010;
– Ensure that all workers in the secondary and tertiary level of the sector are functionally literate and numerate by year 2010;
– Establish training programmes for farm and enterprise workers in appropriate technical and management skills by July 2005;
– Collaborate in ensuring maximum use of resources of the relevant Sector Education and Training Authorities (PAETA), Food and Beverage Sector and SETAs**[xi]** to achieve the above targets;
– Institute a sector-wide young professionals employment and mentoring programme, which targets 5,000 black unemployed and underemployed graduates per annum for the next five years in all disciplines, starting in 2005 financial year. Mentorship programmes shall be accredited by the relevant SETA or other agreed authority

The way in which this framework was released, elicited a great deal of criticism. It was said that there had been a breach of trust, because organised agriculture, which had cooperated in the establishment of a new framework, had not been consulted in regard to the final edition of the document. Furthermore, it was pointed out that unrealistic expectations were being created and that there were neither the funds nor the infrastructure to achieve the stated aims. Thereafter the Minister of Agriculture did a great deal to effect damage control and invited institutions to make inputs towards a final framework by the end of 2004. Is it a symbolic policy that is not really intended for implementation?
The most important preliminary findings have been indicated. Although this is a critical analysis, an attempt has been made to avoid value judgements. Furthermore the analysis does not question the necessity of land reform.

Schools of thought, models and expectations
As in the case of science and higher education, in many cases policy formulation on land reform has been strongly influenced by experts from abroad. The assistance that has been received has also often been accompanied by particular

inputs and conditions. For example, land rights are based on Roman Dutch Law and elements of English Law, with some accommodation of the customary law of Africans, and it is susceptible to differing interpretations.

Hereafter a number of the relevant aspects are highlighted
– There is a fundamental difference between the value that the most Westerners attach to land and the value that Africans attach to it. This aspect probably underlies the problems that are experienced in respect of land reform. Westerners view land as a means of production that has a market value. The black man has never been a crop farmer and farmed with cattle in a context in which numbers were more important than quality. In many traditional communities the woman was and still is the crop farmer. It is for this very reason that the criticism is expressed that black women are not given sufficient assistance to obtain land.

Davidson and other researchers (London Review of Books 1994b) shed light on the metaphysical considerations in respect of ancestral land that motivated the Mau Mau murders in Kenya. He points out the differences between 'them' and 'us'. The Kikuyu did not lose a large area of land. 'But what they crucially did lose was all assurance of control over ancestral forest and fields that had been theirs from "time out of mind", they lost, it could be said, their environment', and as a result a 'Land and Freedom Army' was established '… In line with Kukuyu ancestral concepts of the difference between good and evil, between success and failure, eventually between life and death'. After many years it now becomes clear what the underlying reason for the murders was. In South Africa, the whites are particularly ignorant about the meaning that land has for blacks, i.e. the homes and graves of their ancestors. Following from the preceding discussion, there is an open debate on whether blacks, especially the younger generation, are interested in becoming farmers. My research in the 1980s indicated that young black men who do not have a regular job in urban areas, earn more money than their brothers who till the soil in the African sun. The aspirations and expectations of the youth are more prevalent amongst urban blacks than in amongst rural blacks. Surveys reveal that the majority of blacks have a desire for a relatively small area of land on which they can live and can farm to provide in their own needs. A broad-based attitude survey found that one-third of the respondents indicated '… no interest in additional farm land, and another third wanted one hectare or less' (Zimmerman 2000: 16). This is clearly an area in need of further research.

– It is clear what the political objectives of land reform are, namely the correction of inequalities by means of race restructuring. Some researchers believe that politics is the main driving force. It is for this reasons that high expectations are created by urban politicians who do not grasp the complexity of farming. Others believe that economic objectives – alleviation of rural poverty, work creation and general economic growth – should be the main driving forces.

– There are two strongly divergent schools of thoughts on how land should be divided and rural poverty alleviated. A school of thought of the World Bank, which is supported by prominent South Africans, states that '… our research shows that efficiency and employment in South African agriculture would increase if average farm size were to decrease in the commercial farming sector and increase in the former homelands' (Thirtle, van Zyl and Vink 2000: 303). Another school of thought holds the view that the aforementioned opinion is ideologically driven. Only large commercial farms can afford new technology and negotiate prices. There are, however, many examples in the world in which agricultural production has been increased by the subdivision of land, but these countries do not have the uncertain rainfall and poor soil that South Africa has. Sender and Johnston (2004: 144) say that there is no empirical proof of successful small farming in Africa and that '… many economists arguments for land reform amount to an ideologically driven search for something that does not exist, namely efficient and egalitarian family-operated small farms that are likely to provide an escape from poverty for millions of the poorest rural Africans'. Davidson (1994: 275) points out that neither capitalistic nor socialistic systems have been successful in Africa. Africa, like South Africa, requires its own unique solutions. The school of thought that advocates an enlargement of the land of black households, bases its argument on surplus labour that is available. Empirical research indicates that this surplus does not exist. Productive men are away as migrant labourers. The women, children and elder persons that are left behind, spend most of their time fetching water and gathering firewood.

– Another aspect that still requires a great deal of research is the question whether blacks are willing or able to move to new land. Zimmerman (2000: 1) summarises a number of obstacles as follows: '… the poor have less inclination to move the distance demanded by the redistribution, have less labour available for farming, are less able to afford the program's upfront costs, have fewer farming-specific skills, and have less capacity to cope with agricultural risk'. The question

is also asked regarding where poor black people will find the funds for transport to a new home where basic infrastructure has to be created. Many are unwilling to exchange their social networks for new homes where they face an uncertain future. If the objective is achieved of having 30 per cent of agricultural land in black ownership by 2015, it will involve social engineering that will probably exceed that of the apartheid years.

– It is probably too early to make a final judgement on the influence of the alleviation of poverty in rural areas. One group points to the marginal success, the other highlights failure (Neto 2004). There is no proof of job creation on the new land. Statements made by the government have led to approximately 200,000 farm workers losing their jobs on commercial farms. Sender and Johnston (2004: 158) conclude that '… over the last decade, redistribute land reform in South Africa has had adverse effects on the standard of living of very large numbers of the poorest rural people. They did not require any land and suffer from declines in the rural wage earning opportunities that are crucial for their survival'.**[xii]** Land reform should be part of a wider rural economic restructuring process.

– Changing the communal land ownership system is a complex and a politically highly explosive enterprise. Communal land ownership, in which the power of the traditional leaders is largely vested, is the cornerstone of the social system in many African countries. On this issue, too, there are different schools of thought. One school of thought believes that communal ownership does not permit any individual initiative and does not offer access to credit. Another school of thought stresses the utility value of communal ownership and the safety net that it offers many poor black people (Hall, Jacobs and Lahiff 2003: 22). Research reveals that chiefs' power over land is rejected in some areas and applauded in other areas. The Communal Land Rights Act (2004) is intended to give title deeds to the inhabitants of tribal or trust lands. It will have a far-reaching effect on the lives of more than 7 million people in the former homelands.

– There is a variety of other aspects that should be taken into account and that cannot be discussed in any detail. One such aspect is that the current approach departs from the point of view that black communities are homogeneous, while there are large differences between ethnic groups and between various areas. Research indicates that the demand-driven approach can lead to the establishment of a black elite of owners to the detriment of the poor. Thus far the process has been driven by some (urban) elite with little input from rural

communities (Levin and Weiner 1997: 4). Some observers say that the process is being retarded because it has become '… over-centralised and bureaucratic' and the state '… tries to do everything' (Kirsten et al. 2000). Lastly, researchers refer to the fact that land reform could have far-reaching implications for sustained development, biodiversity and the preservation of, amongst other things, national parks (De Villiers 1999).

– Research indicates that the HIV/AIDS pandemic may have a major influence on land reform. One aspect is particularly important, namely that the law of inheritance should give ownership to the women whose husbands die of AIDS.

