The Impact of Educational and Migration Policies on the South African *Brain Drain*

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St. Gallen, November 11, 2004

The President:

Prof. Dr. Peter Gomez
“Our vision is of a South Africa in which all its people have equal access to lifelong education and training opportunities, which will contribute towards improving their quality of life and building a peaceful, prosperous and democratic society.”

South African Department of Education
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Introduction

Many countries, including South Africa, are concerned about skills emigration – the so-called “brain drain”. However, most research documents put the phenomenon in a very emotional and politically biased migration context.

In the first chapter the scope and objectives of this dissertation will be discussed. In particular, the reasons why more research in this field is required will be briefly discussed. These issues will be further investigated in all chapters relating to multiple factors influencing the brain drain under the limits imposed by the lack of consistent historical data.

In the second chapter the key issues affecting the methodology for this research on the role of the government in managing the brain drain will be discussed. Furthermore, this chapter will expand on some key elements of the development of a South African migration policy.

In the third chapter the South African brain drain will be put in the context of the migration policies. The role of the brain drain in the development process of an economy will be analysed to provide a link between the investment in education and training and the growth of the economy.

In the fourth chapter the brain drain will be put in the context of the development of a migration policy for South Africa. South Africa has focused on the limitation of immigration and has not done enough to select immigrants
and facilitate their entry into the country and contribution to the growth of the domestic economy.

In the *fifth chapter* the link between education and development will be analysed. While there is a common belief that more education is translated into higher growth rates, this has hardly proven to be the case. It is therefore legitimate to question whether a government should invest in research and development infrastructure when there is not sufficiently strong empirical evidence that this will generate higher returns for the country.

In the *sixth chapter* the South African Science and Technology policies, capacities and their current status will be analysed to compare them with other countries and to illustrate their development.

In the *seventh chapter* the role of higher education and research policies will be analysed in the context of their role in the Reconstruction and Development Programme for South Africa as well as in the context of migration policies. The boundaries of foreignness have been redefined in the competition of local and foreign students for scarce local resources. Comparative examples are quoted to put the South African policies in a global perspective. While South Africa has tried to limit the inflow of students and has failed to retain them after completion of their studies, other countries have developed policies to facilitate entry and permanence of qualified students in their territories.
In the *eighth chapter* the relationships between the three pillars of this thesis (educational policies, migration policies and the brain drain) will be merged to show the interdependencies between them, their role in the socio-political and economic growth strategies of South Africa, and how they fit with the requirements of businesses. International comparisons will be made in order to illustrate that some other countries have succeeded in implementing appropriate structures that foster a continuous communication between academic, industrial and political structure.

In the *ninth chapter* an alternative approach to limiting the negative effects of the brain drain is presented and discussed. The set up of intellectual networks aims at capitalising on the knowledge of skilled emigrants and reducing the loss of know how and skills caused by South African emigration.

In the *tenth chapter* the key thesis that the Government needs to play a more active and balanced role in dealing with the brain drain is reinforced. Co-operation systems between universities, government and business will be analysed and compared to the South African case. Under scarce resources constraints it is important that resources are allocated where they can generate the highest returns. Such an optimal allocation is only possible if all key actors are involved.

In the *eleventh chapter* I will expose the implications and requirement for further research.
1 Research Objective, Methods and Sources

In this dissertation I strived not to lean too strongly on the systematic branches of science. I believe that the benefits from the analysis of the educational and migration policies implemented by the South African Government before and after Apartheid are much greater than the risk of neglecting specific economic or social aspects of similar analyses. To mitigate this risk I have included some additional aspects only to the extent that they appeared useful in explaining the impact of educational and migration policies on the South African brain drain.

1.1 Research Objective

The overall objective of this dissertation is the analysis of the impact of the migration and educational policies on the brain drain phenomenon in South Africa.

Johnson (1965) argued that the world as a whole would only lose from the brain drain if the net social loss to the home country of the migrant exceeds the private gain of the migrant herself. This internationalist view and approach to the brain drain has been reinforced by the nationalist view of Grubel and Scott (1966). Should these assumptions hold true there would be no need to address the brain drain as an issue and try to define and implement measures with the objective of controlling or restricting it.
However, the impact of governmental policies has not been taken into consideration either by the authors of the internationalist or by those with a nationalist view.

The South African Government has developed extensive policies in various fields of their activities to attract, develop and retain skilled resources. However, these policies have not just proven to be ineffective but have seriously undermined the competitiveness of South Africa on the international market of skilled resources. This preliminary conclusion is strongly supported by empirical evidence showing that the net loss of skilled resources has increased a few years after the end of Apartheid in 1994 and that few of those who left the country have returned to South Africa.

The assumption is that, in addition to migration policies, educational policies have played an important role in accelerating rather than decelerating the brain drain in South Africa. An overall negative result from both policies makes all efforts to retain and develop resources ineffective.

1.2 Additional Research Questions

In order to better illustrate the complexity of the interaction between the various components leading to the lack of the desired positive effect of these policies, I will examine a series of key questions including:

i) Is there a univocal link between migration and development?
ii) Is there a univocal link between development and education?

iii) Does the allocation of resources to education have an impact on the brain drain?

iv) Are there effective measures to ensure that skilled resources required for the development of the home country do not leave?

v) Are there alternative measures to capitalise on skilled resources inside and – in the context of the brain drain – outside the home country?

vi) What is the effect of policy decisions on the brain drain?

vii) Is there a set of univocal policies that can universally be applied to retain the skilled resources considered to be critical for the development of a country?

1.3 Research Methods and Constraints

In order to demonstrate the lack of effectiveness as well as the detrimental effects of South African policies on the retention and development of skilled resources, I will start by analysing their effects on the brain drain in the context of the economic and social development of South Africa. Particular attention will have to be put on the development of the migration and development history before and after Apartheid and compare it – where possible – to the experience of other countries.
The rationale for choosing South Africa is that it is dependent, more than other countries, on the availability of skilled resources to achieve the objectives set in the Reconstruction and Development Programme of Post-Apartheid South Africa. Furthermore, more than in any other country the debate on brain drain has reached such a high profile as to trigger direct political interventions with receiving countries.

1.3.1 Data Analysis

The available data will be used extensively to illustrate the impact of policy changes on the research and development activities and on the migration flows in South Africa.

However, the most reliable data are the censuses of 1994 and 2001 as well as data on acceptances of new immigrants. Other data samples are too small in size to support any meaningful conclusions. Data on skilled professional leaving South Africa present considerable discrepancies with data from receiving countries raising serious doubts about their quality as the example below shows. This data has specifically been collected over the period leading to the end of Apartheid and the subsequent change in Government.
Figure 1: Discrepancies in migrants’ censuses

<table>
<thead>
<tr>
<th>Year</th>
<th>5 Main Countries Aggregate Data</th>
<th>SSA</th>
<th>Difference</th>
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<tbody>
<tr>
<td>1987</td>
<td>14613</td>
<td>9010</td>
<td>-5603</td>
</tr>
<tr>
<td>1988</td>
<td>13774</td>
<td>6106</td>
<td>-7688</td>
</tr>
<tr>
<td>1989</td>
<td>17790</td>
<td>3406</td>
<td>-14384</td>
</tr>
<tr>
<td>1990</td>
<td>11756</td>
<td>3787</td>
<td>-9014</td>
</tr>
<tr>
<td>1991</td>
<td>12365</td>
<td>3351</td>
<td>-8594</td>
</tr>
<tr>
<td>1992</td>
<td>12000</td>
<td>3406</td>
<td>-10728</td>
</tr>
<tr>
<td>1993</td>
<td>17127</td>
<td>6399</td>
<td>-11242</td>
</tr>
<tr>
<td>1994</td>
<td>18584</td>
<td>7342</td>
<td>-7697</td>
</tr>
<tr>
<td>1995</td>
<td>13749</td>
<td>6052</td>
<td>-14738</td>
</tr>
<tr>
<td>1996</td>
<td>21751</td>
<td>7013</td>
<td>-16203</td>
</tr>
<tr>
<td>1997</td>
<td>22419</td>
<td>6216</td>
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</table>
The continuous readjustment of databases and statistics on migration flows as well as on many other topics, like the number of foreign students at South African universities or the number of publications before and after Apartheid, make a statistic assessment of the brain drain an exercise that can only be flawed by the objectives of single political parties or policy makers.

In order to maintain a minimum level of consistency between the available literature, the political events and the various data sources, most references will focus around the year of transition from the Apartheid to the post-Apartheid era.

1.3.2 Surveys

Informal surveys are continuously performed by various governmental and non-governmental agencies in South Africa. All the surveys with one exception, which will be analysed in detail in 2.2, lack a sufficient number of respondents to allow the researcher to reach a significant conclusion. For this reason, most results are published on newspapers rather than on academic journals, underlying once more the politically driven flaws in this source of data and information.

Another limiting factor to this kind of approach is the length of time since the change in Government. Ten years is generally not considered to be a sufficient length of time to
reach significant conclusions. Surveys used in similar studies stretch over a period of twenty or more years (Tansel, 2003).

Performing a survey to collect primary data in South Africa is impacted by the constraints described above. Low return rates as well as expected cultural and political flaws in the responses would rather detract than add value to the overall research.

1.3.3 Analysis of Policy Documents

The limitations above can be best addressed through a thorough analysis of the relevant documentation on the development of the current policies and their implementation.

The links between the various variable and policies are illustrated in Figure 2.

![Figure 2: Proposed approach to the analysis of policies and their role in the context of the national strategies.](image)

It is important to put the policy documents, which will be analysed, in the context of the South African historical and political development. Objectives set by the Government can
be assessed only on the basis of the historical and political event that led to their implementation.

The role of industries and firms in the development of such policies is subordinated to the objectives set in the Reconstruction and Development Programme of the post-Apartheid South African Government. The subordination of their objectives to the national ones is an important factor in the allocation of resources to research and development activities and ultimately to the training of resources.

This multi-layered approach allows me to analyse the impact of the educational and migration policies on the brain drain without having to rely exclusively on the available data. Furthermore, it allows me to draw conclusions on the effectiveness of the policies that have been implemented by making a qualitative assessment of the available statistical data.

1.4 Steps in the Analysis of the Impact of Migration and Educational Policies on the South African Brain Drain

The primary objective of this dissertation is of an exploratory and descriptive nature. The goal is to collect, analyse and put into an overall framework the available set of policies and documents on the brain drain in South Africa.

The secondary goal is to evidence the gaps and inconsistencies in the policies developed and implemented in
Post-Apartheid South Africa, especially in relation to the objective of the government to retain and attract skilled resources.

The tertiary goal is to challenge some key assumptions and myths entrenched in the global discussion on the *brain drain*.

Furthermore, I strive to provide a larger framework for the analysis of the *brain drain*. Most of the available literature is based on case studies and the remaining focuses on the *brain drain* as a more extreme issue in the context of migration. The issues of policy development, distribution of resources in research and development, as well as the issue of ensuring a consistent approach to this phenomenon are often neglected.

Although the scope of this dissertation is primarily focused on South Africa, it draws on the experiences of other countries that have succeeded in retaining and attracting skilled resources and discusses what can be learnt from them in South Africa. It intends to provide an alternative view of the *brain drain* in South Africa by highlighting inconsistencies, side effects of erroneous resource allocations, and to explain what could be the reason for an accelerated *brain drain* despite continuous efforts by the Government to reverse it.

In order to achieve the objectives stated above, I will focus on the historical and political background of the country before concentrating on the development and implementation of educational and migration policies and their impact, first singular and then combined, on the South African *brain drain*. 

1.5 Measurement of the Impact of the National Policies on the Brain Drain

While the approach to the analysis of the South African brain drain is multi-layered, the measurement of its impact has to follow the same process.

The objective of this dissertation is not to conclude whether the brain drain has a positive or a negative effect on South Africa but to determine whether the policies that have been implemented are adequate for the overall objective that they want to achieve.

In specific areas these policies might well be very effective. In fact, these policies have shown considerable positive results in the protection of the local workforce against immigrants from overseas.

However, policies keep changing rapidly and erratically to anticipate or adapt to the changes in the business and social environment. An assessment of the long term effect of the current policies would therefore be very difficult. Expectations of future changes in the policies are an important factor in the decisions currently made by industries and universities alike. Both of them support a major openness to immigrants with the “right” set of skills.
2 Sources of Information and Reference Framework

The low quality and scarce content of information of the available data on the South African migration phenomenon has to be compensated by a stronger focus on the available literature. However, a mere quantitative overview of the available publications shows that most research on the brain drain was performed prior to the year 2000.

Furthermore, the main focus of the available research on the brain drain phenomenon in emerging markets is strongly limited to that of a provider of skilled resources and is hardly ever put in a regional or global context. The regional cross-border migration in Southern Africa is an important distinguishing factor when comparing it to other regions. The selection of the literature is strongly influenced by the particular focus on the Southern African region which cannot be compared to the Northern American region (Canada – USA) or to the European cross-border migration streams (Wolfburg, 2001). This restriction also applies to the selection of the appropriate reference framework, which has to be specific to the South African context.

The research methodology applied is strongly dependent on the availability of data and specific literature on the brain drain and by the objectives to be pursued. A strong interdisciplinary approach is required to capture the most
important features of a phenomenon that has gained the attention of scientific literature only since the 1960s.

Furthermore, most of the scientific literature available is limited to a case study approach and to the basic assumption that the *brain drain* has mainly negative effects on the home country of migrant skilled labour and thus needs to be prevented by acting on receiving countries and putting additional burdens on people leaving the home country.

A new approach to the analysis of the *brain drain* in South Africa requires an in-depth analysis of the phenomenon in the context of migration and its impact on the policies of the home country of the migrants themselves.

The available literature on migration and on the *brain drain* focuses on the phenomenon from a variety of perspectives. However, it fails to link the phenomenon to the political choices of the country experiencing an emigration that is perceived to have a negative impact on its welfare. This is particularly true for South Africa, a country that is battling to achieve the objectives of the Reconstruction and Development Programme and provide an equitable access to all South Africans to education and welfare.

All research papers base their analyses on the South African national census data of 1994 and 2001. Subsequent surveys are limited in scope and often do not provide significantly different results from that of the main basic research performed on the whole South African population.
The only recently published census of 2001 has not been used in any research papers or in any major discussion documents. The census has in fact not offered any new insights into the migration or educational policies. To the contrary, by not providing any relevant information on the impact of the brain drain, it could contribute to questioning the gravity of the phenomenon.

2.1 Brain Drain Literature

In the early 1960s literature covering a wide range of topics related to the migration of highly skilled workers from Less Developed Countries to Developed Countries started to emerge, in particular, with a focus on the impact on welfare for the economies experiencing a loss of skilled people.

Johnson (1965) states that “in the absence of any very persuasive evidence to the contrary [...] there is no significant probability of world loss from the international migration of educated people”. He argues that the world as a whole is negatively affected by brain drain only if the net social loss to Less Developed Countries is greater than the gain to the migrant. However, a net social loss only occurs if the loss of externalities to the Less Developed Countries is greater than the gain of externalities.

Grubel and Scott (1966a, 1966b) come to the same conclusion arguing that no loss to Less Developed Countries is associated with brain drain. On the contrary they suggest
that the emigration of highly skilled workers increases the nation’s capital-labour ratio and thus raises the long-run average income in the home country. The potentially largest benefit to the home country arises from the research of scientists and engineers in the foreign country because of the accessibility of their results, which become public as soon as they are published. However, in their research Grubel and Scott ignored the redistribution effects of welfare (Weisbrod, 1966).