– A shortage of funding is one of the strongest reasons why only 2.9 per cent of the agricultural land has been transferred to blacks. Funding for land reform has never yet exceeded 0.5 per cent of the national budget (Hall and Lahiff 2004: 1). It is being asked whether the funding is in line with the expectation that has been created that 30 per cent of the agricultural land should be in black hands by 2015.

The Landless Peoples Movement and the South African Communist Party have already made threats. There are no comprehensive estimates of what the total cost will be. The 2004/5 allocations in the budget include R474 million for land reform, but it is estimated that at least R1 billion will be needed. The implementation of the Communal Land Rights Act will amount to R1 billion per year over the next five years, '… equivalent to over 70 per cent of its current budget for all aspects of land reform' (Hall and Lahiff 2004: 3).

The preceding discussion gives rise to the question whether the government can continue with its current policy of 'demand driven and willing buyer, willing seller'. There have already been calls to farmers to reduce the price of land. A committee was appointed by the Minister Agriculture and Land Affairs in 2004 to investigate the purchasing of the land of foreigners and the increase in land prices. A lack of funds, the inability of the government to conclude land claims speedily and to select and train black farmers, can lead to illegal land invasion. In fact, it has been pointed out that "the history of land reform around the world demonstrates that land invasions, which governments then normalize through legal processes of expropriation and allocation, have been the most common and effective processes of land reform (Van Zyl, Kirsten and Van Binswanger 1996: 10). A legal framework should attempt to reduce the probability of such action

being taken. It is being asked whether the current legal framework is advantageous for land reform. Various cases have gone the long route through the high court and the appeal court to the constitutional court.

A possible strategy and the role of research

It is important not to be overwhelmed by the complexity of the problem. International donors have largely failed to form a coherent strategy and the complexity of land reform makes it difficult to justify aid. Research indicates that the process is proceeding too slowly and has failed in certain respects. Various researchers state that the entire programme should be reconsidered and that a new vision should be formulated. In the first instance, land reform should form part of a broad rural development programme. Secondly, experience in other countries indicates that centralised ministries or parastatal institutions do not always implement land reform successfully. The civil society (communities, farmers, organised agriculture, unions, NGOs, commercial banks, research institutions, traditional leaders etc.) should be involved. An information and communication system is a precondition for success. A foundation or forum for land reform is advocated where the best experts, nationally and internationally, can provide inputs, which involves the civil society and the private sector and which can provide independent advice and assistance.

The aforementioned illustrates the necessity of research. The extent of the interest in land reform in South Africa is astounding. Commendable work has been produced by agronomists, land ownership specialists, economists, sociologists etc, but 'there has been little systematic effort to synthesise their findings and combine them with intensive field research to produce practical policy recommendations for both local actors and the international community' (International Crisis Group 2004: v). In particular, there is a lack of fieldwork that indicates, among other things, the large spatial differences between heterogeneous groups. There is an urgent need in respect of the following fields: Historical research on the validity of land claims; the attitude of blacks towards land in general and towards farming in particular; the best way of selecting black farmers and providing them with training, mentorship, finance or agricultural extension in respect of crop varieties and the marketing of seed; an effective information and communication system; literacy programmes etc.

Universities in the Netherlands have, over a period of more than 100 years, made huge contributions to the training of South African academics and researchers.

The Netherlands has had an immeasurable influence through constructive criticism and even an academic boycott to bring about a just and fair South African society. In the late eighties and nineties, I benefited a great deal from universities and academics in the Netherlands in my endeavour to establish a system of self-evaluation and quality promotion at the University of Pretoria.

In some respects the task of the Netherlands has been made easier by the fact that a democratic government was established in South Africa in 1994. In some other respect the task is more daunting, because the issues that face science and technology and higher education at present are even more challenging than in the past. The new generation of academics and researchers look forward to co-operating closely with the Netherlands in the future in the building of a just and better future for all inhabitants, not only in South Africa, but also in Southern Africa. In the fields of science and technology South and southern Africa cannot afford to fall farther and father behind the industrialised nations.

NOTES

i. Research on infectious diseases was neglected.

ii. 54,2 per cent of the total expenditure in 1987 to 12,4 per cent in 1997.

iii. With the exclusion of the medical sciences.

iv. The NRF (8 October 2004) states clearly that it '…will support research only within these focus areas'.

v. If reasonable throughtput rates of 20 per cent had been achieved 25,000 more graduates would have been produced.

vi. '… that the ministry will be able to plan the country's highly skilled human resource provision efficiently by determining how many students may be admitted to which programmes' (SAUVCA April 2004).

vii. Specific sectors, such as public health, were not investigated and it is precisely in these sectors that many medical doctors are leaving the country.

viii. In 2003 the NRF commenced the development of a National Research Agenda for Social Sciences, Law and Humanities.

ix. This percentage should be qualified. The western part of South Africa is a semi-desert with a sparse population. The eastern part of the country accommodates the majority of the population on relatively fertile land with a high rainfall. These facts do not, however, mean that the country is not unfairly divided.

x. '41 per cent of the Africans in the agricultural section had no schooling'

(Strategic Plan for the Department of Agriculture 2004: 42).

xi. Sector Education Training Authority.

xii. Land claims on the largest tea plantation in South Africa near Tzaneen are the main reasons why production will be terminated. More than 10,000 workers will lose their jobs.

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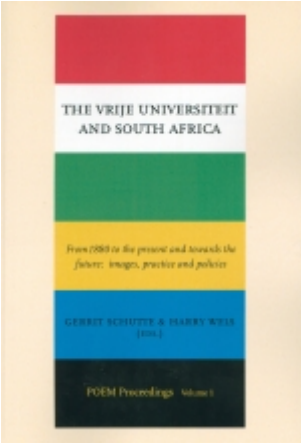
The Vrije Universiteit And South Africa ~ The Changing Higher Education Landscape In South Africa



The apartheid legacy

In order to contextualise the discourse on the changing higher education landscape in South Africa, it is necessary to briefly sketch the historical origins and thrust of the ideology underpinning black education in South Africa during the apartheid era.

Hendrik Verwoerd and apartheid education laws 1953-59

Black education in South Africa was originally introduced, developed and funded by Christian missions of various denominations. Subsequently and as the benefits to the economy of an educated black workforce became apparent, the government introduced a system of subsidization for the mission schools. The mission schools offered the same content and used the same syllabuses as the white schools, and the successful students received the same diplomas and certificates as the white students. Some of these black mission schools became well known for excellence,

such as Lovedale in the Cape (Mandela's old school), Marianhill and Adam's College in Natal.

Fort Hare Native College, later Fort Hare University, was established by the Presbyterian Church and drew students from as far afield as east and central Africa. It boasts among its graduates such famous African leaders as Robert Mugabe and Nelson Mandela.

In the early 1950s, Hendrik Verwoerd was Minister of Native Affairs, and immediately complained that missionaries were providing the wrong kind of education for black people, and were trying to make 'black Englishmen' out of them. In 1953, he introduced legislation to remove black education from mission control to that of the Department of the Department of Native Affairs, vowing that:
I will reform it [black education] so that Natives will be taught from childhood to realize that equality with Europeans is not for them.

There was 'no place [for blacks] above the level of certain forms of labour. So, what is the use of teaching a Bantu child mathematics when he cannot use it in practice? Education must train and teach people in accordance with their opportunities in life'.

Verwoerd then created the following landmark laws:
Bantu Education Act (1953)
Separate education for black children; use of the vernacular; teachers and school, boards handpicked by the government.

Extension of University Education Act (1957)
Banned undergraduate training of black people at white universities; created what became know as 'bush colleges'.

Democratic dispensation
The apartheid ideology and apartheid laws ruled the roost for four decades, until the political changes culminating in the democratic elections of 27 April 1994. The advent of democracy in 1994 brought about dramatic changes in the South African higher education system, described by Van Vught (of the Center for Higher Education Policy Studies, CHEPS, of the Universiteit Twente, and later rector of that same university) as 'probably the most ambitious and comprehensive change programme in the world today'. The changes began with

the appointment by Nelson Mandela of a national commission to map out the future of HE in a democratic SA.