Godfrey (1970) raises criticisms similar to those of Grubel and Scott, arguing that more emphasis should be put on the average income rather than on a theoretical distribution of the total between individuals. He introduces the concept of compensation schemes to neutralise the negative effects of the brain drain. Furthermore, he proposes various solutions to reduce the brain drain, e.g. limiting the number of students studying abroad or making education so specific that it would be completely unacceptable to foreign employers. In his proposals he followed the argumentation of Myint (1968), who argued that the less internationally acceptable a country’s qualifications, the lower the incidence of brain drain. Bhagwati (1972) even proposed the implementation of a supplementary income tax on those who migrate to the benefit of the source economy.

Watanabe (1969) published a comprehensive study on the topic of brain drain, and possible countermeasures against it.
He argues that emigration on any substantial scale of highly educated and skilled labourers will negatively affect the welfare of the source economy by retarding its development. However, he also acknowledges that the brain drain is cause and effect of slow development rates thus implying that one possible solution to reduce the brain drain is to accelerate economic development in Less Developed Countries.

Bhagwati and Rodriguez (1975) conducted a detailed literature review on the theoretical analysis of the welfare effects of brain drain classifying the literature into contributions that deal with comparative-static or dynamic formulations and those that assume a perfectly competitive model or one with endogenous market or policy-imposed distortions.

Kwok and Leland (1982, 1984) as well and Katz and Stark (1984) put the emphasis on the asymmetric distribution of information about the skills of migrants. The receiving country has worse information about the abilities of migrants and will therefore set wages at the average perceived level of education of migrants. For this reason only people with skills below the average have an incentive to migrate.

Webb (1985) addresses the question of how brain drain influences the distribution of educational opportunities in Less Developed Countries. The objectives of the Government play an important role in his model. The Government is either concerned with the efficiency of its education system or its endowment of educated labour. Migration will have a positive
impact on the education “cash abundant” families and a negative impact on that of “cash constrained” families. By implementing appropriate public policies the effect of migration might become positive for both classes.

Gallup (1997) presents a survey of theoretical models of migration decision-making, including the gravity model, the two-sector model, family decision-making models, information and networks.

The literature on the brain drain phenomenon, because of the strong political bias involved in the subject and the inaccuracy of data, is bound to remain strongly influenced by specific case studies in the Sub-Saharan continent, by the lack of empirical and documented evidence and by the inadequate – partly biased - collection and retention of data.

2.2 Analysis of Existing Surveys

In the context of the analysis of the brain drain in South Africa, data analysis is of paramount importance to understand the political use and abuse of figures to support the thesis that immigration has a negative impact on local jobs. In order to put the so-called “skill crises” in South Africa on an objective basis the South African Migration Project (“SAMP”) initiated a major research project on skills migration to and within the SADC region. The extensive research resulted in two major reports, which opened the debate on the South African migration policy.
The objective of the first research study (Mattes and Richmond, 2000; Mattes, Crush and Richmond, 2000), was to ascertain whether the brain drain would escalate into a chronic and damaging skill shortage and was based on a survey among a representative sample of skilled South Africans. The main findings of the study can be summarised as follows:

- The economically active population in South Africa was approximately 17,000,000. The size of South Africa’s skilled segment was 1,600,000;
- The pool of skilled South Africans who might conceivably leave is a large one. Over two-thirds (69 percent) said that they had given the idea of emigrating some thought and 38 percent said that they had given it a “great deal” of thought. 69 percent of whites and 68 percent of blacks had given emigration some thought, thus defusing the misconception that emigration is a purely white phenomenon;
- Only 20 percent said that is was “quite likely” that they would leave for a period of more than two years. Slightly higher proportions of skilled whites (22 percent) than blacks (15 percent) said that a permanent move was very likely. On the other hand, skilled blacks were more likely to leave South Africa on a temporary basis (15 percent) than whites (10 percent);

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1 Given the role of Apartheid in reserving important positions in the economy for whites, it was no surprise that the random sample was predominantly white (72 percent)
The firmest indicator of a person’s emigration potential is whether she has actually begun the process of application for emigration documentation. Approximately 6 percent said that they had applied for work permits in another country, 5 percent had applied for permanent residence elsewhere, and 3 percent had applied for foreign citizenship;

The definition of a timeframe dramatically cut the levels of potential emigration. Only 3 percent said that is was “quite likely” that they would leave within six months, 5 percent said that they would leave in the next two years, and 13 percent said that it was very likely that they would leave within five years. The proportions of skilled blacks and whites who expressed a strong probability of leaving within six months or within two years were statistically the same;

A composite statistical index was used to summarise each person’s potential to emigrate and around 2 percent of the sample fell into the “very high category of emigration potential, 10 percent had a “high” emigration potential and 25 percent had a “moderate” potential. Only 20 percent had “no” emigration potential;

There was absolutely no difference in the proportion of skilled whites and blacks who fell into the “very high” category (2 percent of either group). A higher proportion of skilled whites (11 percent) than skilled
blacks (4 percent) fell into the “high” probability category. Adding the two groups together, the difference in proportions of skilled whites (13 percent) and skilled blacks (6 percent) with a high/very high probability of leaving the country within five years was not nearly as great as might be expected;

- If only those with a “very high” emigration potential left the country within the following five years, this would have translated into a potential gross loss of 32,000 skilled people. If those with a high potential are added, the number would have increased to 192,000; and
- Restrictive migration policies by the Government were considered to be counter-productive and hasten the exit of skilled whites and blacks. Specific steps such as requiring a year’s national service from students leaving professional schools, an end to dual passport holding, or increased fees for documents were expected to hasten the exit of between one-third to one-quarter of this group. This last finding stressed the importance of the political intervention in the migration debate.

The second report (Robertson and Robertson, 2000) had the objective of assessing hiring practices, and responses of private companies toward the skill shortage in key areas of the economy and was based on the results of a survey among employers. The main findings of this study can be summarised as follows:
The sample of 200 enterprises interviewed employed an estimated 100,000 skilled personnel with the largest absolute numbers in banking and finance, education and health, and industry. The sectors with the lowest absolute numbers of skilled personnel were entertainment and tourism, and construction;

The sectors in which the ratio of skilled personnel to total employment was especially high included education and health, banking and finance and computers and IT services. The most high-skill-intensive sectors were computers and IT services (57 percent of employees), business services (47 percent), education and health (41 percent) and banking and finance (29 percent). In total these sectors accounted for 78,000 skilled employees. In several computer services and IT enterprises the proportion of highly skilled personnel was over 90 percent;

Over 50 percent of enterprises employed a skilled workforce of citizens or permanent residents alone. Some 46.5 percent employed some foreign high skilled workers. The highest proportions were in banking and finance, computers and IT services, education and health, and business services. Across the 200 surveyed enterprises, foreign skilled personnel number in total only between 2,000-3,000 workers. Overall, non-South Africans represented
more than 5 percent of the total labour force in only 8 percent of the enterprises;

- In certain multinational enterprises, foreign skilled personnel were not in South Africa on a long-term basis. They were part of intra-corporate movements involving rotation of personnel or exchange programmes;

- Companies said that the impact of the emigration of skilled personnel had been much greater in the post-1994 period and the tempo of emigration of skilled personnel had escalated since 1996;

- While 98 percent of the interviewed enterprises said that the impact of emigration was negligible before 1994, the corresponding figure for the post-1994 fell to 67 percent;

- The perceived impact of the brain drain varied across sectors. The number of enterprises reporting a significant impact was high in education and health (59 percent), business services (47 percent), banking and finance (43 percent), computers and IT services (35 percent) and industrial high technology (35 percent);

- The most severe emerging skill shortage related to computing and information technology personnel. Within the global labour market of computing and IT skills, South Africa was – and still is - rapidly losing ground against the aggressive recruitment strategies,
immigration incentives, employment packages offered by enterprises in USA, Western Europe and Australia. The major potential source of recruitment for new high skill personnel was South Africa rather than overseas;

- A key measure to offset the brain drain was represented by the training programmes offered to employees. The operation of training programmes was a major means for expanding an enterprise’s asset base of skilled personnel. A positive finding was that the vast majority of the surveyed enterprises – 85 percent of the total – were involved in training and upgrading of their personnel. In many cases the budgets allocated to training and upgrading of personnel were substantial; and

- Finally, enterprises seeking to hire overseas employees reported consistently negative experiences with the Department of Home Affairs. Almost without exception, there were complaints about lack of transparency, delays and even obstructionism.

The surveys summarised above have built the basis of the major research carried out in South Africa on the brain drain and have relentlessly been quoted in all major academic and commercial publications.

The findings of subsequent surveys as well as some previous preliminary surveys have not identified any significant differences in the key areas of problems raised when
managing the *brain drain*. Developing, retaining and gaining skills have consistently been identified as causes and consequences of the *brain drain* phenomenon in South Africa.

Therefore, the analysis of the immigration policies in the context of the South African historical background as well as the actions of the private and public enterprises in developing resources and research in South Africa are crucial to describing an alternative approach to managing the *brain drain* phenomenon.

### 2.3 Overview of the Relevant Approaches to Migration Studies

Generally speaking, the phenomenon of the *brain drain* can be included into the general theme of migration theories. Therefore, interest in international migration in the social sciences has tended to increase and decrease with various waves of emigration and immigration and so has the interest in the *brain drain* phenomenon. In Canada the establishment in 1967 of a point system for entry based on skills and the reunion of families has not only diversified the number of immigrants but also their places of origin. The same applies to Australia where 40 percent of population growth after 1945 has been the result of immigration.

Attempting to analyse the *brain drain* phenomenon based on the migration theories makes the approach subject to the same limitations that affect migration studies. In social
sciences, an inquiry starts with a puzzle or a question, whatever the topic of study may be. The way in which the question is formulated or framed is dependent upon the discipline and the construction of hypotheses is driven by disciplinary considerations. Furthermore, intense disagreements and debates about the meaning and interpretation of the same body of data exist within single disciplines. While there might be agreement across disciplines on the nature of the problem or even the methodology, an agreement on a single model or explanation is less likely. Each discipline has its preferred list of questions, hypotheses and variables.

Table 1 summarises the principal migration theories, the related research questions and levels of analysis.
<table>
<thead>
<tr>
<th>Discipline</th>
<th>Research question</th>
<th>Levels/Units of Analysis</th>
<th>Dominant Theory</th>
<th>Sample Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anthropology</td>
<td>How does migration effect cultural change and affect ethnic identity?</td>
<td>More micro / individuals, households, groups</td>
<td>Relational or structuralist and transnational</td>
<td>Social networks help maintain cultural difference</td>
</tr>
<tr>
<td>Demography</td>
<td>How does migration affect population change?</td>
<td>More macro / populations</td>
<td>Rationalist (borrows heavily from economics)</td>
<td>Immigration increases the birth rate</td>
</tr>
<tr>
<td>Economics</td>
<td>What explains the propensity to migrate and its effects?</td>
<td>More micro / populations</td>
<td>Rationalist: cost-benefit and push-pull</td>
<td>Incorporation depends on the human capital of immigrants</td>
</tr>
<tr>
<td>History</td>
<td>How do we understand the immigrant experience?</td>
<td>More micros / individuals and groups</td>
<td>Eschews theory and hypothesis testing</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Law</td>
<td>How does the law influence migration?</td>
<td>Macro and micro / the political and legal system</td>
<td>Institutionalist and rationalist (borrows from all the social sciences)</td>
<td>Rights create incentive structure for migrants</td>
</tr>
<tr>
<td>Political science</td>
<td>Why do states have difficulty controlling migration?</td>
<td>More macro / political and international systems</td>
<td>Institutionalist and rationalist</td>
<td>States are often captured by proimmigrant interests</td>
</tr>
<tr>
<td>Sociology</td>
<td>What explains immigrant incorporation?</td>
<td>More macro / ethnic groups and social class</td>
<td>Structuralist and/or functionalist</td>
<td>Immigrant incorporation is dependent on social capital</td>
</tr>
</tbody>
</table>

*Table 1: Overview of migration theories and approaches*

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2 Brettell and Hollifield, 2000, p. 3
Migration and the *brain drain* have only recently emerged in the disciplines associated with the study of politics and government. Given the substantial lack of theories about the politics of international migration it is not surprising that migration theories tend to be dominated by economic or sociological explanations. “Push-pull” and “cost-benefit” analyses are loosely associated with neoclassical economics, whereas networks and transnationalism are analytical concepts derived primarily from world systems theory and most often studied in sociology and anthropology. Only recently, in the late 1980s and 1990s has the field of study begun to emerge, which might be called the *politics of international migration*, in which researchers are attempting to define how the state can be brought back into the social scientific analyses of migration.

Recent research has focused on three major themes. The first major theme revolves around the question of *control*, i.e. the role of the nation-state to establish rules of entry and exit. Within this first major theme of analysis, research has focused on the extent, capacity and limits of control by the state on its borders and cross border movements (Brochmann and Hammar, 1999; Cornelius, Martin and Hollifield, 1994; Freemann, 1995; Hollifield, 1992; Hollifield and Brettell, 2000). The second theme is directly derived from the first one and focuses on the impact of migration on international relations. The relationship between migration, national security and foreign policy is the most common subject within this theme.
(Teitelbaum, 1980; Weiner, 1993 and 1995). The third theme is closely linked to the first two and revolves around the issue of incorporation. The research questions lead to discussions over national identity, citizenship and rights, which are the core elements through which every policy defines itself (Brubaker, 1989 and 1993; Schuck, 1998; Schmitter, 1979).

In the context of the brain drain, especially in South Africa, the first theme of analyses recovers a major role because of its direct influence on the further development of the nation-state. However, the issues of national security and incorporation are not fundamentally important to understand, explain and manage the brain drain phenomenon. More important in the context of the brain drain is the role of the nation-state in formulating research and development policies as well as in defining educational priorities. The reason for choosing a sub-section of the policies of a nation-state is that the brain drain is part of the migratory flow but, because of its impact on sending and receiving countries, it refers only to the migration of skilled workers.

2.4 Migration in the South African Context

2.4.1 Politics of Control

Unlike economics, where the emphasis is on scarcity of resources and efficiency in their use, in the study of politics the primary emphasis is on power, influence, authority, but with
strong ethical and normative overtones (Carens, 1989; Schuck, 1998; Walzer, 1983). In a free market, the allocation of scarce resources takes place according to the logic of supply and demand. However, the exercise of power takes place in the legal and institutional framework of political systems. Therefore, almost all of the literature on migration control politics is focused on the receiving countries. Very little has been written on the control issue from the standpoint of the sending country. The same applies to the actions of the nation-states which have focused on immigration control rather than emigration control. Only recently, due to the perceived increase in the impact of the brain drain have nation-states begun to find solutions to the growing outflow of skilled people.

However, most researchers point out that in order to understand the politics of immigration control, one must be able to define the distribution of costs and benefits (Freeman et al.). Freeman (1995) in particular associates different cost-benefit distributions with specific “modes of politics”. If we combine Freeman’s “modes of politics” with the work of Kessler (1998)\(^3\) then we have a fairly complete theory of the politics of immigration control. However, this theoretical framework is economically over-determined and reduces the political process to an economic calculus. By focusing on such

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\(^3\) Kessler argued that the demand for immigration policy is heavily dependent on the relative rates of return to factors and the substitutability or complementarity of immigrant and native factors.
an economically over-determined process, we might lose sight of the institutional and ideological variations that might influence it. Policy outputs often distort market interests of different groups to such an extent that certain group may end up pursuing policies that under different circumstances may appear irrational. This is particularly the case for South Africa, where both immigration and educational policies are strongly influenced by the policy programme drafted and implemented in 1994.

### 2.4.2 International Relation and Migration in South Africa

Since South Africa's democratic transition in April 1994, the new ANC-led Government has confronted challenges brought on by its new role in the international system. After decades of raising barriers to the outside world and being shunned in various official and informal ways, the country has rejoined multilateral organisations and re-established diplomatic ties. Another consequence of South Africa's burnished reputation is the 'influx' of foreigners. The media and certain vocal politicians put great emphasis on 'illegal immigrants', who are blamed for a range of scourges, from crime to unemployment. While international relations theorists trumpet 'new security issues', South Africa experiences them on a daily basis. Migration is but one of these concerns.
The issue of (both legal and illegal) migration intersects various international 'regimes', that is, clusters of international norms and institutions that regulate state policies in particular issue areas. For example, some immigrants qualify under international norms as refugees, a crucial source of transborder population movement in Southern Africa. In 1993, South Africa finally entered into its first agreement with the United Nations High Commission for Refugees (UNHCR). International human rights norms also play a critical role in the politics of migration. A new culture of constitutionalism has increased popular demands for legal protections, also raising the issue of the extent to which foreigners qualify for human rights safeguards. Nevertheless, in the 1994 elections certain temporary residents acquired the right to vote. Expectations for additional rights have escalated but have so far not been fulfilled.

There are numerous reasons to expect the new democratic Government to be more responsive to international normative pressures than the Apartheid regime. The ANC, for example, spent three decades in exile, working within international organisations and building diplomatic ties.\(^4\) Having seen the power of international norms (through global sanctions) in

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aiding their own rise to power,\(^5\) ANC leaders should be expected to be more sensitive to the state's international reputation. Yet, democracy also means that domestic protest is stronger and broader, and hence more influential than before. Not all members of the new Government spent those years in exile, most notably unionists. Many divisions within the liberation movement are now played out on different grounds. Immigration policy has emerged as one of these contested terrains.

In the midst of pragmatic policy concerns, the Government also confronts a meta-political quandary about whether South Africa 'owes' anything to other countries in the region which suffered from overt military aggression, destabilisation, economic coercion, and more subtle political costs for supporting the anti-Apartheid movement. If this is the case, the Government would have to question whether migrants - including refugees – should be allowed freely into the country. Furthermore, under such a scenario the Government would have to revise the entitlement to citizenship rights, claims, including education and healthcare, in the face of budgetary constraints. Contemporary debates over these questions highlight overarching issues of political community and identity.

Looking at the ways in which the South African state seeks to regulate population flows enables the exploration of the

extent to which international norms and organisations influence both policy-making and processes of identity formation. Furthermore, comparing current policy-making with the 1920s offers perspective on whether these 'new issues' actually represent unprecedented global normative commitments. Evidence from the history of migration casts doubts over the recent stress on globalisation as something unique, or more forceful, in the post-Cold War era. International pressures have always been, and will continue to be, crucial factors in South Africa's migration policy.

2.4.3 Norms, Identity and Migration

In general, the analysis of international regimes offers insights into two types of political processes: policy-making and identity formation. The former stresses the effects of international norms and institutions on the behaviour of states while the latter explores the social construction of agents. Rather than giving a broad survey of the literature on norms, however, the focus here will be on the constitutional dimensions of the migration issue, particularly current debates on globalisation, sovereignty and post-national policies.

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Globalisation has become the trend of the 1990s as policymakers and theorists in hegemonic states finally acknowledge the extent of international constraints on state action. But for post-colonial states, globalisation may be nothing new: they have never enjoyed the sovereignty of international relations theory but rather, struggled with state-building\(^7\). South Africa, as a former British Dominion, falls somewhere between the two extremes, having enjoyed early self-government (albeit not representative of the majority of the population), but without autonomy in foreign policy.

A renewed debate over sovereignty accompanies concerns over globalisation. Many international relations theorists increasingly stress the role of meaning in constituting states. Yet, each places a different emphasis on the process by which social construction operates. Some focus on the social construction of threat\(^8\). Others challenge the foundational role of the domestic analogy\(^9\). Those rooted in international law traditions consider rights and obligations\(^10\). Despite their

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\(^7\) For a provocative argument that stresses the role of international norms and institutions in constructing States, see Jackson H. R. (1990), *Quasi-States: Sovereignty*, in: "International Relations and the Third World", Cambridge University Press, New York.


differences, these critiques of conventional realist notions of sovereignty all question distinctions between 'us' and 'them' and reject the reification of states.

In summary, it is too easy to take state boundaries for granted. Sovereignty, both conceptually and physically, is more porous than most conceptions imply. Yet, to the extent that these scholars pursue empirical research, most focus on traditional issues: weapons, intervention, security communities, international trade, and environmental hazards. In many cases, the social foundations of sovereignty and state-building get lost because of a persistent state-centrism. Noteworthy exceptions are those increasingly acknowledging an important role for transnational social movements\textsuperscript{11}.

These debates lead to three sets of questions about social construction and migration. The first concerns the state, the second, international norms, and the third, agency.

Questioning the nature and origins of threats leads to an examination of the notion of 'we-ness', that is, the boundaries and characteristics of political communities. Defining friends and enemies has symbolic and pragmatic implications. For migrants, the process of \textit{naming} demarcates legal status\textsuperscript{12}. The categories involved, such as national origin versus cause

\textsuperscript{11} See especially Lynch C. (1996), \textit{Beyond Appeasement: Interwar Social Movements and Change in World Politics}, Northwestern University, Chicago, Illinois

\textsuperscript{12} Sinclair M R (1996), \textit{Unwilling Aliens}, University of Western Cape, Bellville
of displacement, fuel political debate and identity formation (for example, in some circumstances, xenophobia).

These categories are simply discursive and turn the attention away from the fact that resources are at stake. Rather than disputing friends and enemies in terms of weapons, migration turns debates over 'we-ness' inward, encompassing crucial welfare dimensions (including healthcare, education, employment opportunities, as well as political and civil rights). Focusing on migration enables to explore questions of sovereignty and the state by encompassing both the external and internal dynamics of social construction. Through this approach it is possible to escape both the state-centrist emphasis on strategic interaction, as well as the domestic focus implicit in most studies of nationalism.

International normative frameworks are one component of the categorisation or naming process. For example, migrants are evaluated as individuals or national groups in part due to prevailing international regimes. While state policy generally follows broader global trends, variations in 'incorporation regimes' across countries are significant. Regional variations are also bound to be significant. For example, the Organisation of African Unity (OAU) convention on refugees contains a broad-brush definition, which acknowledges flight

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13 On domestic incorporation regimes, see Soysal N. Yasemin (1994), *Limits of Citizenship*, University of Chicago, Chicago
from political instability, economic hardship, and environmental disruptions, in addition to political persecution as defined more narrowly by the UN convention.

The historical evolution of norms regulating population flows provides insights into the diffusion of global social understandings and their implications for states' policies and evolving identities. But we should expect norm diffusion to be neither linear nor inherently benevolent; it is not necessarily "progressive" in either sense. Rising xenophobia and violence against legal and illegal migrants around the world are sobering reminders that globalisation is not necessarily a "good" process.

Normative diffusion raises a third issue for international politics and theory: the nature of agents. Migration is clearly about non-state actors, and these population flows have crucial implications for state policy. But what are the political differences between formal non-government organisations (NGOs) versus non-organised agents of change? In other words, should we take into account migrants themselves as social actors, or simply the various interest groups, NGOs, bureaucracies and international organisations, which mobilise around (or against) international norms?

To explore these broad issues raised by looking at migration from the perspective of international relations theory the following sections briefly summarise immigration policy in South Africa during the 20th century. Three themes are
explored: the way in which immigrants are defined as threats, the role of international norms, and the range of non-state actors involved in public debate and the policy-making process.

2.4.4 Migration in the Interwar Period

The origins of the contemporary international migration regime, to the extent that one exists, can be traced to the interwar period. Two aspects of regime formation are evident: the emergence of global regulatory norms (in the wake of refugee flows from World War I) and the growth of international organisations to implement these new understandings. Prior to the late 1910s, most states adopted open migration policies, often encouraging emigration (from Europe) or immigration (in host countries and colonies).

South Africa was one colonial destination for migration. Following its establishment as the Union in 1910, South Africa retained Commonwealth ties to Britain (particularly in foreign affairs). Migration policy highlights the difficulties of state-building during this period. Serious regional tensions, as well as racial prejudices, are evident in policy-makers' attempts to create and regulate a new South African identity. The compromises and statutes of the interwar period set the foundations of migration policy for the rest of the century.

One theme that persists in immigration policy has been high barriers to Africans. Initially, immigration policy did not
explicitly address this question since Africans were not allowed official entry as permanent residents. Africans were brought in regularly, however, as migrant workers, especially from neighbouring Mozambique and Malawi (formerly Nyasaland). But since migrant labour falls under a different international economic and legal framework (primarily through bilateral agreements between South Africa and Portugal), it will not be considered here.

Because of the consensus on African exclusion, the prime focus of early immigration debates was the status of Indians, who were brought to South Africa as indentured labourers. Themes raised in these debates foreshadowed Apartheid restrictions implemented following the National Party election victory in 1948.

The original Union policies were comparable, in a sense, to international agreements as they sought to co-ordinate four provincial perspectives: Cape, Natal, Orange Free State and Transvaal all had different cultural and economic concerns. However, they shared a common view of the importance of maintaining the predominance of white society. While the growing presence of Indians presented a threat (albeit geographically concentrated in Natal), important differences

14 The exception was those from neighbouring British protectorates. See Bradlow E. (1978), Immigration into the Union 1910-1948: Policies and Attitudes, Ph.D. dissertation, University of Cape Town
emerged between the provinces about how to regulate white population flows as well – with a marked prejudice against newcomers from eastern and southern (as opposed to western and northern) Europe.

One key legal provision that provides insights into cultural preferences is the language criterion for immigration, implemented as one of the very first restrictions in 1902. Early legislation, such as the Cape Immigration Act (No 30) of 1906, required that an immigrant be able to write out an application form in any European language. At the time, Yiddish counted. Newcomers also had to be in possession of visible means of support (at the time, defined as 20 pounds sterling). The statute contained a further provision for religious or political persecution. The laws in the three other colonies generally corresponded with these Cape statutes, with some variations reflecting local concerns. Natal remained particularly concerned about Indian and Chinese immigration. The Orange Free State, desiring to increase its white population, had lighter restrictions. Transvaal primarily faced African migration.

The Union formulated policy within the Commonwealth context. Not only did this entail direct British influence on colonial policy, but also attempts to co-ordinate immigration flows throughout the Empire, with direct involvement of the
various voluntary societies (precursors to contemporary NGOs) that encouraged and supervised immigration\textsuperscript{16}.

Asian, particularly Indian, migration rose and became the primary issue of contention between South Africa and Britain. Periods of anti-Jewish sentiment also flared, although less persistently. Within the context of world trends, immigration to South Africa was relatively marginal: its Indian population, however, was the largest in the Empire. As India gained an increasingly significant role in the Commonwealth, Britain remained caught between its commitment to the rights of its subjects to travel freely within the Empire and its recognition of the rights of self-government for the Dominions. For example, Australia granted full citizenship to Indians in 1918. At the 1921 Imperial Conference, Britain urged citizenship rights for Indians throughout the Commonwealth. In contrast, South African restrictions provoked concern, which flared repeatedly at subsequent Commonwealth gatherings\textsuperscript{17}. The Orange Free State, for example, prohibited Asians from farming, trading, or owning property. Following the 1919 Peace Conference, pressure also increased to accept Jewish war refugees, with mixed results. Some of those with valid passports – often difficult for Jews to obtain – headed to Johannesburg.

\textsuperscript{16} For a detailed study of the work of some of these immigration societies, see Swasiland C. (1993), \textit{Servants and Gentlewomen to the Golden Land: The Emigration of Single Women from Britain to Southern Africa, 1920-1939}, University of Natal, Pietermaritzburg

\textsuperscript{17} Bradlow, op. cit., pp. 111-112, 127.
Although sympathetic to racial concerns, Imperial policy-makers would not allow explicitly discriminatory provisions. Language remained a useful technique for circumventing such sensitivities. By 1906, for example, Indian languages were rejected for the educational requirement. Measures to encourage Indians to depart voluntarily also skirted Imperial norms. Transvaal and Natal, for example, applied a special tax to indentured workers who did not return to India. Later, the Department of the Interior implemented elaborate (and costly) repatriation schemes to entice Indians to return to India (with varying success). Within this context, Gandhi emerged as a powerful leader who extracted some compromises from the provincial and later Union governments\(^\text{18}\).

Opponents of the Indian presence emphasised two themes, one economic and the other cultural. The 1910s and 1920s marked a particularly difficult economic period in the white South African history. The 'poor white problem' resulted in many Afrikaners flooding the mines and urban areas seeking work as their farms went under. Union organisers thrived, ultimately leading to a bloody confrontation with mine owners and the Government. During these lean years, Indians represented an economic threat, especially in trading. In addition, opponents of immigration emphasised the lack of cultural assimilation, evident, for example, in debates over the

\(^{18}\) Ibid., pp. 10-16, 113-116.
legality of non-Christian marriages. 'White civilisation', they argued, was threatened.

The 1920s, in general, marked a period of growing xenophobia, exacerbated by increasingly restricted immigration policies in the United States, which forced would-be migrants to seek other destinations. Following international trends, South Africa adopted a national quota system in 1930, inaugurating a new era of treating immigrants by country of origin, rather than personal circumstances (that is, by group rather than as individuals). South Africa followed in the nativist tide of the times.

The numbers, however, did not substantiate whites' fears of 'swamping'. However, as repatriation efforts ebbed, segregationists grew increasingly concerned with the South African-born Indian population, which had even fewer incentives to return to their ancestral homeland – and they could not be legally deported. Restrictive domestic legislation increased, foreshadowing both Apartheid legislation and future conflict within the United Nations over the treatment of Indians in South Africa.

The immigration policy contained two fundamentally domestic components, perhaps unique to the South African setting. Firstly, due to the federation of four distinct colonies at

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19 In other words, the question of the rights of more than one wife (and children) to immigrate remained contentious and highlighted cultural differences; ibid., pp. 83-93.

20 Ibid., pp. 221-226.

21 Ibid., pp. 116-120, 124.
the time of Union, the immigration policy also regulated the flow of people between provinces, not simply from 'outside'. The precursors of Apartheid influx control, in other words, are already evident by the turn of the century. For example, Indians were not allowed free inter-provincial movement until 1975. Secondly, the question of indentured Indians quickly shifted to the question of Indians born within South Africa as demographic trends began to favour the latter. Restrictions on citizenship rights, even more draconian during the Apartheid era, thus also emerged as early as the turn of the century. Perhaps, it is no mere coincidence that the founders of Apartheid, notably future Prime Ministers Malan and Verwoerd, served as immigration ministers earlier in their careers.

2.4.5 Post-Apartheid Migration Policy

As this historical overview has shown, the regulation of population flows is not new. The Apartheid era even included

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22 Ibid., p. 184.
24 Daniel François Malan (22 May 1874 – 7 February 1959) was a Prime Minister of South Africa. He is seen as the champion of South African nationalism, and the government under him started implementing Apartheid.
25 Hendrik Frensch Verwoerd (8 September 1901 – 6 September 1966) was Prime Minister of South Africa from 1958 until his assassination in 1966. Unlike his predecessors, Verwoerd was not born in South Africa, but immigrated at age two with his parents from the Netherlands. A polarizing figure, he is widely considered the architect of Apartheid, and was president during the Sharpeville Massacre, the banning of the African National Congress and Pan Africanist Congress, and the treason trial of Nelson Mandela and others. He also presided over the establishment of a republic through the use of questionable electoral practises in a whites-only referendum.
restrictions on internal movement (such as population registration, pass laws, “independent” bantustans\textsuperscript{26}) that were harsher than many other states' policies regulating cross-border migration. The democratic Government has already eliminated the most egregious of these internal policies, but thus far has retained much of the legislative legacy for dealing with external migration. One noteworthy change occurred in 1990 when South Africa reduced the voltage of the electrical fence on the border of Mozambique from a lethal to a stun level.