National Commission on Higher Education (NCHE) The NCHE made sweeping recommendations, which were incorporated in the *Higher Education White Paper* (policy document) and the *Higher Education Act* (legislation) and continue to reverberate through the Higher Education system today. Among these were:

– Deracialise the HE education system;
– Increase the participation rate (18-24 year olds in Higher Education): from 19 per cent overall (12 per cent for black students, 70 per cent for white students) to 30 per cent overall [these goals have not been attained];
– Transform from the Higher Education system from an 'elite' to a 'mass' system, a process called massification, which refers not only to an increase in student numbers, but also to diversification of academic programmes and qualifications [note: there is a tension between massification and quality, hence the concomitant need for a quality assurance mechanism];
– Adopt a cooperative governance model for institutions: between internal stakeholders, and between the institution and the state [raising the question of institutional autonomy];
– Promote race and gender equity among students and staff.

Subsequent to the NCHE, the government published: *The 1997 White Paper called A orogramme for the transformation of Higher Education.* The White Paper took cognisance of the far-reaching NCHE recommendations, and laid down the philosophy underpinning the new HE system as follows:
To redress past inequities and to transform the HE system to serve a new social order, to meet pressing national needs and to respond to the new realities and opportunities.

The impact of democratic change on higher education
The new democratic dispensation was followed by numerous changes in the higher education sector, both positive and negative, three of which are perhaps most relevant in the context of this paper:
Drastic changes in student demographics in Higher Education
One of the most dramatic changes have been in the composition of the student population at universities/technikons:
– The overall proportion of white students dropped from 44 per cent in 1994 to 36

per cent in 1997.
– In the Technikon sector, there was an even more dramatic change from 52 per cent in 1993 to 24 per cent in 1997.
– Black students now constitute more than 50 per cent at historically white institutions.

Underperformance of the secondary school system
Ironically, as the tertiary system was expanding to take in more disadvantaged applicants, the secondary school system was increasingly producing applicants who were alarmingly under-prepared for tertiary education, particularly for science and technology disciplines.

In 2002, the year considered to have produced the best high school results since 1994, 443,821 candidates wrote the senior certificate examinations nationwide, of whom only:
– 4.6 per cent passed mathematics HG;
– 5.6 per cent passed physical science;
– 5.1 per cent passed accounting;
– 16.9 per cent obtained university entrance grades (matriculation).

And there is evidence that high school graduate proficiency in literacy and numeracy has deteriorated significantly, certainly to a level inferior to that of the other SADC states.

The rise of private HE providers
With the inception of the democratic dispensation in 1994, private Higher Education became a growth industry with numerous domestic and international Higher Education providers establishing themselves in the country. In 1999, private Higher Education colleges were thought to have attracted more than 150,000 away from the public universities. Perhaps fuelled by negative perceptions regarding the quality of public HE in South Africa, these private institutions continue to thrive.

The changing Higher Education landscape: the merger movement
Prevailing HE debates and contestations post-1994
The post-1994 era has been characterized by a whole set of debates and contestations, many of them historically based. These included the following:
– Historically Disadvantaged Institutions (HDIs) expressed frustration and

resentment towards the government for failing to provide redress funding to help liquidate their huge student fee debts, upgrade their crumbling infrastructure and provide facilities similar to older universities so as to 'level the playing fields'; there was a sense that the new democratic government had a moral obligation to create black institutions of equal prestige to the historically white institutions.
– On the other hand, the government's attitude seemed to be that HDIs were poorly managed, financially wasteful, racked with disruptions, corruption and chaos, and probably beyond salvage.
– There was the unmistakable community perception that HDIs offered second-rate education and produced poor quality graduates, and the better qualified high school graduates flocked to previously white and largely English-medium institutions.
– Afrikaans-medium institutions struggled to find black students, and were perceived as unwilling or unable to transform, and as covertly wishing to remain white using language as a barrier to access by black students.
– English medium institutions were seen as elitist, arrogant, covertly racist and financially 'fat and sassy', and the earlier cohorts of black students at these institutions were frightfully unhappy.

The government found it difficult to run an orderly operation in the midst of these conflict-ridden divisions and contestations within the Higher Education system, and probably saw academic mergers as one way to get rid of the problem.

Rationale for institutional mergers
According to the Department of Education, the main objective of mergers is to establish institutions that:
– Are better placed to meet the demands of the modern job market;
– Offer equalized access;
– Provide opportunities for sustained student growth.

Mergers are also intended to address the thorny questions of quality, institutional governance, and financial sustainability. However, there clearly are tacit subtexts beyond the formal motivations. These include the desire:
– To deal with perceived incompetence at HDIs;
– To blunt the tensions between HDIs and the more successful historically white institutions;
– To deal with the conundrum of Afrikaans-medium universities.

Minister Kader Asmal put it more plainly on 25 July 2002, when he told the *Mail & Guardian* that mergers would help eradicate unhealthy competition between apartheid divided academies.

Institutions for the most part have yet to go beyond the old apartheid divides. The reality on the ground has unfortunately been characterized by unhealthy competition between institutions rather than working together to complement each other's work.

Minister Kader Asmal was well known for his impatience with, and some would say disdain for the frequently crisis-ridden HDIs. On 12 March 1999, he complained to the newspaper Business Day that
… some of our vice chancellors [rectors][of HDIs] are still using historical disadvantage as an unconvincing cover for the mess they've caused in their tertiary education institutions.

Higher education institutions under apartheid
To understand the changes brought about by mergers, it is necessary to have an idea of the nature of the deployment of Higher Education institutions prior to the inception of the merger process.

In 1994, there were 36 Higher Education institutions in South Africa, consisting of 21 universities and 15 Technikons. These could be classified as follows:
* *Historically White Universities* 11
– Afrikaans medium (5)
– English medium (4)
– Bilingual (1)

– *University of South Africa* 11
– *Historically Black Universities* 9
– *Technikons (white and black)* 15

Total of universities + technikons 36

Pre-1994 institutional governance models
Prior to 1994, three governance models were to be found in Higher Education:
– The collegial model primarily at the English-medium institutions, with minimal state interference;
– The centrist/'autocratic' model primarily at the Afrikaans-medium institutions,

with minimal state interference;
– The nominal autonomy model with strong state interference, primarily at historically black institutions.

For a variety of reasons, all of these models began to change quite significantly post-1994, with a move towards the managerial model (the adaptation of business management principles and style) with varying degrees of success, coupled with greater state interference than before 1994. Nevertheless, significant institutional culture differences remain within the system, and overcoming these differences would inevitably constitute one of the critical challenges for merging institutions.

The changed Higher Education landscape post-merger
The merger template provides for a radically reduced and diversified higher education landscape from the pre-1994 constellation of 36 universities and technikons down to 21 Higher Education entities consisting of four types of tertiary institutions: traditional universities, comprehensive institutions (now also called universities), universities of technology, and national institutes:
– Some institutions would be merged, some across the binary divide (between technikons and universities), and some would remain unmerged to constitute 11 traditional universities.
– Some institutions would be merged, or if unmerged would convert, to form six comprehensive institutions offering both university and technikon courses (such as the new University of Johannesburg resulting from the merger of Rand Afrikaans University and Technikon Witwatersrand).
– Five technikons would remain unmerged, to be known as 'universities of technology'.
– Two national institutes, offering a limited menu of tertiary courses, would be established in the provinces currently without universities or technikons.

The role of government in the merger process
The role of government in the actual merger process has been uneven, for a number of reasons, among which are:
– There is a lack of capacity (in terms of staff and expertise) within the Department of Education to guide and manage the massive nationwide merger process.
– It is evident that the merger initiative was undertaken with insufficient insight preparation for the sheer magnitude and complexity of the exercise.
– The government underestimated the cost of the exercise.