The extent to which policy continuity will prevail, or alternatively, whether critics advocating a more open policy will make political inroads, depends in part on the strength of international norms (across a number of relevant regimes), the new Government's responsiveness to international expectations, and the extent to which domestic and transnational political actors utilise this international normative framework. While it is too early to give a definitive answer (the Government is only now preparing a green paper on migration policy, the precursor to a more formal white paper proposing draft legislation), debates over the past few years highlight trends and warning signs.

\textsuperscript{26} The term "bantustan" refers to any of the territories designated as tribal "homelands" for black South Africans during the Apartheid era. The term "bantustan" was first used in the late 1940s and was coined from Bantu (meaning "people" in the Bantu languages) and -stan (meaning "land of"), and was based on Hindustan. It later became a disparaging term used by critics of the Apartheid-era government's "homelands".
The current uproar over “illegal” migrants entering South Africa conflates a number of fairly distinct issues, and the growing xenophobia accompanying this debate further blurs the understanding of the stakes in the debate. Examining this situation through a focus on international norms, however, helps to unravel various themes. As in earlier times, the debate over migration concerns issues including citizenship and entitlements within a discourse of rights (either to be granted or denied).

At the heart of the rhetoric is the term “illegal” and despite the fact that South Africa is currently overturning Apartheid legislation, there is a curious silence about the definition of categories of migrants. The criteria of *legality* are another Apartheid legacy.

The Aliens Control Amendment Act of 1995 and the South African Citizenship Act of 1995, until the Immigration Bill replaced them, modified the Government's powers to deport illegal aliens and alter the rules of residency. Despite government claims, these new laws strengthen the state's powers and further limit the possibility of migrants gaining legal status. Furthermore, the administrative framework for implementing immigration policy – a system of regional committees appointed by the minister – remains fundamentally consistent with initial Union institutions. Thus, South Africa's

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current policy is a legacy, not simply of Apartheid, but of the interwar period.

As a general rule, immigration policy needs to adapt to the contemporary international and domestic context but it remains unclear how this should happen. Two themes have persisted throughout the 20th century in migration policy: refugees and human rights. Both are evident in contemporary South African debates.

The status of refugees is one area of policy that has shifted substantially since 1990. South Africa reached an agreement with the UNHCR in 1991 to supervise the repatriation of (anti-Apartheid) exiles. Then, after years of denying any obligations in particular to Mozambicans streaming across the border (caused by South Africa’s own destabilisation policies), South Africa reached a second accord with the UNHCR in 1993 granting Mozambicans refugee status. Converting them from illegal immigrants to refugees enabled displaced Mozambicans to claim international aid for the first time.

However, the extent of this new turn in policy is limited. This became clear when South Africa announced in July 1996 that it would no longer extend refugee status to Mozambicans after the 1st January 1997. In its defence, the Government claimed that the civil war had ended and migrants no longer could justifiably claim flight from persecution. Numerous difficulties with this position have been pointed out in the public debate. These include the persistent problem of
landmines that make a return to farming dangerous, if not lethal; the uncertainty of the current political settlement between RENAMO and FRELIMO\textsuperscript{28}; and the lease of land to South African corporations, which previously belonged to these refugees.

In response to the announced withdrawal of the right to international aid, refugees have already been marching in protest, demanding to remain in South Africa. Thus, international norms are transforming the debate, teaching “illegal” migrants about the existence of international rights and resources, placing unprecedented pressures on the South African Government to alter its policies. How this political situation will resolve itself is uncertain, but the terrain of debate has changed.

A second dimension of international pressure arises regionally, as members of the Southern African Development Community (SADC) call for a regional migration policy. So far the South African Government has resisted a liberal policy of a free-flow of populations in the region, but also has stopped short of resisting this as a longer term goal. Once again, the

\textsuperscript{28} RENAMO was established in 1976 by the Rhodesian security services, primarily to operate against anti-Rhodesian guerrillas based in Mozambique. South Africa subsequently developed RENAMO into an insurgent group opposing the Front for the Liberation of Mozambique (FRELIMO). Mozambique has a constitutional government headed by President Joaquim Chissano who was elected in the country's first multiparty elections in October 1994. The largest opposition party, RENAMO, made a strong showing in the elections, winning majorities in the country's five most populous provinces. President Chissano and the leadership of his party, the Front for the Liberation of Mozambique (FRELIMO), which has ruled the country since independence in 1975, control policymaking and implementation.
lines are blurred between refugees and economic migrants, keeping the domestic debate in South Africa hostage to rising xenophobia in a time of budgetary limitations and high unemployment. Yet, important domestic groups – notably the Council of South African Trade Unions (COSATU) – strongly support a co-ordinated regional plan to address questions of employment, development and migration. Thus migration policy is clearly linked to broader issues of regional integration and South Africa's economic hegemony.

The recent marches by refugees also highlight the other dimension of the new debate over migrants: human rights. For obvious reasons, the extent to which migrants themselves can actively organise is seriously constrained. Commentators have championed their cause by challenging the persistent denial of basic human rights – another legacy of Apartheid. With the adoption of a new Constitution and the creation of a human rights commission, South Africans finally have institutional recourse. One of the primary concerns is the treatment of illegal immigrants while in detention, and the general lack of transparency and appeal in processing immigrants.

In this debate over human rights, migrants are just one dimension of the new politics of constitutionalism, itself a product of new international norms reinforcing democracy.

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Some evidence has emerged to indicate a loosening notion of sovereignty. For example, many migrant labourers resident in South Africa in 1994 were allowed to vote in the first universal suffrage elections.

This is not an attempt to make strong claims about the overthrow of sovereignty and the traditional boundaries of the state in South Africa. Yet, the extent to which international norms are penetrating the domestic political process must be emphasised, both framing a new discourse of rights and offering new goals for mobilisation. South Africans are not yet embracing a post-national identity, but there are signs that the international processes moving in that direction in other states are having some effect in what has been an adamantly insulated and isolationist state for almost fifty years.

2.4.6 Implications for Policy Makers

This overview of South Africa's immigration policies in the 1920s and 1990s raises a number of theoretical questions. It highlights population pressures as part of the processes of “social construction” at the heart of a more sociological and less economistic approach to world politics. An analysis of migration sheds light on the agency side of these processes, in part by highlighting the role of actors, which are not formally organised (that is, migrants themselves). As 'agents', migrants

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30 For example, South Africa's policies are nowhere near as dramatically post-national as those analysed by Soysal, op. cit.
respond to opportunities and constraints created by international social structures, create pressures on states, and subvert state authority. These are just a sampling of the types of activities by which non-state actors construct and reconstruct state identities and interests.

This institutional approach also adds to the study of migration, particularly highlighting the need to understand international normative structures. Like many areas in international relations, migration analyses tend to be dominated by implicit, if not explicit, realistic assumptions. Alternatively, other disciplinary approaches tend to emphasise economic dimensions, such as changes in global production patterns and competitiveness (especially for understanding labour flows). To the extent that any of these approaches take a more social or cultural perspective, they tend to be micro-level studies of migrants' decision-making processes or local community relations. International relations theory has much to add to these analyses, including explicit attention to state theory.

The evolution of immigration policy has substantial implications for the Southern African region. South Africa is no longer insulated and isolated. It needs to develop new policies, which are sensitive to international normative constraints, as well as to the regional context. The expansion of a conceptual tool to improve the understanding of the brain drain phenomenon will support South Africa in the development of
more effective policies, which address and reconcile multiple economic, social and ethical demands.
3. The Definition of “Brain Drain”

When migration is discussed, it is often within the context of fears of masses of migrants overrunning a country. However, Adam Smith’s report on the legislation in Great Britain shows that not only immigration but also emigration has been the subject of public concern:

“Accordingly, by the 5th Geo. I. Chap. 27, the person who shall be convicted of enticing any artificer of, or in any of the manufacturers of Great Britain, to go into any foreign parts to practice or teach his trade, is liable for the first offence to be fined in any sum not exceeding one hundred pounds, and to three months’ imprisonment, and until the fine shall be paid; and for the second offence, to be fined in any sum at the discretion of the court, and to imprisonment for twelve months and until the fine shall be paid”

(Adam Smith, 1976, Book IV, p. 178)

Throughout the 18th and 19th century, emigration of skilled professionals, craftsmen, was seen as a loss for the country and punished accordingly. However, the question as to how far the emigration of skilled professionals constitutes a loss for the country of emigration has become one of the most heavily discussed in economics under the catchword “brain drain” in the 1960s and 1970s. The phenomenon that led to this highly controversial debate was initiated by the decision of students, mainly from developing countries, studying in developed
The Definition of “Brain Drain”

countries to stay in the host country after completion of their curricula. Against this background brain drain is often defined as the permanent emigration of highly skilled manpower from poor to rich countries and it implicitly assumes that the process is irreversible and that it induces a loss. Various authors have questioned this narrow definition of brain drain, especially because its use has been extended to a variety of phenomena, including the emigration of scientist from one developed country to another.

In contrast to the brain drain view of highly qualified migration, one could argue that the migration of highly qualified people is mutually beneficial. For this reason, migration among developed countries is viewed as a brain exchange rather than a brain drain and a brain gain (Findlay, 1993). The assumption is that the brain drain is only of a temporary nature and is reversed fairly soon. Skilled people, who migrate, do so in order to acquire new skills and knowledge that will be beneficial once their return to their home country.

The first question that needs to be answered is whether and under which conditions the brain drain really constitutes a problem for the home country.

The second question that needs to be answered is what measures are effective to compensate for the loss of welfare induced in the home country of the skilled resource.
Before we start to answer the questions above, it is necessary to analyse the often contradictory literature on the brain drain phenomenon and its links to both technological development and education.

3.1. Static Effects of the Brain Drain

Under the assumption that the brain drain phenomenon has an impact on the welfare function, we need to analyse the impact of the brain drain on income, unemployment and equality.

3.1.1 Impact on Income

Income effects of international factor movements can be subdivided into a factor endowment effect and a “terms of trade” effect.

3.1.1.1 Factor Endowment Effect

The direct income effect of the phenomenon due to an alteration of the factor endowment can be illustrated in a simple neoclassical one good and two factor model (the basic model). Grubel and Scott (1966) first analysed the effect of emigration on the welfare of those remaining the home country. Their conclusion was that a very small emigration left the welfare of the remaining population unaffected. Berry and Soligo (1969) argued that a sensible migration affected the
welfare of those remaining by altering the factor proportions and thus the per capita income. Clarke (1994), in contrast, argued that no such effect takes place if capital is internationally mobile and thereby equalizes the factor returns or if the capital labour ratio stays constant. This argument implies a perfect substitutability between labour and capital. Skilled labour has a higher capital value. Under international capital mobility there would be no monetary migration incentives and the decision to migrate would only be based on non-monetary motives. The income effect of migration would be compensated through flows of physical capital leaving the level of per capita income unaffected. Otherwise, the brain drain phenomenon would lead to a decrease of the economy-wide capital labour ratio and thereby causes the per capita income to decrease in the home country.

However, in order to draft a more realistic model the capital variable needs to be disaggregated into human capital and physical capital. Furthermore, human capital intensive and labour-intensive industries must be distinguished in order to be able to analyse migration within the Ricardo-Viner model, in which capital is taken as the mobile factor. Within this model the emigration of human capital decreases the returns in the capital-intensive sector and thereby induces capital movements into the labour-intensive sector. If the remuneration of human capital and physical capital is greater that that of labour, the brain drain leads to a decrease in the per capita return (Davies and Wooton, 1992). Under free trade
and international mobility of any factor, the return of each factor is exogenously determined and the brain drain has no welfare effects. However, if all three factors are needed in the production of both goods, the world market does not determine the factor returns and the emigration of skilled labour has a negative effect on those remaining in the home country.

The brain drain can decrease the per capita income through three different channels:

- If education is positively related to ability, the emigration is substituted by less able persons in the post-migration equilibrium thereby lowering the overall productivity and the output (Berry and Soligo, 1969);
- Highly skilled persons might constitute a bottleneck for certain kinds of development projects. In this case the output loss is magnified and may go along with thereby induced unemployment; and
- A magnification of the income loss also occurs if positive externalities from human capital exist (Bhagwati, 1976).

### 3.1.1.2 “Terms of Trade” Effect

The terms of trade are generally defined as the ratio of export to import prices a country faces in an open economy and, hence, positively related to the level of welfare.
Taking the technology within this theoretical framework as given, terms of trade can be influenced via migration through demand and supply effects (Dixit and Norman, 1993).

Assuming a Heckscher-Ohlin world, it is essential to distinguish among small and large countries. Small countries are unlikely to be able to influence terms of trade and the only effect of a brain drain is an alteration of the capital labour ratio and hence the per capita income. Large countries face an additional negative effect triggered by the brain drain, a deterioration of the terms of trade of the export good is labour intensive. Brain drain causes the production of the capital intensive good to decrease proportionally (Rybczynski effect) and consequently the export sector to expand. An increased supply of the export goods at the world market brings about a price decrease and thus a deterioration of the terms of trade.

We can conclude that a limited emigration has no effect on the welfare of a small country. However, this result needs to be revised if non-tradable goods are taken into account (Rivera-Batiz, 1982). In this case the price of the traded good is given from the work market but the price of the non-tradable good is determined endogenously and also depends on the factor endowment. The terms of trade are defined as the ratio of prices of tradable goods to non-tradable goods. Since the price of the tradable goods is exogenously determined, the terms of trade solely depend on the prices of the non-tradable goods. Alam (1982) argues that in developing countries, highly
skilled people primarily work within human capital-intensive sectors. The output of these sectors is non-tradable. Therefore, in developing countries, the brain drain causes the service sector to contract and its price to increase, which implies a worsening of the terms of trade.

An additional effect of the brain drain can be identified if a non-tradable good is produced under increasing returns to scale. As argued by Krugman (1991) increasing returns to scale in the use of labour can be caused by indivisibilities. Under these assumptions factor price equalisation might occur in the presence of free trade but real wages still differ because of differences in the price index stemming from varying output levels of the non-tradable good. The country whose non-tradable production is higher will have a lower price index and consequently higher real wages. Free factor mobility will completely depopulate the small country. Based on this model, it can be argued that non-tradable goods are human capital intensive and that the migration costs vary inversely with the educational level.

If only skilled people are mobile, every emigrant will harm the home country by causing a decrease in the per capita income. Furthermore, if the increase in foreign output does not outweigh the loss of domestic output, compensation becomes theoretically impossible.

Compensatory measures are therefore crucial to ensure the stability of the system. The United Nations have suggested
the application of compensatory measures for taxing flows of human capital (e.g. loan repayments, flat tax)\textsuperscript{31}.

\subsection{Inequality and Employment}

The relationship between brain drain and unemployment is linked to the process of rural to urban migration within the development process. The classical mechanism to generate unemployment within the brain drain literature is the application of the assumption of rigid wages. Bhagwati (1976) argues that highly qualified people in developing countries stick their wage level above the equilibrium wage rate to that of industrialised countries because they have adapted Western norms and values and thereby induce unemployment. Unemployment of qualified persons may furthermore be due to mismatching when the pace of economic development lags behind the pace of human capital formation.


\textsuperscript{31} “There are several alternatives for taxing flows of human capital: a) a requirement for loan repayment, where each student in tertiary education is given a loan that would have to be repaid if the student leaves the country; b) a flat tax, where overseas nationals pay a small fraction of their income, say 1 percent; c) the US model, where individuals are taxed on the basis of nationality, not residence. This would require negotiating bilateral tax treaties; d) the cooperative model, where a multilateral regime would allow automatic intergovernmental transfers of payroll taxes or income taxes paid by nationals of other countries.” Kapur (2001) and Bhagwati and Partington (1976) in UNHDDH Report 2001.
countries sets its wage rate according to the corresponding wage rate in developed countries and unskilled labour pegs its wage rate to that of skilled labour. This institutionally induced market failure leads to unemployment because of the resulting disequilibrium. If unemployed skilled labour leaves the country, two effects on employment arise:

- The reduction of skilled unemployment induces an increase of the expected skilled wage rate and thus makes education more attractive for unskilled labour. A new disequilibrium situation might be induced if the increased supply of newly skilled labour overcompensates the loss of skilled labour; and

- As domestic wages are linked to foreign wages, nominal wages of skilled and unskilled labour tend to increase and induce a positive effect on unemployment.