– The objectives would appear not to have been sufficiently thought through; for example, the concept of a 'comprehensive university' remains poorly articulated. Without a roadmap, institutions destined to assume this role are at sixes and sevens about how to curriculate, staff and implement a combined offering of traditional university and technikon programmes while the binary divide continues to be maintained.
– The introduction of a new funding formula in the midst of all the changes has created uncertainties about the sustainability of newly merged institutions.
– The government has imposed a cap on growth in student numbers, which would seem to contradict the fundamental objectives of increased access and participation rates.
– Some mergers do not appear to have an academic rationale, do not seem to meet the test of common sense and would seem to have been politically inspired.

The impact of the merger on the Higher Education system
It will probably be a decade before the benefits of the merger, if any, are realised (according to international experience, merger consolidation can take up to 10 years). Merger has, however, achieved some things:
– Adjacent institutions separated only by a road or a fence on the historical basis of ethnicity have been brought together.
– The merger will neutralize the perception of exclusivity for those Afrikaans-medium institutions that are being merged.

But it is not clear that the merger will save money, increase access or promote institutional stability at this present time.

The challenges of merger for the institutions
My own institution, the Durban Institute of Technology (DIT) is a product of a merger between two technikons, one historically white and one historically black, which occurred on 1 April 2002. As South Africa's first merger, we have the longest merger experience spanning two-and-a-half years.

Originally separated by a fence for historical reasons, a merger seemed the right thing to do. But we were also separated by institutional culture and traditions, ethnicity, resource endowment and long-standing rivalries, and these barriers have proved more difficult to overcome than was anticipated. Potentially, there are significant academic benefits to be gained from the merger, but not before we have resolved the complexities of merging people, systems and academic

programmes.

Merging people in an endeavour to mould a single unified institution with common citizenship has proved to be the greatest challenge. As one example, human resource issues have loomed large, such as harmonizing salaries and benefits, sorting out academic leadership contestations, and dealing with staff redundancies. However, the academic endeavour, our core business, has proceeded largely unimpeded, and the process of merger consolidation is beginning to come together. We are therefore confident that DIT is already proving to be a viable institution, and that in time, our merger will prove to have been the right thing to do.

Other post-1994 changes in the Higher Education landscape
Finally, I want to conclude by highlighting some of the other changes in the Higher Education landscape beyond the merger initiative, as articulated by Professor Jonathan Jansen of the University of Pretoria in an article published in 2003. He lists:
– The dominance of an ageing white professorate in South African HE and in research particular, and the declining research output as these greying individuals are 'put out to pasture' (my words). The greying white professors are being replaced by less experienced black appointees under pressure to meet equity targets, and Jansen is concerned about what he sees as 'the declining status of the South African professorate'.
– The declining quality of the student body due to secondary school problems already discussed in this paper.
– The culture of instability and campus conflict at some institutions, mainly the HDIs, reflecting lack of credibility of institutional leadership due to the intrusion of political considerations in the appointment of such leaders.
– Declining the voice of criticism of government and public policy within higher education 'in the face of perhaps the greatest challenges to universities' such as mergers and changes in the funding formula.

Jansen calls these 'changes in the soft architecture of higher education' as opposed to the 'changes in the hard architecture' in the form of mergers. However, the final word has to be that despite challenges of the hard and soft changes in the Higher Education landscape and the associated turmoil, South African Higher Education remains intrinsically sound, and it is up to people of good will and of courage to ensure that the seemingly monumental challenges are

overcome.

The Vrije Universiteit And South Africa ~ Good Neighbours And Far Friends: The Netherlands, Europe And South Africa

Science in transition

The 21st century heralds the age of globalisation. Our world is moving towards an integrated and interconnected network which forms the backbone of interaction, communication, transport and trade. It is noteworthy however, that there are manifest examples of globalisation avant la lettre, notably science. The history of our world has convincingly demonstrated that science – as a professional intellectual activity – has grown to maturity in an open world that was not restricted by national borders (Van Doren 1991). Copernicus, Erasmus, Descartes or Einstein; they all illustrate that the search for new knowledge and insights transcends national interests and is not confined to national territories. The global nature of science calls also for international cooperation. To the same extent that the economies of nations are best served by labour specialisation and international trade in an open liberal market, are academic knowledge centres (such as universities and research laboratories) best served by the free exchange of information through scientific collaboration (for example in the form of joint research programmes).

With the advent of modern ICT and the development of fast international transport, our world witnesses an unprecedented rise in interaction and communication among scientists. Distance is no longer an impediment to international contacts. And scientific cooperation follows the laws of international

trade, by seeking selectively for those modes of cooperation on a world-wide market that are beneficial to own research interests.

Europe has in the past decades show a remarkable growth towards cooperative science markets among its member states, which would be in the interest of both individual participating nations and Europe as a whole. The so-called Framework Programmes have laid the foundation for new forms of scientific cooperation which were hitherto unknown in Europe. But science is not restricted to the domain of Europe, and supersedes its borders. We already witness the first signs of Transatlantic research programmes, we observe first modest signs of collaborative agreements with Asian countries, and we will soon see the development of common research policies with new emerging economies. And South Africa is one of them.

In this contribution I will first give a concise sketch of changes in the European science domain, followed by an exposition on the importance of investing in the European knowledge society. Then I will outline new pathways in the European research landscape, and subsequently address new research policy tasks and new opportunities for research councils. Finally, I will discuss new chances for scientific cooperation between the Netherlands (and Europe in general) and the emerging economies (including South Africa). The paper will be concluded with a brief overview of Dutch-South African modes of cooperation and will suggest new future endeavours.

Ambitions and challenges for Europe

Europe has been a cradle of science and culture for many centuries. But Europe has not managed to maintain its dominant science position in our age of global science competition. This is a source of deep concern. Is Europe capable and ready to cope with the great challenges of our millennium? And will a knowledge-intensive society be a panacea for all weaknesses in the current socio-economic systems of Europe? Who will assume responsibility for the science future of Europe? And what will global science competition mean for Europe?

It should be noted at the outset, that the history of European culture has been decisively influenced by a strong science orientation, which has created progress and prosperity. Europe has become one of the leading world regions in terms of innovative capability and highly skilled human resources which have created unprecedented welfare for many European countries. Science-driven research –

ranging from fundamental to applied research – has created a wealth of innovations, which have laid the foundation for a modern knowledge-based society that is predominantly characterized by strong international ties.

Indeed, modern science is increasingly characterised by a strong internationalisation process, as is, for instance, witnessed by a multiplicity of cooperative agreements between research institutions in various countries or by a rising number of multi-country authorships of scientific publications. The rising cross-border orientation of scientific research prompts various challenging questions: Is Europe able to keep pace with the unprecedented dynamics in scientific development in our globalising world? Are the national and European research (funding) systems sufficiently and effectively addressing the far-reaching challenges of the emerging European knowledge economy? Is the result of national funding mechanisms for science-driven research in Europe comparable to that of competing regions like the USA and emerging economies like China or India? And is Europe able to translate its scientific performance into welfare and prosperity?

These challenges call for a critical review of European achievements. Whilst Europe has moved in the past decades to a common market for goods, services, people and capital, the market for scientific research is still mainly nationally oriented. Despite the plethora of advances in the European knowledge-based society, two significant concerns have to be recognised. In the first place, the demand and user side of Research and Development (R&D) is often insufficiently addressed in Europe. As a consequence, excellent knowledge does not always lead to the best entrepreneurship, the highest innovation rate or the most favourable growth path of the economy. Secondly, several national efforts outside the Framework Programme (FP) of the European Commission (EC) to invest in science-driven research in European countries lack focus and critical mass in many cases, with the consequence that the existing fragmented national funding schemes in Europe do not generate the maximum possible revenues and the high-quality knowledge intensity that is required to keep European industry internationally competitive. There is an urgent need to cope with fragmented science systems in Europe.