The possibility exists that the fall of the per capita income and the rise of unskilled unemployment is also accompanied by an increase in skilled unemployment.

Within this framework, if skilled labour crowds out unskilled labour in unskilled jobs, emigrated skilled labour that does not exceed the number of skilled labour in unskilled jobs induces an offset by unemployed unskilled labour and consequently leaves productivity unchanged. As a result, unskilled employment and per capita income may rise.
The brain drain might also have an impact on welfare through its influence on inequality. Gupta (1988 and 1991) argues that urban migration and overall unemployment might be increased through emigration. An increase in unemployment increases inequality measured by the Gini coefficient, if the unemployed people earn less than unskilled labour.

If the degree of inequality becomes socially undesirable, the introduction of wage subsidies or social security payments leads to an increased tax rate. Because of lacking institutional structures in developing countries, a further incentive to migrate is therefore created for taxpayers, usually well educated labour.

While the overall effect of brain drain is ambiguous, a substantial emigration will most certainly lead to higher unemployment and to lower per capita income.

3.1.3 Public Sector

On the expenditure side, if education is publicly subsidised, the brain drain induces a negative fiscal externality. If the economy-wide education is expanded in response to emigration, the governmental deficit increases (Bhagwati, 1976). This effect is accelerated if the newly educated people are less gifted.
On the revenues side, progressive income taxation combined with a positive correlation between education and income leads to a decline in the average tax rate, if highly qualified labour emigrates.

Under a static framework, in which the tax structure is constant, the \textit{brain drain} induces two effects:

- It reduces the volume of expenditure, if the budget is to be balanced. A reduction of public expenditures is particularly harmful to governmental sectors producing under decreasing average costs. A reduction of public subsidies for education leads to an increase in the private costs of education and thus to a decrease in private demand; and

- A government whose citizens are able to emigrate freely has generally less taxation power. If emigration shall be avoided and the level of publicly provided goods and services is to be maintained, less distribution can take place and the Government faces a trade-off between equality and income.

While the loss of skilled labour from developing countries toward developed countries is likely to continue in the foreseeable future, governments are challenged to find a solution to recover some of the resources they lose.

In order to seek compensation for the loss of skilled labourers, governments of developing countries are exploring
different options following the recommendation of the United Nations:

- Exit taxes for educated labourers leaving the home country could be collected through unilateral or bilateral mechanisms. The revenues from these taxes could be reinvested in education;
- Loan Grants could force educated labourers to stay until individual loans are fully repaid;
- Flat tax rates levied on all nationals who have left the country amounting to a small fraction of their income;
- The implementation of a tax system similar to the US system where individuals are taxed on the basis of nationality, not residence; and
- The development and implementation of a cooperative model, where a multilateral regime would allow automatic intergovernmental transfers of payroll taxes or income taxes paid by nationals of other countries.

3.2 Dynamic Development Effects of the Brain Drain Phenomenon

The dynamic analysis of the brain drain differs from the static analysis mainly because it takes into consideration also the process of capital accumulation.

The key assumption is that economic development is a basis for any sustainable social development.
Naqvi (1995) identifies a positive relation between the performances of the human development index and of income. Therefore, economic growth can be seen as a necessary precondition for development. The theory of economic growth serves as a theory of development because it identifies the determinants of the long-term income evolution. Under this theory we will be able to develop a broad approach toward the effect of the *brain drain* on development by focusing primarily on its impact on the technological progress. Technological progress – in the sense of moving forward toward better techniques than those initially available – enables the overall productivity and the per capita income to increase and implies that its content differs with respect to the stages of the development process. Therefore, the *brain drain* has a direct impact on the development process through its strong relation to economic growth.

In order to analyse these links, the required development theory has to fulfil two main requirements:

- It should be able to explain why some countries developed and others did not under the same external conditions; and
- It should allow the consistent incorporation of the development process of developed countries into this theory.

In order to fulfil the requirements above, the discussion will be based on Kuznets’ (1973) theory of development.
According to Kuznets, modern economic growth “may be defined as a long-term rise in capacity to supply increasingly diverse economic goods to its population, this growing capacity based on advancing technology and the institutional and ideological advancements that it demands”.

The importance of the development process is given by the fact that it triggers a self-sustaining growth process. Growth enables research activities that lead to inventions and innovations whose returns can be used for research. Kuznets derived six characteristics of modern economic growth:

- Gross domestic product per capita rises rapidly;
- The rise in productivity for all inputs is high;
- A transformation of an agriculturally oriented society toward a non agriculturally-oriented society takes place;
- The structure of a society and its ideology change rapidly;
- The propensity to reach out to the rest of the world; and
- The spread of growth is limited.

However, to fully understand the process of economic development, we need to consider both the links between the six characteristics above as well as the political and institutional factors (Conroy and Glasmeier, 1995; Olson,
1994). Following this technologically oriented approach, the degree of development can broadly be categorised by the degree of technological activity.

Mitch (1990) argues that human capabilities are decisive for development. Their development depends on the occupational composition of labour force, the degree of urbanisation and the distribution and organisation of power in a society. According to Easterlin (1981), education raises the extent to which the economy is able to adopt, exploit and develop new techniques. Therefore, a large scale emigration of educated people has a negative impact on development. However, if emigration takes place in response to unemployment, the phenomenon might be positive for development because it eases the labour market conditions and reduces the likelihood of falling into a poverty trap (Todaro, 1994).

Elaborating on the influence of education on development, Todaro (1994) concludes in line with the findings of Psacharopoulos (1985) that the return of education is inversely related to the level of development measured in per capita income as well as the level of education whether the latter effect results from an overproportional increase in the costs of education and an underproportional increase in productivity with the educational level. One can argue that the emigration of persons with tertiary education is less harmful in terms of decrease in production that the emigration of people
with secondary education. During the early stage of development it is most important to enlarge basic education enabling the use of basic technologies (World Bank, 1995) that coincides with the objectives of the South African Reconstruction and Development Program.

However, the relation between migration and development remains ambiguous. Kuznets (1973) argues that although technological change in the economic sense plays an important role, substantial development may require greater innovation in the political and economic structure. Abrams and Lewis (1995) conclude that economic and personal freedoms encourage growth significantly. Thus, the lack of a corresponding political environment will be an even greater obstacle for development. Fischer et al. (1995) review the results of fourteen case studies on the link between migration and development. They conclude that labour market effects are mixed, ranging from labour shortages to a substantial ease. Skill improvements due to the return of former emigrants seem to be limited. The Return of Qualified African National Program, run by the International Organization for Migration, has tried to encourage qualified nationals to return and helped them to reintegrate. It reintegrated 1,857 nationals across Africa in the period 1983-1999. Given the high level of brain drain from Africa, these efforts are unlikely to make any meaningful difference.
Taking the necessary institutional preconditions as given, a significant brain drain leads to a loss of managerial and innovative potential if there is no compensation by the skilled immigrants. The formation of technological capabilities is reduced if the stock of human capital is reduced and a country will find more difficult to compete in human capital-intensive products.

Understanding the link between education, economic growth and technological changes is crucial to measure the impact of the brain drain on a nation and to develop strategies to compensate for its potentially negative effects.
4 The Brain Drain in South Africa

Officially, South Africa consistently experienced net immigration gains from 1940 until 1994; temporarily interrupted by periods of political upheaval in 1960-61 (Sharpeville), 1977-1979 (Soweto), and 1986-1988 (the States of Emergency). Under the Apartheid regime, legal immigration was limited to whites only, primarily from Western Europe. This policy was not officially removed until 1994. However, this picture is misleading since official figures underestimate the extent and impact of emigration. The official net immigration losses over the last ten years fail to reveal the full extent of the loss. Indeed, post 1994 skilled immigration policy has become increasingly restrictive. Immigration is not viewed as public policy tool that could benefit South Africa but rather as a threat to South African jobs. The reasons for these narrowing visions of the legislator include, amongst others: the racially sullied immigration history of the country, the impact of nationalism and nation-building, a poor understanding of the relationship between skill and economic development, and growing xenophobia (Reitzes, 1995; Croucher, 1998; Crush 1998 and 1999).

4.1 Migration Policy

Despite the perceived high pressure of the loss of skilled labour force felt by both business and policy makers, immigration is not viewed as a public policy tool that could
benefit South Africa as a whole. Even the most skilled immigrants are perceived as a threat to South African interests. Surprisingly, the immigration policy has become more restrictive after the end of Apartheid, despite the objective set by the Reconstruction and Development Programme that put great emphasis on building skills for a new Post-Apartheid South Africa. Home Affairs Minister Buthelezi summarised this paradox in 2000:

“In South Africa, we need to acquire large numbers of skilled people to support our economic growth, for we are aware that only through economic growth will our country be able to provide a long-term solution to its severe social problems. However, the relocation to South Africa of skilled people on a temporary or permanent basis is often perceived as threatening scarcely available job opportunities for our nationals. Obviously, this might be true in the short term in respect of specific or even anecdotal situations. However, in a country such ours which is still on its way towards development, the macroeconomic impact of additional skills leads to greater employment generation and the broadening of the economic basis”

Until 1994 South Africa was officially a country with net immigration. However, the composition of the immigrants by geographical area has changed over time as shown in Table 2.
<table>
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<th>Period</th>
<th>Europe</th>
<th>Africa</th>
<th>Asia</th>
<th>Americas</th>
<th>Oceania</th>
<th>Total</th>
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<td>791</td>
<td>742</td>
<td>746</td>
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<td>1931-1935</td>
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<td>464</td>
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<td>1936-1940</td>
<td>30,896</td>
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<td>845</td>
<td>1,369</td>
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<td>1941-1945</td>
<td>5,422</td>
<td>928</td>
<td>417</td>
<td>328</td>
<td>198</td>
<td>7,293</td>
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<td>1946-1950</td>
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<td>1,386</td>
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<td>2,734</td>
<td>1,189</td>
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<td>157,087</td>
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<td>2,918</td>
<td>3,218</td>
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</tr>
<tr>
<td>1981-1985</td>
<td>98,191</td>
<td>58,603</td>
<td>3,136</td>
<td>2,837</td>
<td>1,278</td>
<td>164,045</td>
</tr>
<tr>
<td>1986-1990</td>
<td>28,189</td>
<td>13,946</td>
<td>4,730</td>
<td>2,422</td>
<td>554</td>
<td>49,841</td>
</tr>
<tr>
<td>1991-1995</td>
<td>18,999</td>
<td>8,474</td>
<td>12,462</td>
<td>1,890</td>
<td>498</td>
<td>42,323</td>
</tr>
<tr>
<td>Total</td>
<td>907,487</td>
<td>292,353</td>
<td>39,456</td>
<td>27,244</td>
<td>16,839</td>
<td>1,283,379</td>
</tr>
</tbody>
</table>
In absolute numbers immigration from Europe has experienced the strongest decrease. However, if we look at the available data in more detail and focus on the number of skilled immigrants and emigrants the net flows appear to be almost negligible in the context of the overall migration phenomenon.
Figure 3: Flow of skilled immigrants and emigrants

In absolute terms the net number of immigrants is continuously decreasing, despite the almost negligible number in the context of the overall migration phenomenon, raising questions about the selection criteria applied by the Department of Home Affairs in selecting and approving the entry of new immigrants.

4.2 Post-Apartheid Immigration Policy

The key reason why immigration has been consistently outstripped by emigration is that immigration policies have become increasingly restrictive. The new post-Apartheid restrictionist attitude toward immigration has affected migration flow in two major ways:

- The number of people allowed to legally immigrate into South Africa has fallen consistently since 1994. Ironically South Africa’s skill basis has been augmented by undocumented immigration and official corruption (Human Rights Watch, 1998)

- The new restrictionism has also affected temporary skills import. Official figures indicated that the number of temporary work permits issued to foreign temporary residents increased during the 1990s but has fallen consistently since 1996.
<table>
<thead>
<tr>
<th>Year</th>
<th>Europe</th>
<th>Africa</th>
<th>Asia</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>7,560</td>
<td>1,628</td>
<td>2,837</td>
<td>2,474</td>
<td>14,499</td>
</tr>
<tr>
<td>1991</td>
<td>5,767</td>
<td>2,065</td>
<td>3,650</td>
<td>897</td>
<td>12,379</td>
</tr>
<tr>
<td>1992</td>
<td>3,869</td>
<td>1,266</td>
<td>3,005</td>
<td>546</td>
<td>8,686</td>
</tr>
<tr>
<td>1993</td>
<td>4,541</td>
<td>1,701</td>
<td>3,165</td>
<td>417</td>
<td>9,824</td>
</tr>
<tr>
<td>1994</td>
<td>2,784</td>
<td>1,628</td>
<td>1,645</td>
<td>342</td>
<td>6,399</td>
</tr>
<tr>
<td>1995</td>
<td>2,272</td>
<td>1,343</td>
<td>1,063</td>
<td>386</td>
<td>5,064</td>
</tr>
<tr>
<td>1996</td>
<td>2,315</td>
<td>1,601</td>
<td>1,137</td>
<td>454</td>
<td>5,507</td>
</tr>
<tr>
<td>1997</td>
<td>1,630</td>
<td>1,281</td>
<td>1,148</td>
<td>473</td>
<td>4,532</td>
</tr>
<tr>
<td>1998</td>
<td>1,614</td>
<td>1,169</td>
<td>1,207</td>
<td>381</td>
<td>4,371</td>
</tr>
<tr>
<td>1999</td>
<td>1,213</td>
<td>1,504</td>
<td>693</td>
<td>259</td>
<td>3,669</td>
</tr>
<tr>
<td>2000</td>
<td>978</td>
<td>831</td>
<td>991</td>
<td>253</td>
<td>3,053</td>
</tr>
<tr>
<td>2001</td>
<td>1,714</td>
<td>1,419</td>
<td>1,289</td>
<td>410</td>
<td>4,832</td>
</tr>
<tr>
<td>Total</td>
<td>36,257</td>
<td>17,436</td>
<td>21,830</td>
<td>7,292</td>
<td>82,815</td>
</tr>
</tbody>
</table>

Table 3: Immigration to South Africa by Source Region, 1990-1998

The number of work permit renewals and approvals by the Department of Home Affairs also supports the conclusion on the trend identified above. After a consistent rise until 1996, the number has rapidly decreased thereafter and no trend inversion is identifiable, despite the reported increase in 2001, which coincided with a peak in request for legalisation of immigration after arrival in South Africa.

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### Table 4: Temporary Residence Permits, 1990-1998

<table>
<thead>
<tr>
<th>Year</th>
<th>New</th>
<th>Renewals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>7,657</td>
<td>30,915</td>
<td>38,572</td>
</tr>
<tr>
<td>1991</td>
<td>4,117</td>
<td>32,763</td>
<td>36,880</td>
</tr>
<tr>
<td>1992</td>
<td>5,581</td>
<td>33,318</td>
<td>38,899</td>
</tr>
<tr>
<td>1993</td>
<td>5,714</td>
<td>30,810</td>
<td>36,524</td>
</tr>
<tr>
<td>1994</td>
<td>8,714</td>
<td>29,352</td>
<td>38,066</td>
</tr>
<tr>
<td>1995</td>
<td>11,053</td>
<td>32,838</td>
<td>43,891</td>
</tr>
<tr>
<td>1996</td>
<td>19,498</td>
<td>33,206</td>
<td>52,704</td>
</tr>
<tr>
<td>1997</td>
<td>11,361</td>
<td>17,129</td>
<td>28,490</td>
</tr>
<tr>
<td>1998</td>
<td>11,361</td>
<td>17,129</td>
<td>28,490</td>
</tr>
<tr>
<td>Total</td>
<td>85,056</td>
<td>257,460</td>
<td>342,516</td>
</tr>
</tbody>
</table>

In order to understand the inversion of the immigration trend, the White Paper on immigration needs to be analysed in more detail.

### 4.3 White Paper on International Migration

The White Paper on International Migration is the result of a political and historical process initiated with the drafting of a Green Paper and terminated with the issuance of the Immigration Bill (2000), which should have reflected the ideas embedded in the Green and in the White Paper.

#### 4.3.1 Historical Context

South Africa has recently moved away from a history of isolation. In this process, it has joined countries in Eastern Europe, South America and East Asia in leaving behind an

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existence sheltered from the growing pressures of globalisation, in particular the movement of capital, technology, information and population. Since 1990, and particularly since 1994, South Africa has faced increased tourist traffic, refugee flows, heightened business immigration interests and an increase especially in illegal immigration. These are the features of globalisation in the late 20th century, which most of the countries in the world have difficulties in managing and regulating.

The historical legacy of Apartheid made South Africa unable to quickly grasp and cope with the consequences of globalisation. Therefore, South Africa has been relatively slow in developing policy responses to immigration and international migration. Although some improvements were made to the Aliens Control Act, 1991, immigration policies are strongly rooted in the past. The current challenge for South Africa is to formulate a policy that takes advantage of the positive aspects of globalisation, including the unprecedented movement of people with skills, expertise, resources, entrepreneurship and capital, which will support the country’s efforts at reconstruction, development and nation-building.

The proposed White Paper substantially accepted the spirit of the Green Paper, which is to strike a balance between liberalisation of the immigration policy and necessary government regulation in the interests of domestic communities. It seeks, therefore, to facilitate the immigration of
people who add value to South African society while keeping out those that do not. The people who can add value to South Africa’s growth and development are those who invest, are entrepreneurs and promote trade, those who bring new knowledge and experience to the society, and those who have the skills and expertise required to perform the activities that locals cannot properly do at this stage.

At the same time, the history of South Africa has been disadvantageous to sections of the population, excluding them from participation in the skills and educational market. As a consequence, there must be affirmative action in immigration, in the sense of compelling all employers to search for suitably qualified South Africans first and to invest in their training and development. There is also a hierarchy of interests to be considered. The primary obligation is to serve local people first; the people of the region and the member states of the Southern African Development Community (SADC) second; the people of Africa third; and the rest of the world last.

4.3.2 Background on Policy Drafting

On May 13, 1997, the Department of Home Affairs published a draft Green Paper on international migration in the Government Gazette for general information and comment from interested parties. The Department of Home Affairs received comments from 52 individuals and organisations. The Minister of Home Affairs appointed a Task Team to consider
The Brain Drain in South Africa

the comments and draft a White Paper. The Task Team was chaired by the Director General of the Department of Home Affairs, Mr A S Mokoena and consisted of Mr D Chetty (NEDLAC), Dr W James (IDASA), Mr D Lewis (NEDLAC), Mrs NW Madikizela-Mandela, MP (ANC), Dr PM Matlou (Home Affairs), Adv. PK O’Malley, MP (IFP), Dr MGR Oriani-Ambrosini (Ministerial Advisor), Mr C Schravesande (Home Affairs), Mr M Tlhomelang (Home Affairs), Mr AF Tredoux (Home Affairs), and Dr SH Buthelezi (ANC).

During its first meeting in May 1998 the Task Team was briefed by its Chairperson, on behalf of the Minister of Home Affairs, on its parameters and terms of reference. *Inter alia,* such parameters and terms of reference included that the Task Team would not be bound by the findings, recommendations and policies set forth in the Green Paper, which could be taken forward, reconsidered or altered on the basis of the comments received or additional different findings made, or opinions reached, by the Task Team. The Task Team did not deal with the issue of refugees, which was addressed through another policy formulation exercise leading to a separate White Paper and Bill; the White Paper should be inspired by practical considerations rather than by theory alone and should serve as a guideline capable of being immediately translated into the required legislation, if any, and transformed into administrative practices supported by the relevant structures and operating within existing budgetary
and logical constraints, including the scarcity of human resources.

Policy formulation is a process conducted by reconciling the following two conflicting considerations. On the one hand, policy formulation is a fluid process, which must respond to the needs and circumstances of the present which, when they change, determine the change of policies. Therefore, they should not be the product of speculation on what may happen in the future under ideal circumstances.

On the other hand, policies should ensure that any structure of government or legislation set in place in their pursuance are sufficiently durable and long-term in nature to justify the financial and administrative cost of establishing, maintaining and implementing such structures or legislation. Consideration was also given to the policy guidelines submitted by the Cabinet to the Task Team, which drafted the Green Paper.

Following on the Green Paper’s recommendation that a distinction be drawn between refugee protection, regarded as a human rights issue, and immigration, which is the effort to regulate population movement, a separate White Paper on Refugee Protection was published in May 1998 and legislation based thereon was presented to the Parliament in November 1998 and adopted in December 1998.

In considering its work, the Task Team addressed the preliminary question of the existing relevant policy framework
relating to migration within the broader set of policies adopted by the Government of National Unity (“GNU”). It was noted in the Green Paper that the policy framework provided for the GNU by the Reconstruction and Development Programme does not give precise guidance on how to formulate migration policies.

Indirect guidance could be found in other policy frameworks developed by the GNU, such as its macro-economic plan and the *Growth, Employment and Redistribution* (“GEAR”) strategy (1996) developed to implement it. However, the input of this policy instrument on the specific issue of migration is not unequivocal. For instance, one could argue that the objectives of GEAR could be best achieved by the maximum possible limitation on the entry of any migrant other than tourists and business people, so as to reduce the number of people to whom government needs to supply services and for whom the economy needs to provide. Conversely, one could also argue that the GEAR strategy calls for a policy of relaxation of border controls to induce a relocation of people to South Africa who have the skills or the capacity of making a contribution towards the country’s economic growth. However, there are some firm elements associated with the macroeconomic policy which have a bearing on migration policy: South Africa should attract foreign investments, especially as fixed capital investments or employment producing enterprises; assist the tourist industry, in respect of which South Africa has a competitive advantage; facilitate international trade and commerce; recognise the
informal sector and allow some controlled cross border movement of traders who benefit it; and attract foreign skills and entrepreneurial energies.

Moreover, in their respective policy-making exercises some of the other Government’s departments have received the benefits of the guidance of policies entrenched in the South African Constitution. However, in respect of migration, the Constitution does not spell out any precise duty or mandatory policies but operates as an outer limit on how government may pursue its chosen policy. For instance, the Constitution would not have a bearing on the policy decisions of how many temporary or permanent aliens are to be allowed into the country and the criteria for their selection or qualifications, but it prescribes that once such aliens, however chosen, are in South Africa they must receive certain protections by the law.

Furthermore, whilst one acknowledges that the transformation of South Africa from Apartheid to democracy is the event with the greatest significance on any process of policy formulation conducted in the past five years, the Task Team could not determine the importance or impact of this event on the shaping of the new migration policies. In abstract, the migration policies of the old South Africa could work for the new one once the existing legislation fully complies with the Constitution and the administrative practices developed under it do not unfairly discriminate against certain aliens on the basis of origin, ethnicity or religion.
Population control policy also affects migration policy. Countries with an insufficient population basis, such as Canada and New Zealand, have adjusted their respective immigration restrictions to attract additional permanent residents, while those with excessive population will discourage additional permanent settlements. In its policies, the Department of Welfare has acknowledged that “our present population and its projected growth at the present growth rate are such that one can consider that the country’s available resources cannot support the South African population”. The Department of Welfare has stopped short of developing a population control policy. Legal and illegal immigration are already a cause of population growth, and one should assume that the current migration policy should reflect the notion that further population growth through migration is not desirable.

Finally, insufficient guidance could be found for the formulation of migration policies from any other of the government’s major policies, such as those striving for the transformation of the state, affirmative action, the redressing of present social and economic imbalances and past social injustices or the so-called black empowerment initiatives.

Therefore, in the absence of a pre-existing framework for policy formulation, the Task Team had to face the challenge of determining its own framework.
4.3.3 Assumptions about Migration in the White Paper

The White Paper on International Migration is underpinned by a series of assumptions based on an outdated Malthusian view of “carrying capacity”\textsuperscript{36}. The number of people a nation can accommodate should be determined by a simple relation between population and available resources, but should also take into account a number of other variables such as the structure of the economy, the level of economic development, the skill base, and so on.

Arguing that “illegal immigrants” have flooded South Africa since 1994 justified the general control of immigration as the highest priority of the White Paper\textsuperscript{37}. The White Paper assumes that the primary means of unauthorised access to South Africa is clandestine border crossing but given the length of South Africa’s borders no effective action can be taken to stop illegal immigrants from entering into the country by implementing a more efficient border control. Following this line of reasoning and combined with the high domestic unemployment rate, migrants from other countries are considered the prime cause of unemployment, although other

\textsuperscript{36} The document claims that South Africa has reached its carrying capacity and therefore cannot accommodate an additional significant population increase.

\textsuperscript{37} The White Paper assumes that South Africa has approximately 5 million illegal immigrants. While this figure cannot be substantiated and other research suggest that this figure is an exaggeration, the policy makers have not questioned this figure.
research shows that they often create new domestic jobs (Rogerson, 1997; Crush and Peberdy, 1998).

Furthermore, the recommendations on which the White Paper was based are the outcome of an oversimplified view of a push-pull model of migration. The policy makers assert that South Africa cannot affect push factors and therefore must take action on pull factors. These assumptions are not correct since South Africa can, because of its trade imbalance, influence the policies of the SADC region from which the highest number of immigrants originate.

The dichotomist emphasis put on skilled and unskilled immigrants might also trigger a brain drain in the SADC region by depriving them from the most skilled resources. The possibility that this region might be targeted by the recruitment of skilled professionals is underlined by the hierarchy of immigration defined in the White Paper: “Our obligations are to serve our people first, the people of the region and the member States of the Southern African Development Community second; the people of Africa third; and the rest of the world last” (Section 4, para 4, p. 9).

4.3.4 Brain Train and Brain Gain

Another aspect, which may impact on the development of a migration policy, is the unfortunate consideration pointed out already in the Green Paper that South Africa is losing a number of qualified people because of emigration. A migration
policy should try to compensate the *brain drain* with *brain gain* and *brain train*. *Brain train*, i.e. the development of local resources by continuous education and training, can be achieved by requiring that foreign investors who seek permission to reside in South Africa commit themselves to train a certain number of local people. ‘Brain-gain’ could be promoted by creating a special class of permanent or temporary permits, as it exists in countries such as the United States and the United Kingdom. These permits would be available for people of exceptional skills or with extraordinary qualifications. The Department of Home Affairs would issue regulations to determine applicable flexible criteria, and each application would be reviewed individually on its merits.

Another alternative type of work permit would be for working vacations, which could be pegged at a certain age limit. This permit might accommodate the needs of the tourism and hospitality industry where foreigners enjoy the assistance of compatriots and might cater for *au pair* domestic employment. These permits would not require labour certification or payment into the national training fund, but would require proof of available financial resources on the side of the employee, including any payment received while in South Africa. This permit should be beneficial to the domestic tourism industry, usually because young working visitors come back as adults, possibly with their families.
4.3.5 From the White Paper to the Immigration Bill

The general intent of any Bill should be to give effect to the policies laid out, and accepted by Government, in a policy White Paper. For this reason there should be consistency in the content of the principles of the White Paper and the immigration legislation that emanates from it. However, in the South African Immigration Bill some key elements of the White Paper have been ignored while other elements not mentioned in the White Paper have been added. This was particularly critical because the public process of revising the Bill was different than that chosen to revise the White Paper.

The rationale of the new Bill includes the common objective of using immigration to enrich the country economically and culturally while protecting jobs and the future of citizenship by creating a clear segregation between locals and foreigners in terms that suggests that the attempt to “prevent and deter xenophobia” has not been successful.

The concept of the “immigration hierarchy” spelled out in the White Paper has been completely ignored in the Immigration Bill.

The White Paper makes several references to the “need” of the mines and farms to employ non-South African labour and that policy should accommodate this need, while simultaneously seeking to encourage them to reduce their foreign-labour dependence (Section 4.4.6). The Bill (section
18(5)) went even a step further and made an astonishing concession to the mining industry that has no backing within the White Paper or by South African trade unions. The clause potentially exempts specific employers from all the provisions of the corporate permits scheme proposed for all other employers, entrenches the bilateral mechanism and permits compulsory deferred pay strongly opposed by various bodies involved in the consultation of the White Paper. Even under the Bill the mining industry maintains a special status vis-à-vis all other industries. This special status has also a severe impact on the training programmes. Since the mines also have training programmes for South Africans, it appears that they will also be exempted from paying a proportion of their foreign employees’ salaries into a national training fund (Section 12(4) and 16(5)). The Bill does not appear to carry any incentives for the employment of South Africans over foreign workers on the mines.

The sections on citizenship and illegal immigration have been strengthened in the Bill, which is in line with the objective of containing immigration. These restrictions also apply to skilled and highly qualified immigrants or to investors. The conditions under which these categories might apply for a permanent residency are very arbitrary and question the idea of equality of treatment and fairness embedded in the South African Constitution to the point that some researchers have questioned the legality of this document.
4.4 Conclusion on the Migration Policies

The White Paper on International Migration and the Immigration Bill set the policy framework for the immigration and emigration of unskilled and skilled labourers. In particular, the White Paper recognises that there is a need to attract qualified people in South Africa to “offset the brain drain and promote economic growth “ (Section 7(8)). While there is a clear benefit in recognising such a need, the assumption and motivation for doing so, i.e. replacing South Africans leaving the country, has been politically exaggerated. Furthermore, when it comes to the implementation of such objectives, the White Paper proposes a simplification of the immigration procedures based on skills. The simplification of the immigration procedures is not fully translated into the Immigration Bill.

However, neither the White Paper nor the Immigration Bill manage to adequately address the potentially conflicting needs and priorities of labour and business when it comes to determining the number and type of immigrants who are to be encouraged or allowed into South Africa. Section 6 (para 4.4.2) of the White Paper acknowledges that “the development of a migration system is closely interrelated to the management and regulation of labour dynamics and requires an interface with labour institutions”. The precise operation of such an interface is not defined and it appears that the
interests of employers may be served to the detriment of labour interest.

Furthermore, both the White Paper and the Immigration Bill fail to define the mechanisms by which skilled immigrants are to be selected and admitted. The White Paper does not reconcile market- and state-driven immigration management strategies and leaves considerable uncertainty over how skilled immigration will operate in practice. While the reliance of the mining and commercial agriculture sectors on foreign labour is accepted and endorsed, the question of admitting foreign labour is left to a combination of “the invisible hand of economic fundamentals” and “negotiation among social partners” (section 6, para 4.4.5 and para 4.4.7).

The White Paper and the Immigration Bill are mostly silent on the issue of gender and labour other than for manufacturing, mining and commercial purposes. Sections 41 and 42 put the burden of due diligence in the immigration process on both employers and learning institutions.
5 Educational Policies

The Reconstruction and Development programme provides the framework of the national development programme and of all subsequent initiatives aimed at developing the nation.

“Our people, with their aspirations and collective determination, are our most important resources. The Reconstruction and Development Programme (RDP) is focused on our people’s most immediate needs, and it relies, in turn, on their energies to drive the process of meeting these needs. Development is not about the delivery of goods to a passive citizenry. It is about active involvement and growing empowerment.”

(Reconstruction and Development Programme, 1994)

Development of skilled resources is considered a key priority in post-Apartheid South Africa. However, the lack of resources has strongly influenced the priorities of the Government and the allocation of resources. Primary education has started to receive an increasingly larger share of funding while tertiary education has suffered from proportional reductions.