European policy-makers have in recent years fortunately reached an agreement on the ambitions of and clear commitments to the European knowledge economy as well as on the amount of R&D spending in Europe, as laid down in the Lisbon

and Barcelona agreements which act as milestones of the European Research Area (ERA). From the side of both the science community and policy-making bodies the awareness is growing that new institutional constellations may be necessary to reinforce the position of science-driven research in European countries in association with the ERA. Europe needs change in order to ensure a place on the global science platform. It ought to be recognized that the European knowledge society is suffering from several flaws which preclude an optimal use of its resources and its scientific talents. The most prominent weaknesses of the knowledge system in Europe are:

– A systematic and structural underinvestment in scientific research (including R&D), in both the private and the public sector;
– A lack of focus and mass in world-class research, caused by fragmented research strategies and funding mechanisms in Europe and by uncoordinated investment plans in large-scale research infrastructure facilities;
– The diversity in R&D mechanisms among European countries, which may lead to intra-European 'cannibalism' in research and innovation policy while neglecting the global battle field where the future is shaped;
– The co-existence of various research funding mechanisms (both private and public), which lead to overlap and duplication in research efforts (leave aside financial inefficiencies);
– The absence of benchmarking systems through which real European top quality of scientific research can be identified.

Such weaknesses are a source of distress among the research community in Europe (including the research councils) and should be addressed with priority.

Several questions emerge from the previous alarming observations: Is Europe taking its mission as a generator of world-class research and innovation endeavours seriously? Is there sufficient awareness that science is taking place in an open international (that is, global) market and that Europe cannot afford the luxury to lean back by referring to its glorious past? Is Europe prepared to invest in the best it has (that is, human talent) as well as in advanced research infrastructure? And are research councils prepared to give up part of their autonomy in order to design a shared road towards high European achievements in science? The current European research landscape resembles the description of the Italian nation-state by writer and former minister of Piedmont, Massimo d'Azeglio, who pointed out, when the nation-state of Italy was created in 1861:

‘We have made Italy, now we have to make Italians’. Europe still has a long way to go!

A need for innovative knowledge investments

The search for unknown frontiers is a never-ending story. New pathways and discoveries in Europe were always instigated by curiosity-driven research. In the long European history, science has always been the trademark of Europe. In the ancient Greek period, the famous statesman, scientist and writer Euripides once stated: ‘knowledge is more important than a strong arm’. The message –more relevant today than ever before – is that the best way to serve society is to invest in education and research; in the European history we can find thousands of examples confirming this claim. For example, what would have been the position of Europe in international trade in the past centuries, had it not invested in cartography as a leading scientific discipline in the 17th century? Investment in knowledge (education, R&D) is of critical importance for economic progress and prosperity!**[i]**

Science used to be an individual knowledge activity in past centuries, but the functioning of modern societies is so much determined by the pervasive nature of scientific knowledge that nowadays we often speak of the knowledge-based economy. And indeed, modern economic development is to an important extent determined and driven by the fruits of this knowledge economy. As a consequence, knowledge has in recent years become a key driver for growth of cities, regions and nations. Access to knowledge is, therefore, generally recognised as a key condition for innovative activities in our modern society.

Consequently, both the creation and the dissemination of new knowledge may act as a critical success factor for urban, regional and national growth. Knowledge has, however, important characteristics of a fluid good, which also gets obsolete easily. The life cycle of knowledge is getting shorter all the time. Knowledge also has various features of both public and private goods. These characteristics of knowledge prompt a wide range of questions regarding knowledge, research and science policy in Europe. Is knowledge ‘manna from heaven’ that will descend in equal shares to all nations? Can Europe obtain a strong international position, with a passive attitude of the EU? And can European countries afford to work in ‘splendid isolation’ or is Europe only part of a global knowledge economy?

Clearly, in recent years the scene of science policy in Europe has changed, but

whether Europe has managed to create effective new structures for growth and innovation that would lead to a promising bright future remains to be seen. A major advantage compared to the past is certainly the emerging broad willingness for research cooperation in Europe, as is witnessed in EU Framework Programmes and by several recent initiatives of the EUROHORCs (such as the European Young Investigators programme and the 'Money Follows Researcher' programmes).

Admittedly, scientific cooperation among European countries has already a long history; it has adopted different forms ranging from bilateral covenants and intergovernmental agreements to EU-instigated framework programmes. With the advent of the ERA a recent much discussed issue has been whether the national markets for science-driven research should be opened up for all European countries. An open research market would have many advantages for scientific achievements, such as:

– Significant enhancement of the quality of scientific research (e.g., through more competitive bids and strict benchmarks of evaluation standards and procedures);
– Stimulation of research mobility in all academic ranks within the EU countries;
– More efficient use of large-scale research infrastructures among EU countries;
– High international research standards resulting from trans-national scientific cooperation and networking and from open access to research programmes;
– A visible and appealing research profile of EU countries on a world-wide scale.

The widely accepted policy goal to establish a European knowledge society which would be internationally competitive and even at the forefront of science development in our world has prompted a vivid debate on the necessary investments in our knowledge society. Do public expenditures on knowledge creation and dissemination matter? Or can we remain passive and buy knowledge on a world market? This question has intrigued many policy-workers and researchers. They often refer to Silicon Valley types of development, to North-Carolina, to Finland, to Taiwan or Singapore, where research has created on avalanche of spin-offs in the form of innovations, new start-ups, licenses and patents, and so forth. Europe will soon be facing a severe competition at the global level. How should we respond when we know that China only in its 53 Science and Technology Parks will already need 4 million knowledge workers? And what to do if already now India has a serious shortage of R&D personnel and is planning a rigorous brain gain policy? It is undoubtedly true that knowledge-

intensive regions with a research-benign climate tend to grow faster than others, as is witnessed by the fast growth pattern of the ICT sector in Bangalore.

Clearly, public expenditures in science and technology are not the only critical success factors for accelerated economic development. Other factors, such as the development of timely niche markets (for example ICT or biotechnology) are important as well. For example, Roller and Waverman (2001: 909-23) demonstrate that there is a significant positive causal link between telecommunications infrastructure and economic growth for 21 OECD countries over 20 years. Responsive governments may see it as their task to orient their R&D expenditures towards promising new market niches. This message is also reflected in the new growth theory in economics which stipulates that public policy is not only driven by demand stimuli, but also by endogenously determined factors such as infrastructure, education, innovation and the like (Nijkamp 2005). The diversity in all these explanatory frameworks has however, one element in common, viz., the importance of knowledge availability and access. Knowledge creation and diffusion is to a large extent a mission of academic research and education institutions (universities, research laboratories, colleges, high schools etc.), so that governments are not a neutral actor in this context. The size and direction of public expenditures on science and education may exert a decisive impact on the prosperity and well-being of nations or regions. But how significant is this premise in a real-world setting? And what is the benefit of research expenditure for economic performance?

The strategic policy question whether public expenditures – in general or for specific policy domains – enhance or retard economic development has been the subject of heated debates in the past, with an interesting mix of scientific and policy arguments. A recent study by Nijkamp and Poot (2004: 91-124) tries to avoid various traps in this debate by presenting the results of 123 empirical and officially published studies on (categories of) public expenditures and economic growth for a great variety of countries and for different time periods.

Table 1. Impact of government expenditure on economic growth

Education and research	++
Infrastructure	++
Taxation pressure	-
Defense	-
Government consumption	?

Source: Nijkamp and Poot (2004)

Table 1. Impact of government

expenditure on economic growth

The findings can concisely and schematically be summarized in the following table (see Table 1). The conclusion is clear: public expenditures do matter! More precisely: Europe will not be able to reach the Barcelona and Lisbon ambitions, if public expenditures on R&D are not significantly increased. On top of it, private R&D expenditures are equally critical. But it should be added that sheer money is not enough! We need more initiatives for change in Europe, in particular the organisation of research. We will now address some basic flaws in the institutional ramifications characterizing in the European research landscape.

New pathways in the European research landscape

The need for a re-orientation in European science policy is undisputed. Europe has historically been the cradle of civilisation thanks to its strong science base. Europe has become in the past centuries also the home of science. In the same vein Europe has provided a source of innovation in many fields of industrial and economic activity, as, for instance, exemplified in the Industrial Revolution some 150 years ago. At present however, the scientific position of Europe is less firm and even slightly hesitant.

Nowadays, Europe sometimes tends to be a follower – fortunately, not in all respects – and sometimes Europe tends to be more a passive science consumer than a proactive science producer. Hence, there is a danger that Europe may be losing momentum. Clearly, there are also good elements, sign-posts for hope so to say, such as the Lisbon Declaration, the Barcelona Agreement, and more recently the communication by Commissioner Busquin on 'Europe and Basic Research'. Increasingly we are facing in Europe the intriguing question: Do we have sufficient scope for an open market for research in Europe? Will a new institutional constellation for scientific research help us? This question is in fact not new; it has been discussed already several decades ago by important policy-makers such as Spinelli and Dahrendorf, but politically this issue has never materialised in the form of a common market for research (Nijkamp 2003: 79-85).

Fortunately, we have at least various good examples of research cooperation all over Europe which may act as catalysts, such as, bilateral, trilateral or multilateral agreements; we have also inter-governmental arrangements, and furthermore we have network arrangements instigated by the European Commission. All such cooperation modalities have their own merits. Nevertheless,

the bitter reality is that nowadays we still have to a large extent segmented national research markets with many feeble elements such as the lack of critical and visible mass. The efficiency benefits of a more open science market, however, are rather evident from an economic trade perspective. We would be able to achieve much higher scientific quality through competition. We also would be able to stimulate a better through-flow of researchers all over Europe and maybe also from outside of Europe. And we would certainly be able to put in place high standard review protocols, which certainly do exist in various individual countries, but are not commonly shared with other countries, so that we do not know exactly how research performance in a given country compares to other European countries. In addition, we would have a more efficient use of and better access to large-scale research facilities. An important demographic concern – also in view of the demographic cycle in European universities where in ten years' time some 40 per cent of the existing staff will retire – is related to future talents: how do we get the next scientific generation incorporated into our educational and research systems? It would be a major benefit, if the issue of the next generation in Europe could be collectively tackled. And finally, we would have a better use of proper benchmarks for review policies of funding agencies. These issues have been discussed rather intensively in recent years. The question is how much time do we have to wait and to discuss. Admittedly, the scene in Europe is certainly not overall negative; we can be proud of many scientific highlights that have been achieved, but we are no longer on a rising edge. New initiatives are needed to cope with the rising tide of global science competition. And Europe has to play a pro-active role.

Europe forms at present a patchwork of largely fragmented national research systems. The Lisbon Summit declaration (March 2000) states the ambition to make the EU 'the most competitive and dynamic knowledge-based economy in the world by 2010, capable of sustainable economic growth, with more and better jobs and greater social cohesion'. Europe has a diversity of actors in the research field, and this leads to a case of a so-called `prisoners dilemma´. If all actors act from the perspective of national interests, then the final result is not optimal from a collective viewpoint. This social dilemma clarifies that neither individualistic national research policy nor free-rider research policy will help to achieve the Lisbon objectives. Europe is forced to change its fragmented research systems, if it wants to reach a visible and recognized top position at the global research ladder. Competition, cooperation and coordination are a sine qua non for

innovativeness in Europe. These critical success conditions can be comprised in a so-called 3C-model (see Figure 1) which maps out the ingredients of a European survival kit!

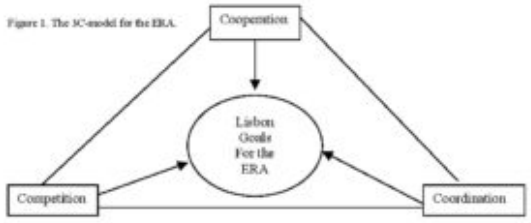


Figure 1. The 3C-model for the ERA

New research policy tasks

Innovation and prosperity in Europe cannot be inherited, but have to be acquired by dedicated strategies. When the conclusion is correct that Europe should have a shared mission regarding its science and research policy, then the question is: which promising, realistic and feasible initiatives can be envisaged so as to achieve the broadly accepted goal of the most intensive knowledge society leading to a high economic and social performance? And what is the task of research councils and funding agencies in Europe?

In the past years most debates have centred around the necessary changes in the EU Framework Programmes (culminated in particular in the recently published Marimon Report and the Kok Report), as well as around the creation of a European Research Council (ERC). Clearly, the ERC is a strategic vehicle for the realisation of the ERA. The task of the ERC would be to favour European research excellence. It should be clear at the outset that the ERC complements and completes the European research architecture and would by no means replace existing research councils, but would rather build on them and even reinforce them.

An important guiding question for the establishment of a new fund for frontier research at the European level would always have to be: what are ‘the costs of non-Europe’ in the research field? It is evident that the ERC will only be a meaningful institution, if it is able to create scientific synergy on the basis of existing strong national research councils. Consequently, an ERC would have to avoid an unnecessary duplication of national research endeavours (institutions and programmes), and would have to focus on complementary or cooperative

initiatives (ranging from small-scale projects to large thematic programmes), while respecting the subsidiary principle. It is evident, that an ERC would have to operate under low transaction costs and would have to avoid any increase in bureaucratic burden. The creation of the ERC is just a matter of time. But it would be a strategic mistake to limit the role of the research councils to the specification of conditions to be met by an ERC. Research funding agencies have their own intrinsic position in the European research landscape. Clearly, the long-run demarcation of tasks between national research councils and the ERC is an issue of great importance. Here again, the 3C-concept may be helpful to design the roadmap for research excellence in both Europe as a whole and in its constituent member states. This will now briefly be discussed.

Competition at the European level is necessary to achieve the highest possible research performance. *Cooperation* is necessary to avoid a waste of resources and duplication of efforts as well as to ensure a fruitful use of research findings in European industrial and policy sectors. And *coordination* is needed to cope with fragmentation in European science policy. By implementing the 3C-principles, many challenges in the emerging dynamic environment in which European research policy is evolving can be addressed. I see several such challenges:

– Capacity building;
– Talent development;
– Scientific partnership;
– Large scale research facilities;
– Integration of accession and pre-accession countries;
– Embeddedness of research in society and industry.

The first challenge concerns the need for proper applied science to overcome the knowledge paradox in Europe, where we sometimes have excellent research results with an enormous number of international publications in the most prestigious journals but low application rates in industry and in government. Apparently, at present, European competitiveness is not always leading to the best results for industry and policy, and a shared vision needs to be developed and implemented. Capacity building is a task for all European counties and will help to bridge socio-economic gaps inside Europe.

A second challenge which ought to be addressed is talent development, especially for the younger generation, also in the light of the demographic cycle referred to

above. The next generation of young scientists should be addressed more explicitly in research education. International mobility should be favoured, including non-Europeans who might be willing to come to Europe. On a recent tour through Asia, I found it rather stunning to see that in countries like Japan, Taiwan, China, Korea or Singapore, most of the universities would send their PhD students to the United States almost automatically. They would not even think of Europe. Why not? We are convinced that the research climate can be very interesting in Europe, but the mindset in many non-European countries is oriented towards other parts of the world. Consequently, we need a dedicated policy to attract young people toward Europe. It is of critical importance that Europe is a learning house for scientific development and training for scientific talent all over the world.

The third challenge to be addressed is scientific partnership among research agencies and the EU in order to cope with fragmentation. This is a different challenge compared to research excellence. Fragmentation has to do with lack of co-operation inside Europe and sometimes also with a feeble, uncoordinated innovation potential within our European countries. Often, we tend to concentrate more on intra-European competition, i.e. competition between countries in Europe, rather than putting our efforts together at a global world-wide level. It ought to be recognized that essentially the playing field of scientific research is not exclusively oriented towards Europe; it is the world as a whole. The fragmentation in Europe may sometimes also lead to duplication of research efforts in different countries. This weakness in the European research system is also identified in various OECD studies which have clearly demonstrated that in many countries almost all research groups in a certain area tend to concentrate on largely the same domain. It may be questioned whether duplication is a good spending of public money.