5.1 Education and Economic Growth

The importance of education for technological change and productivity is at once obvious and opaque. Profound questions and disagreements surround this crucial topic. How
much education is needed, who should get it, who should deliver it, how should its delivery be organised, who should pay, who will benefit, and how is education related to other types of economic and social policy?

In the past, it has been difficult to answer these questions because analysts have had trouble explaining why and how education is related to growth and competitiveness. Does education promote productivity and growth because it prepares a technical and intellectual elite or does it strengthen the economy by reducing fertility and improving health? Some analysts in the U.S. and in Japan (Kazushi, 1956) argued that education promoted growth in a capitalist economy by creating a docile and obedient workforce.

But the last decade has seen new progress in theoretical and empirical work on education and growth. One of the fundamental conclusions of that research is that the relationship between education and growth cannot be understood in the abstract. Education is not something that can be tacked onto the society and economy regardless of the surrounding conditions. Different conditions require different educational strategies. This insight, as simple as it may seem, has had profound implications for educational strategies in both industrialised and developing countries. In developing countries, it has exposed the folly of educational systems copied from the U.S. or Europe. In developed countries it has suggested that an education system, that was appropriate for
the post-World War II economy, may no longer be adequate for current economic, political, and technological conditions. In the U.S., the problem is not that schools have deteriorated, as many politicians have argued, but rather that the economy has changed, leaving the schools behind.

New thinking about education and growth in economics suggests that technological and economic conditions may themselves influence the acquisitions of skills and the accumulation of human capital\(^{38}\). Thus policy makers cannot simply think of education as a tool, which they can use to promote growth. Rather trade and commercial policy can influence human capital accumulation, which can in turn influence growth and productivity. This line of thinking suggests that free trade, which most economists in the developed world believe would benefit developing countries, may, in some cases, slow the accumulation of knowledge and human capital in less developed countries.

5.2 Economic Theory, Growth and Education

The promotion of education and training has been a staple of economic development policy for decades. The importance of education to growth and education in the developed world has also long been recognised. Historians argue that early public education in the U.S. helped launch an era of U.S. economic hegemony. In 1983, the profoundly influential

\(^{38}\) Human capital is endogenous in some of these models.
publication “A Nation at Risk” (U.S. Commission on Excellence in Education, 1983) blamed rising trade deficits and stagnant standards of living on a deteriorating U.S. education system. Seven years later, the Commission on Skills in the American Workforce (1990) argued that the country had a "choice" between two future paths. One involved high levels of education, high skills, and rising standards of living, while the other was based on low wages and low skills, and would lead to increasing inequality and a deterioration of the average standard of living. Business people and educators argued that the German and Japanese success in export markets was due to their apparently superior education systems.

Empirical evidence developed over many years has confirmed the importance of both education and technology to economic growth (see Mowery and Rosenberg, 1989; Denison, 1985; Benhabib and Spiegel, 1992; Mankiw, Romer and Weil, 1992). Several studies have shown that individual earnings rise with education. On a cross-country basis, a one-year increase in schooling leads to an increase in wages by between 5 to 25 percent, after allowing for other factors (World Bank, 1991).

The fundamental question whether and how education promotes growth and development has produced Most analysts agree that increases in health, nutrition and higher labour force participation rates are important reasons why education fosters economic development. In 1890 Alfred
Marshall wrote that "health, strength, physical, mental and moral [...] are the basis of industrial wealth." But these notions have not been explicitly incorporated into economic theories of growth. For many years, developing countries emphasised the need to train a technological and scientific elite. More recently, many analysts have argued that skill and educational deficiencies among lower level workers directly involved with production and agriculture have been a fundamental block to economic development. Which educational policy is most efficient will clearly depend on the underlying reasons why education promotes growth and on the mechanisms and processes through which education is translated into development and increased productivity. For most of the period since World War II, economic thinking about growth has been based on what has been referred to as the neoclassical benchmark model, which was developed by Solow (1956, 1957). This model assumed that all capital and labour were homogeneous, thus eliminating any consideration of differences in the quality of labour (and capital) that might arise from education, technology, or other factors. In this model, only population growth (which was considered exogenous) and the accumulation of physical capital (which resulted from savings) influenced income levels. In the absence of constant, exogenous technological change, the model implied that the per capita growth rate of national income must approach zero in the long run. The policy implications of this model flowed directly from its basic
assumptions - in order to raise per capita income, keep population growth to a minimum and raise the savings rate, which would raise the per capita rate of capital accumulation. However, education was not mentioned anywhere.

Thus the model was inadequate to analyse the effects of education. The assumption of homogenous labour excluded any consideration of differential effects of education on labour, and while many analysts believed that education might promote technological innovation, this model assumed that such innovation was exogenous - its causes were not under consideration in the model.

Moreover, the earliest empirical tests of the Solow model, so-called growth accounting exercises (Solow, 1957; Abramowitz, 1956; Denison, 1961), suggested that most of the growth in output could not be explained by population growth and the accumulation of capital. Abramowitz labelled the unexplained "residual" responsible for most of the growth in output "The Economists Index of Ignorance"39.

Discouraged by the simplistic policy implications and the weak empirical support, analysts turned their attention to exploring the components of the Solow Residual to explain economic growth. Early attempts by Solow (1960), Kaldor and Mirrlees (1962) and many others sought to make the model more sophisticated by dropping the assumption of homogeneous capital. They recognised that at any moment,

39 The term was later renamed into the "Solow Residual".
capital included both new and old vintages of equipment and that newer equipment embodied more advanced technology. These so-called vintage capital models enjoyed a period of popularity but the ultimately more successful theoretical extensions of the Solow model were based on dropping the assumption of homogeneous labour.

These investigations, which examined the determinants and importance of human capital investment, were initiated by Schultz (1960) and led to a rich literature on human capital and on-the-job training (Becker, 1964; Mincer, 1974; and Schultz, 1961). By accounting for differences in human capital, economists were then able to account for a much larger share of economic growth.

But the growth accounting exercises were in effect empirical findings without an underlying theoretical explanation. More education was associated with more growth, but the relationship was still not clear. Furthermore, there was no consideration of the causes of human capital accumulation - no model took such accumulation as endogenous. Surprisingly, despite the consensus about the importance of education, education and endogenous human capital accumulation were not included into formal models until the 1980s. Findlay and Kierzkowski (1983) presented the first model, which specifically included endogenous skill accumulation, and documented the importance of the stock of human capital in determining competitiveness, comparative
advantage, and the pattern of trade. Subsequently, Romer (1986) developed a growth model that explicitly included human capital although in this case human capital was exogenous. Nonetheless, it remained unclear how, and which kind of human capital contributed to economic growth.

The following years saw mounting empirical and theoretical evidence of the importance of technological change and human capital in competitiveness and growth. By the mid to late 1980s studies showed that the level of education (Mankiw, Romer and Weil, 1992), the size of the educated workforce (Romer, 1986, 1989, 1990), the number of patents issued (Grossman and Helpman, 1991; Judd, 1985), and the size of privately and publicly funded research expenditures in the private and public sector influence not only a country's growth of income, but also its pattern and volume of trade. The approaches of the theoretical literature to explain exactly how human capital contributes to economic growth may be grouped into three rough categories, which are described below.

### 5.2.1 Education as a Separate Factor of Production

Romer (1986), Lucas (1988) and others suggested that human capital, just like physical capital, can be viewed as a production input which can be accumulated.

However, no explicit relation between human and physical capital and technological change was specified. In fact, in this
analysis, human capital represented the effective, or average, technological knowledge of an economy, which could be accumulated in a separate education sector, without implied relation to the current standard of technology. The policy implications were that the competitiveness and growth rate of a country are closely tied to the share of its people receiving education and, most importantly, the level of educational attainment.

The primary contribution of this line of research was that for the first time, allusions to the important external effects of private human capital accumulation were included into formal models. Society as a whole benefits more than the individual from that individual's education, thus left to their own choices, individuals would invest in less education than was socially optimal. This created a justification for public policy to "internalise" the externality, by subsidising human capital accumulation. Internalising the externality was really just an elegant statement of the conventional public goods justifications for public funding of education in capitalist economies (Friedman, 1962). Moreover, since the human capital in these models was included in a highly aggregated form, they were unable to generate insights concerning relative investments in primary, secondary, or tertiary education; how this education should relate to the rate of technological change; or the appropriate government role in subsidising on-the-job training.
5.2.2 “Learning by Doing”

Another avenue explored by the theoretical literature based its analysis of human capital on learning by doing. Once again, labour was assumed to be homogeneous, but serendipitous productivity increases were generated as higher volume of output caused production workers to move down the learning curve. Young (1991, 1993); Lucas (1988); Boldrin and Scheinkman (1988); and Stokey (1988), all showed that learning by doing exhibits crucial scale and spillover effects. The benefits of learning by doing were seen to be twofold:

- The first benefit was the traditional notion (Arrow, 1962) that the more volume of a particular good produced, the further labour moved down the learning curve, and the greater the improvement in efficiency and productivity;

- The more volume of a particular product produced, the more skill useful for the related technology was obtained, making it easier to learn about new, relatively similar, production processes.

Increased output therefore led to lower unit costs (although unit costs fell at a decreasing rate), and to important knowledge spillovers, which facilitated the adoption of new technology. Competitiveness and the pattern of trade are then determined by the size of the market - the volume of output in a specific sector - and by the knowledge content of the sector.
in which learning occurs, leading to important implications for public and commercial policy. While learning by doing emphasizes the educational benefits of particular types of production, research also suggests that prior education also influences the effectiveness of learning by doing. Analyses of the relationship between education, training, and earnings show that schooling and learning on the job are complementary. Thus learning by doing will be more effective if it is built on at least a minimal foundation of schooling.

5.2.3 The Interaction of Technology, Human Capital, and Economic Conditions

The third class of models, rather than viewing education as a simple input into the production process, is based on the idea that the invention and adoption of new technology, the accumulation of human capital, and economic conditions are all interdependent - they are endogenous to the model (Nelson and Phelps, 1966; Romer, 1990; Grossman and Helpman, 1991; Eicher, 1993).

One hypothesis explaining the empirically observed interaction between technological change and human capital (see, for example, Bartel and Lichtenberg, 1987; Davis and Haltiwanger, 1991; Mincer, 1991) was first proposed by Nelson and Phelps (1966). Specifically, skilled workers are assumed to possess a "comparative advantage" with respect to inventing and adapting new technologies. Nelson and
Phelps (1966) suggested that the introduction of a new technology radically transforms the production environment. Skilled workers differ from unskilled in their ability to function in this new environment, since skills enhance the ability to handle new demands created by the new technologies. Nelson and Phelps proceed to rank jobs according to the degree to which they require adaptation to change from unskilled - highly routinised - to highly skilled - involving the necessity "to learn to follow and to understand new technological developments".

One implication of this reasoning is that if the technology in a job changes, the quality of skills required must also change. This implies that the first class of models discussed above, which allows for human capital accumulation independent of technological change, is incomplete. The interaction between human capital accumulation and technological change also relates to the distinction between the determinants of the adoption of existing technologies versus the creation of new technologies. The models based on “learning by doing” focus on the cost of adopting a new technique and production process, while the third group of models recognises explicitly that skilled workers also invent the new technologies, which can subsequently be absorbed into production. This distinction between adoption and innovation turns out to be crucial in the discussion of policy implications of the various models.
The proposition that education promotes both adoption and creation of new technology has strong empirical support. Benhabib and Spiegel (1992) show that human capital explains economic growth better when modelled to facilitate the adoption of new technologies, as opposed to being just another input into the production function. Other empirical work by Bartel and Lichtenberg (1987), Mincer (1989, 1991), Davis and Haltiwanger (1991), Juhn, Murphy and Pierce (1993), Berman, Bound and Griliches (1993), and Bound and Johnson (1992) has shown a large degree of complementarity and reciprocity between technological change and human capital. These studies find that a higher rate of technological innovation and adoption increases the demand of skilled relative to unskilled labour.

The new growth models point out another reason why education should be considered endogenous. Schooling itself is also influenced by the current level of technology and quality of skilled labour in teaching.

These interactions between human capital and technological change can be summarised by the following four critical allocation decisions:

- What share of the population should obtain which skills; and
- How much existing human capital and of what quality should be allocated to education;
Educational Policies

How much existing human capital and of what quality should be allocated to the invention of new technologies; and

How much existing human capital and of what quality should be allocated to the absorption of innovations.

This third class of models implies that the decisions about how much and what type of human capital to accumulate and what resources should be devoted to invention and to absorption cannot be considered independently.

5.3 Policy Implications of the Relationship between Education and Growth

Three classes of recent models of the relationship between education and growth were reviewed. The first treats education as a distinct factor of production, the second is based on learning by doing, and the third focuses on the mutual interactions between human capital development, invention and adoption of technological change, and economic conditions. We argue that the second and third groups offer specific and important insights for education in both developing and industrialised countries.

Learning by doing models are primarily relevant to the adoption of existing technologies, thus, they seem particularly important for developing countries, which in general can make great strides by adopting existing equipment and adjusting it to relevant conditions. But we have also argued that schooling
and learning on the job are complementary. While learning by
doing seems to be a costless by-product of production, its
effectiveness in generating competitiveness is influenced by a
base level of schooling. Without that base, learning will
probably take place, but at a slower rate.

By providing that base education, a country accelerates the
dynamic benefits derived from productivity increases resulting
from learning by doing. This factor, combined with the
increases in health and labour force participation associated
with increases in basic education, suggests that, in countries
with high levels of illiteracy, there are potentially high social
and economic returns to increased investments in primary
education. Empirical evidence supports this conclusion.
Indeed, numerous studies have shown that the spread of
primary education translates into higher agricultural and family
enterprise productivity through better absorption of new
information and faster adoption of advanced techniques
(Welch, 1970; Krueger, 1991). In Peru, for example, it has
been estimated that the return to an additional year of primary
education for self-employed women in the textile sector is 33
percent (World Bank, 1990).

Thus, on the most basic level, the empirical evidence
suggests that during the early stages of the development
process, primary education should receive the most resources
to develop a critical level of basic skills. However, a cursory
examination of government policies suggests that the
empirical evidence concerning returns to primary education is too often neglected. For example, while Brazil spends 69 percent of its public education budget on primary education, only 9 percent is spent on secondary, but 23 percent on tertiary education. In addition, only 23 percent of all elementary schools received textbooks in the first grade in the early 1980s. In Chile, Costa Rica, the Dominican Republic, and Uruguay, the top fifth of the income distribution receives more than 50 percent of the subsidies for tertiary education, the poorest fifth receives only 10 percent (World Bank, 1990).

The learning-by-doing model suggests that there are important learning benefits to large volume production in strategic areas. This creates a link between general economic and trade policy and human resource development. By subsidising output, countries can try to promote larger volume production in order to achieve resulting benefits of learning by doing.

The fundamental question that needs to be answered is which sector should be subsidised. Given that technological innovations take place all the time, Young (1991) has shown that subsidising the sector with high knowledge content is more effective in creating comparative advantage. Such a policy would move production into more skill intensive goods, and prepare the labour force more effectively for the advent and introduction of a new technology. The country with the largest market and most aggressive policy for moving
production into high technology sectors, which tend to offer more opportunities for learning, would thus possess a comparative advantage in high technology goods.

Active commercial policy could steer the economy in the same direction, and could either create even larger markets and comparative advantage, or accelerate the speed with which a country catches up to more advanced nations.