A next challenge is the national bias in large-scale research facilities. The scale of research infrastructure is growing bigger and bigger, while also the humanities and social sciences need more and bigger research facilities. This is a domain where Europe certainly should improve its performance. There are questions of open access, but also of co-ordination of decision-making in view of a better profile of Europe. If we do not have the most sophisticated research facilities in Europe, we will not be able to keep the young generation inside Europe. This means that the strategic needs for Europe have to be mapped out more precisely

on a long-term basis. Here also the industry forms a strategic partner.

In the fifth place, there are also important questions on equal long-term opportunities for new EU member states accession countries and pre-accession countries. Such countries have a great potential, because in many of these countries we find indeed intellectual magnets with a great scientific performance – though not in all cases – and hence we need to develop a pathway toward equity conditions from a longer-term perspective. However, it is also realistic to state that it would not help very much if we would create a situation of positive discrimination.

And finally, it ought to be recognized that the European knowledge-based society cannot be realized in isolation. Knowledge institutions (universities, research laboratories, innovation centres and the like) are part of our shared knowledge culture. Their strength will rest on interaction and exchange, that is, on communication between all stake-holders. If Europe wants to be a strong player in a global world, it cannot afford fragmented research and innovation systems. To achieve the high Lisbon and Barcelona ambitions, the above 3C-model – based on conditions of competition, cooperation and coordination – must be put in place. And of course, research councils in Europe will have to play a key role in this new European constellation. The new challenges and fascinating tasks put on the shoulders of research councils in Europe will be outlined in the next section.

New opportunities for research councils

Any discussion about a re-positioning and strengthening of the profile and tasks of research funding bodies in Europe should appreciate the fact that the total budget of all councils in EU-25 adds up to some 20 billion euro. Compared to the EU research budget this is a formidable amount exceeding the EU research budget with at least a factor 5! Therefore, it seems wise policy not to develop new strategies out of a perception of weakness, but to start new initiatives that will reinforce the strong and successful elements in research funding in Europe.

Wise research policy by the research councils in European would drive behavioural and policy change in the remaining part of the European funding system. That goal does not only apply to the implementation of the ERC, but also to other new mechanisms such as Technology Platforms and new ERANET-*plus* arrangements seeking for a linkage of national research programmes. Research councils should be able to identify and finance the intellectual magnets in the

European research system through a balanced funding of human resources and research infrastructure capital using the 3C-concept as a device for their policy. In this way, a real value added in the European research system may be created. Research councils are in this view the natural partners of the European Commission. The new agenda of research funding agencies in the context of the ERA is vast. I see several – non-exhausting – strategic anchor points for the implementation of such an ambitious agenda:

* *Human intellectual resources*:
– EURYI (European Young Investigators programme);
– ERC (European Research Council);
– MFR (Money Follows Researcher);
– National liaisons with Marie Curie Programmes ;
– Promotion of science literacy in Europe through e-learning mechanisms, science weeks etc.;

* *Research infrastructure facilities:*
– Reinforcement of ESFRI (European strategy Forum on Research Infrastructure);
– Open access conditions through European grid technology;
– Design of common digital information systems (archives, e.g.);
– Design of shared large-scale social science data bases;

* *Strategic collaboration:*
– Partnership with the European Commission in the ERA;
– Innovative Forward Looks for identifying new science trends;
– Transformation of EUROCORES and ERANET-plus into EUROPACT ('European Partnership and Cooperation' programme);
– Clearing house for the rest of the world;
– Mutually recognized joint evaluation procedures;
– Integration of (pre-)accession countries;
– Creation of a platform for European research stakeholders;

* *Practical collaboration:*
– Professional competitive review procedures;
– Exchange of information of good and bad practices;
– Equal opportunities in science participation (gender, age, ethnic groups);
– Development of joint graduate research programmes;
– Design of benchmark procedures for research assessment;

– Code of conduct on ethical issues in research;
– Development of a really common European IPR policy.

This list of opportunities and actions is certainly provisional and deserves further critical thought. But I am convinced that working on such an agenda would generate overwhelming revenues for the European research system, in particular:

– More structural network configurations among science and R&D agencies and institutions in Europe;
– Better use of scientific talent in Europe for innovation, industrial development and good governance, and in general for a higher level of welfare;
– Promising pathways for the achievement of Lisbon and Barcelona agreements and targets, while respecting the subsidiarity principle;
– Efficient use of scarce resources by avoiding fragmentation and duplication in scientific research in European countries;
– Avoidance of support for non-superior research projects, through a system of European competition based on transparent peer review systems;
– Encouragement of best practices in evaluation through the introduction of European benchmarks;
– Open access to research participation in individual country's research programmes (of course, on the basis of symmetric arrangements);
– Creation of more flexible career paths for young researchers in Europe in order to induce a favourable research climate that would retain researchers in Europe (or attract researchers to Europe) and avoid brain drain;
– Development of joint research training programmes for young promising researchers;
– Protection of the viability and vitality of 'small disciplines' through the creation of a broader critical research mass among European countries;
– Efficient co-operation in the use of large research facilities, as well as visible participation in global or international research programmes;
– Stimulation of new research endeavours (e.g., multidisciplinary initiatives) by linking knowledge and research from different countries, for instance, via large-scale technology programmes;
– Open flexible research networks with access possibilities for new participants at any convenient time.

We may thus conclude that Europe – on the basis of its Lisbon and Barcelona agenda – has defined an ambitious road map for its future. By doing so, it has

taken its future in its own hands. Knowledge and innovation are bound to become the signposts of a new Europe. The transformation process may be difficult and sometimes painful, but through partnerships based on the 3C-principles there is no reason for despair. 'Together strong' is essentially not a risky invention for Europe's future, but is a lesson to be learned from birds that fly in a V-formation rather than at random and which are in this way able to gain an additional action radius of 71 per cent! The real European challenge is to transform diversity into a common strength.

A common strong science profile of Europe is not only necessary for reinforcing the indigenous scientific quality of Europe, but also for becoming an interesting partner for international scientific cooperation. The past decades have shown an orientation of European scientists towards established science countries, such as the U.S.A., Japan or Korea. But the fast dynamics in new emerging economies calls for new forms of cooperation, with other countries. Examples of such emerging economies are China, India, and (most likely) South Africa and Brazil (apart from emerging economies in Europe such as Russia). The next section will be devoted to the opportunities offered by these emerging economies, with special attention for South Africa as a potentially important partner for the Netherlands.

International relations and emerging economies
International cooperation in science is an item that ranks high on any science policy agenda. In a recent policy document of the Dutch Advisory Council for Science and Technology Policy (AWT) a series of strategic proposals is formulated on international research (and innovation) cooperation (AWT 2004).

Seven anchor points for a strong Dutch position are mentioned, viz. a strong participation in the ERA, a global science perspective, facilitation of internationalisation trends in science, making transparent strategic choices for the Netherlands, emphasis on 'knowledge as a social capital', linkage between the knowledge economy and the knowledge society, and emphasis on the societal impact and utilisation of knowledge. These orientation points lead to the following anchor points for science policy: favour investigator-driven research, explore innovation opportunities of research, organise research in a proper way with due emphasis on Dutch strengths, and avoid devolution of research efforts over too many research efforts. This requires a strong involvement in European research networks, a better coordination between Dutch and European (and international)

research policy (including a monitoring of policy), and a reinforcement of the dissemination of knowledge developed in EU research programmes. The overall strategy would aim to better utilize Dutch strengths in a European setting.

Clearly, the formulation or identification of success cases in Dutch research is not a responsibility of the government, but ought to be the outcome of a bottom-up selection process, in which several stakeholders are involved, such as universities, research laboratories, academies of science, research councils, NGO's, industries and public bodies (such as ministries of science).

For a small country like the Netherlands, the world is too big to establish research cooperation liaisons with all countries, and therefore a selection of interesting partners is needed. In general, three types of criteria for establishing such links can be imagined:

– Strengthening of scientific quality among partners;
– Maintenance of socio-political or historic-political ties;
– Compliance with socio-economic development goals.

From a science policy perspective, the first goal is a really scientific ambition, and calls for the identification of strong science partners. The second goal is based on political motivation and may probably only receive support in an academic context if the efforts are also funded out of non-science budgets. And finally, developmental goals may be strategic vehicles in science policy, if they favour capacity building to an extent that long-range mutual benefits may be expected. It seems thus clear that the achievement of scientific excellence for both partners ought to be the dominant principle for research cooperation in an international setting.

Recently, we have observed the rise of so-called emerging economies. These are countries characterized by a rapid scientific development and economic growth, as a first stage of an economic and technological take-off process. Sometimes this growth is only concentrated in a few regions in these countries (such as Beijing of Shanghai in China, or Bangalore or Hyderabad in India), but in all cases this growth is based on the utilisation or development of modern knowledge-intensive technology (such as ICT). For a small country like the Netherlands, it is – on both scientific and economic grounds – of critical importance to organise a timely strategic foothold in these countries.

The strategic motivation to be present in these countries and to liaise with their science community stems from various considerations:

– Emerging economies are less seen as less developed regions, but more as self-reliant economic and technological growth poles with a great knowledge potential.
– A focus on emerging economies is more in line with current political views on modern development policy, where the main idea is to favour economic success stories rather than to combat poverty without a clear perspective.
– Various emerging economies have developed in selected areas an advanced knowledge base which may also have great scientific spin-offs for the Netherlands, so that a reinforcement of economic, technological and scientific synergy with those countries may generate high benefits.
– A focus on emerging economies may be a good vehicle to cope with fragmentation in international cooperation in the academic and scientific world in the Netherlands.
– The scientific benefits of a concentration on emerging economies may even be much higher, if there are historical and cultural bonds (like in the case of South Africa).

Consequently, there may be a clear perspective for a national policy oriented toward a partnership with emerging economies, based on a combination of advanced science and economic-technological cooperation.

Scientific cooperation the Netherlands-South Africa
The history of scientific cooperation between the Netherlands and South Africa shows a cyclical pattern, with a deep dip during the period of the apartheids-regime. In the past decade we observe a rapid rise in the number of collaborative science agreements between Dutch and South African universities and research institutes. The current popularity of such agreements is caused by several factors:

– The anticipated mutual benefits of an exchange or collaboration programme between Dutch and South African partners;
– The presence of a well developed and well functioning higher education and academic research system in both countries;
– The increasing importance of South Africa as a knowledge-intensive emerging market;
– The spin-offs of existing collaborative research programmes (in particular,

SANPAD – The South Africa – Netherlands Research Programme on Alternatives in Development, partly supported by the involvement of NWO foundation WOTRO, concerned with research in tropical regions).

It is noteworthy that the current research cooperation between the Netherlands and South Africa is rather fragmentised (a website-scan led tot a rather segmented picture of research cooperation agreements). At an official level however, no formal cooperative agreement exists, neither at the level of governments nor at the level of the research councils. Despite various efforts and mutual visits it appeared to be rather difficult to create a structure for a research cooperation that would be significantly more than symbolic, partly as a result of limited financial resources, partly as a result of the fact that universities were already actively involved in cooperative agreements. Now that South Africa is moving from an economic take-off phase to a 'drive to maturity', it may – besides historic-political motives – become a very interesting partner for the Netherlands from the perspective of a promising, knowledge-intensive emerging market.

In this context, a renewed interest – perhaps in association with SenterNovem (an executive agency of the Dutch Ministry of Economic Affairs) – is likely to emerge. In that case, the motive for cooperation is not predominantly inspired by the political ideal to support the historically disadvantaged academic groups, but to seek for new scientific endeavours with strong partners.

Why could South Africa be an interesting partner for Dutch scientists? The following arguments seem to offer a motivation:

– Mutual benefits from the development of sophisticated technologies in a variety of research settings (e.g. bio-science, agriculture);
– Presence of a knowledge system in South Africa that is highly complementary to the Dutch knowledge system (e.g., in the area of civil law, disease management, biodiversity, water management, food security or resource management);
– Availability of operational economic models and practices for sustainable development, industry- academia interfaces, or support systems for SMEs.
– Existence of strong common scientific interests in various fields of the humanities (such as language, human palaeontology, theology and philosophy);
– Existence of a common knowledge pool centred around designated research fields such as astronomy, marine research, agriculture, Antarctic research, biotechnology, genomics, micro-satellite engineering, encryption technology, or

rural development;
– Availability of a great ‘natural research laboratory’ (e.g., nature and biodiversity, natural resources);
Easy access to each other’s research system at relatively low costs.

Why would the Netherlands be interesting for South African scientists? The following arguments seem to hold:

– Presence of a mutually complementary knowledge base (e.g., in the area of rural development or model design for economic growth);
– Easier access to participation in EU Framework Programmes through cooperation with the Netherlands;
– Shared research interests in fields that are common to both the Netherlands and South Africa (e.g., life sciences);
– Easy collaboration through historical-cultural bonds, common language and cultural identity.

Recent years have shown a gradual development towards more structural and comprehensive forms of research cooperation, such as the TANAP programme (Towards a New Age of Partnership in Dutch East-India Company Archives and Research), centring around the conservation and open access of the VOC archives (partly in Cape Town) and the training of a new generation of historians for this time consuming research. A follow-up is foreseen in the form of ENCOMPASS (Encountering a Common Past in Asia). An example of a structural bilateral programme can be found in SAVUSA (South Africa-Vrije Universiteit-Strategic Alliances), which aims to favour academic quality through progressive emancipation and scientific capacity building, *inter alia* through joint Dutch-South African publications. Other forms of scientific cooperation between the Netherlands and South Africa exist amongst others through SenterNovem, TNO, the Ministry of Transport and Water Management, and the Ministry of Development Cooperation.

Would there be a need for a more formal country-to-country agreement on scientific cooperation between the Netherlands and South Africa? An answer should not be given on the basis of historical and cultural bonds, but on the basis of the intrinsic meaning of such an agreement for the quality of scientific research in both partner countries. Thus, an affirmative answer would have to originate from a convincing and conclusive investigation of the following issues:

– What is the collective value added of a formal agreement for science quality on top of the benefits of already existing bilateral forms of cooperation? Here one may have to look into criteria like scientific innovation, international science visibility, economising on scarce research resources, access to research facilities or to interesting field work.
– What is the common benefit for individual researchers or research teams in terms of expected scientific progress? Criteria may relate to better research opportunities, exchange of experiences on as yet unexplored research fields, etc.
– Which HRM benefits may be expected from a shared responsibility for excellent research talent or from the shared use of research infrastructures (for example in astronomy)? Relevant criteria may be cost savings, implementation of a dedicated talent policy, etc.
– Which advantages may be expected of a common research agreement for the formulation or implementation of strategic national research programmes? Here one may have to assess the reinforcement of existing research themes, the potential scientific innovation based on a critical mass, etc.
– Which industrial or technological revenues may be expected through the development of common research in the context of emerging markets? Appropriate judgement criteria may be the contribution to an innovative industrial climate, access to new technologies, collaboration with well trained knowledge workers, etc.
– Which forms might a common agreement adopt? There may be a variety of mechanisms, ranging from the development of joint research initiatives to the mutual assistance in formulating research evaluation protocols.

International agreements on research cooperation should not have a ceremonial value, but would have to be based on convincing agreements that support the need for the advancement of new knowledge in interesting research domains. South Africa and the Netherlands are undoubtedly potentially interesting partners, as is witnessed by the great variety of cooperative agreements that already exist at the level of universities. There may be a scope for a new modus operandi between the two sister councils in South Africa and the Netherlands, that is NRF and NWO, provided the previous issues are well addressed and lead to clear answers on the future perspectives of a new type of science collaboration.

NOTES
[i] See also Salter and Martin (2001: 509-32).

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