One policy implication of this is that trade should be managed so as to increase the market size. Even if an imported good is cheaper today than a domestically produced good, relying on the import will reduce the domestic producers' market share and thwart its ability to benefit from economies of scale. Temporary protection may allow the comparatively disadvantaged industry to exploit economies of scale, lowering its per unit cost to such an extent that it may become an exporter of the good in the future. This argument is especially relevant to developing economies, as free trade in the presence of economies of scale may simply consolidate the position of the technological leader. This is an argument for so-called Strategic Trade Policy, which influences the terms of trade of a targeted industry in the "right" direction in order to establish a comparative advantage. This approach implies "picking winners" in international competition. Only industries with high growth potential and high learning potential ought to be targeted.
Basic education and learning from experience are, by themselves, not adequate to support extensive innovation of technology to achieve technological leadership. Innovation must involve tertiary education, not only because post-secondary institutions supply the technical and scientific personnel who can carry out innovations, but because significant amounts of innovation actually take place in university labs. This was the thinking behind the earlier popularity of manpower planning in developing countries, which emphasised the development of a cadre of high level technicians, engineers, and scientists.

The third category of models discussed above, has clearly pointed out the problems with this policy prescription. The education of a high-level scientist population must be in relation to the capabilities of a country to absorb the technological innovations, on the one hand, and the stock of scientists on the other. Overinvestment in tertiary education can be detrimental to a country's economic growth, if it stands in no relation to the country's technological capabilities, and thus leads to underemployment of high-skilled labour. An emphasis on tertiary education without an adequately educated mass population, for example, may lead to a glut of frustrated university students (see, for example, the Philippines).

Indeed, the manpower planning approach to train high-level personnel has not been effective, and most analysts now
agree that the returns to expensive (usually publicly funded) tertiary education in developing countries are not large enough to warrant excessive effort (Psacharopoulos and Woodhall, 1985).

Even if developing countries can innovate technologically, an adequate base of education among the general population is still required to adopt those innovations. Without access to huge markets that would allow long learning curves, an uneducated workforce cannot make effective use of innovations, home-grown or not. Furthermore, the Japanese experience has shown that much innovation takes place gradually as workers try to solve small problems. This process, which can be called "innovating by doing," can effectively use production workers, if they have the skills and understanding to make a contribution. This source of innovation is not available with an uneducated workforce.

Any accumulation of cutting edge technological know-how must be carried out in relation to the production and technological possibilities of a country and vice versa. Studies have confirmed that an exceedingly aggressive policy of adopting and advancing technology without the appropriate level of human capital can slow growth (see Young's (1992) comparison of Singapore and Hong Kong). Young's empirical study has shown that an economy's attempts to leapfrog technologies, (i.e., adopt new technologies without having
generated the prerequisite human capital) is not a strategy that utilises resources efficiently.

U.S. Education Reform and Insights for Developing Countries Recent economic theories that relate education to economic growth therefore have a variety of implications for economic, trade, and educational policy in developing countries. However, recent developments in the industrialised world also provide important insights for educational planners.

Ironically, while theory has exposed the learning and educational benefits of large volume production for developing countries, many industrialised countries, especially the U.S., are trying to adjust their production strategies so that they can produce much smaller quantities of particular products efficiently and rapidly. This argument, developed by Piore and Sabel (1984) and many others, contrasts mass production to flexible production.

Mass production depends on large volume production of identical or similar items to recoup the fixed cost of automation and engineering and to maximize the time during which the workforce is operating near the optimal point on the learning curve. Mass production generally involves detailed planning and engineering by a cadre of highly educated technical and professional personnel. But these planners try to simplify or "dumb down" the jobs of production workers. The assembly line with highly fragmented and repetitive jobs is the paradigmatic example of mass production. Mass production
does involve sophisticated equipment and production workers do need a minimal level of education, but these skill demands are not high and the large volume allows maximum operation of the learning curve.

Mass production was particularly successful in the U.S. with its gigantic internal market. Moreover, the American education system was well suited for the skill demands of the mass production approach. The U.S. has, by international standards, very high quality university and especially postgraduate education to prepare for scientific, technological, and professional leadership. However, the quality of education received by the three quarters of the population that does not graduate from college or university is much lower than the equivalent levels of education in many European and Asian countries, implying that U.S. workers in comparison to these foreign counterparts learned a larger share of the required skills on the job. The logic of learning-by-doing models was applied to the educational needs of production workers, while the models that emphasised the interdependence of education and technological innovation were most relevant to the training of higher level personnel.

But economic and technological changes have undermined the basis of the mass production system. Much more intensive international competition and faster changes in products and technologies have greatly reduced opportunities for seemingly endless production of standardised goods using unchanging
processes. The learning curve has much less time to operate. Certainly the need for high level technical personnel remains, indeed, it has intensified. The low quality education of production workers has now become a greater liability for the U.S. system. Other industrialised countries that never had the luxury of the U.S. mass market were never as dependent on learning by doing based on high volume production. This may explain why their non-university education systems are stronger than the U.S. system.

Thus in the U.S., there is a growing realisation that much of the workforce is not adequately educated. In past years, high school graduates could get reasonably well-paid unionised jobs that could support a moderate middle-class lifestyle. But in the last 15 years, the real earnings of high school graduates have fallen sharply (Levy and Murnane, 1992; Katz and Murphy, 1992; Bound and Johnson, 1992).

One response to the educational crisis for those students who do not go on to four-year colleges has been the reform of the content and curriculum of secondary school. This involves a shift from a didactic pedagogy based on the transmission of information from teacher to student, to what is referred to as a student-centred approach, which emphasises inquiry and discovery on the part of the student. Rather than having teachers lecture to students, a student-centred strategy is based on group projects with open-ended or ambiguous outcomes, which facilitate the understanding and application
of underlying concepts. There is also a strong current in this reform movement that emphasises the value of guided internships or apprenticeships in which students have an opportunity to apply school-learned concepts in realistic settings.

A fundamental notion that underlies these school reform movements is that the U.S. is moving into a more dynamic and competitive economy in which learning by doing based on primary or low-quality secondary education is no longer adequate.

This puts a greater burden on the education system to produce graduates who can operate in more ambiguous, faster changing, and less structured environments.

Thus many more workers will have to become more effective in the types of activities previously carried out by college graduates. These added educational objectives can either be accomplished by sending more students to university or by reforming secondary schools (certainly the most effective strategy will involve a combination of these two approaches).

The third class of models discussed above previously focused our attention on tertiary education; the current reforms in the U.S. suggest that some of the objectives that we look for in tertiary education may also be achieved in secondary schools.

What does this imply for developing countries? One possibility is that these countries focus their efforts on capturing those markets that allow high volume production.
Certainly, such markets still exist and possess significant growth potential in developing countries. The high volume production will allow workers to learn, but if countries focus on traditional labour intensive industries, such as apparel and shoes, there will be few benefits to knowledge spillovers. Thus, developing countries must target high volume industries with good potential for learning. The policy implications of this approach involve a refocus on primary education, avoidance of overinvestment in tertiary education, and appropriate trade and commercial policy to promote large volume production in specific sectors in order to exploit the learning curve.

Secondary school reform may offer a middle path that would allow developing countries to lay the groundwork to compete in more sophisticated markets without necessarily increasing their emphasis on costly tertiary education. This would still require a solid base of primary education, but it would put less reliance on the learning curve for human capital development generated by high volume production.

5.4 Conclusion on Economic Growth and Education Policy

The competitiveness of a firm, an industry, and a nation is related to the mix of primary, secondary, and tertiary education and how that interacts with the level of development and the state of technology. The theories that we have reviewed suggest that a government may play a crucial role in
enhancing and allocating the stock of human capital in the economy. Primary education enhances nutrition and health, increases the rate of return in the traditional sectors, and facilitates learning. It is also the foundation for moving to a stage of development where, with expanded secondary education, more and more techniques can be adapted from a technology leader. Comparative advantage, technological leadership and economic growth are most aggressively influenced by a nation's or firm's ability to absorb and advance new technologies, which requires the mastery of previous technologies, a highly skilled workforce, and a large enough stock of Scientists and Engineers. Here traditionally, the interaction between technological change and accumulation of human capital in the tertiary sector are central. We have argued that trends in school reform in the U.S. suggest that secondary schools could also play a large role in this last objective.

Public policy must have a national and an international focus. First, the government must establish reasonable priorities for the distribution of funds based on the rates of return, and stages of development. On the most basic level, it makes little sense to attempt to be a high technology exporter and to subsidise heavily tertiary education when primary education is still insufficient. The empirical and theoretical literature suggests that the correct mix of educational and industrial subsidies, at each state of development, is crucial.
The above analysis suggests that strong emphasis ought to be placed on the accumulation of human capital, but not without relation to the existing industrial and technological state of development. Important and cheap advances in human capital can be achieved through learning by doing and targeting both high growth and high technology industries, if the movement along an industry's learning curve can be accelerated, especially if it occurs in high knowledge content sectors. The theoretical literature suggests that these benefits may be achieved through commercial policy, adjustments in the terms of trade, and subsidies for targeted industries. We have also suggested that appropriate education and job training are needed as a foundation for more effective learning by doing.

As a first step, developing countries should try to capture mass markets in industrialised as well as developed countries. The products that can serve these markets have less demanding skill requirements, they can take advantage of the lower wage levels in developing countries, and the process of production itself generates human capital development through the learning curve. But taking this approach in effect simply follows that path taken by industrialised countries - mastery of standardised products and eventual concentration on more sophisticated and varied goods and services. And the benefits of this approach will be minimal if the products that are produced have little positive spillover effects. Moreover, unlike the industrialised countries, today's developing
countries can benefit from the experience of the industrialised countries. While it is unrealistic for developing countries to compete directly in the most advanced markets, improved education does offer an opportunity to build the foundations of economies that are less dependent on basic standardised items. However, the key to this is not to try to copy the tertiary systems of the industrialised world, although a solid tertiary system is certainly necessary. Better opportunities lie in a variety of alternative policies including a strong emphasis on primary education, an increase in the quantity and quality of secondary education, and new avenues in trade and commercial policies.
6 South African Science and Technology Policies

In the Green Paper on Science and Technology and the subsequent White Paper, the South African government committed itself, among other things, to:

- Creating a new policy framework for public science;
- Conducting a system-wide review of the national system of innovation in order to establish its strengths and weaknesses and future priorities; and
- Creating new structures to develop, implement and monitor the new policy framework.

The process for revising the policy revisited the whole system – the performing science councils, the funding agency science councils, the state corporations such as Eskom, the government laboratories, the higher education system and the private sector laboratories. The major emphasis rested on how to make the science system more responsive to the challenges of the Reconstruction and Development Programme. The central issues were to overcome fragmentation, promote innovation and to develop a research framework in line with national priorities. The strategy that was adopted to build a coherent system out of the fragmented one depended on three substantial developments:
The establishment of the National Research Foundation (NRF) and the National Advisory Council on Innovation (NACI)\(^{40}\); 

The definition of funding drivers for the transformation of the system; and 

A plan for South Africa’s long-term research and technology needs.

6.1 South Africa’s Science and Technology Capacities

World War II proved to be a major turning point for the South African science system – of which the higher education research system was a central element. It gave rise to the establishment of the Council for Scientific and Industrial Research (CSIR), the biggest science laboratory in South Africa outside the university centres. The centre was established in 1946 and played a major role in promoting scientific research and, through its influence, ultimately gave rise to a wider appreciation of the role of research within the country. By the mid-1980s, the CSIR was responsible for 13 percent of all the measured research undertaken on the

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\(^{40}\) The NRF brings together the funding agency functions for the human and natural sciences. The legislation that guides its activities requires that it funds university research on the basis of the broad socio-economic and political agendas of the state. The National advisory Council on Innovation serves to advise cabinet on science and innovation matters as well as issues related to the global competitiveness of South Africa’s industry and its ability to meet the needs of the majority of South Africans.

After World War II, scientific research was also encouraged in the South African university system. Similarly to other Anglo-Saxon universities, the racially segregated “white” universities were strongly based on a research culture, which stressed the importance of scientific publications. While scientific output in terms of publications was high, very little found its way into commercial applications. A survey (Philips, 1990) of over 200 significant South African innovations concluded that “there was strong evidence of a failure to commercialise significant university-led inventive abilities”.

Starting in 1987, the CSIR underwent a major restructuring process. The focus moved to applied research and to a far greater market orientation, mainly because of a change in the formula for funding from government. The CSIR currently secures less than 50 percent of its funding from government. The main portion of the funding is generated through contracts.

Whilst the share of publications in the Science Citation Index (SCI) peaked at 0.6 percent in 1988, subsequently it declined to 0.48 percent in 1994 (FRD, 1996: p. 133). However, since 1990 the number of South African patents registered with the United States Patent Office (USPO, 2002) varied between a low of 101 in 1992 and 1993 and a high of 137 in 2001.
6.3 Private Sector Interventions: the Role of Tax Subsidies

Most OECD countries provide tax incentives for private R&D activities. The general practice is to allow a full write-off of current R&D expenditures accounted for as costs and accelerated depreciation allowances for capital investments related to R&D – machinery and equipment buildings. A growing number of less developed countries and newly developed countries have introduced similar practices.

Table 5 shows a comparison of the tax treatment by a number of selected countries. The After-Tax Costs (ATC) and the B-Index (a measure of the effectiveness of the incentive\(^\text{41}\)) are compared. CIT is the Corporate Income Tax rate.

<table>
<thead>
<tr>
<th>Country</th>
<th>ATC</th>
<th>B-Index</th>
<th>Tax Credits</th>
<th>CIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>0.507</td>
<td>0.787</td>
<td>Yes</td>
<td>35.60</td>
</tr>
<tr>
<td>USA</td>
<td>0.521</td>
<td>0.879</td>
<td>Yes</td>
<td>40.65</td>
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<td>Australia</td>
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<td>0.890</td>
<td>Yes</td>
<td>36.00</td>
</tr>
<tr>
<td>Korea</td>
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<td>0.918</td>
<td>Yes</td>
<td>30.80</td>
</tr>
<tr>
<td>Mexico</td>
<td>0.640</td>
<td>0.969</td>
<td>Yes</td>
<td>34.00</td>
</tr>
<tr>
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<td>1.010</td>
<td>No</td>
<td>37.80</td>
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<td>1.027</td>
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<tr>
<td>Germany</td>
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<td>1.051</td>
<td>No</td>
<td>56.60</td>
</tr>
</tbody>
</table>

*Table 5: Tax treatment of R&D by selected countries*

The comparison shows the relatively unfavourable position of South Africa with respect to tax incentives - this has a negative impact on the cost of financing R&D of local

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\(^{41}\) Smaller numbers show a higher effectiveness.
companies and is a disincentive to multinational companies to invest in local R&D facilities.

### 6.3 Research Expenditures

After 1994 the new South African government moved very actively at the national science level to set into place a new funding regime that would support its commitments to national priorities. At least three different, but related, funding strategies were implemented:

- The establishment of the National Innovation Fund to support strategic, collaborative research and development;
- The consolidation of the existing funding agencies into one national funding agency (the National Research Foundation) and the introduction of a new policy of theme-orientated funding; and
- Significant increases in funding via two strategic funds: the (THRIP) Technology and Human Resources for Industry Project and SPII (Support Programme for Industrial Innovation).

National statistics on Research and Development are extremely unreliable and do not allow to assess the impact of expenditure on both academic and industrial research output. Although major initiatives and positive changes occurred in the National System of Innovation between 1996 and 2001, one
area that was seriously neglected was the gathering of reliable
data and information on science and technology indicators.

The total Research and Development expenditure on public
science (excluding the private sector) for the most recent set
of data available (1996/1997) is estimated at Rand 2.91 billion.
The expenditure developed as represented in Figure 4.

![Figure 4: R&D expenditure in the higher education sector (1983 – 1998)](image)

The data on the R&D expenditure by the business sector,
as illustrated in Figure 5, is based on various estimates and
assumptions. The survey conducted by the National Research
and Technology Audit (DACST, 1998) was carried out on a
limited number of large corporations.

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Figure 5: Estimated R&D expenditure in the business sector\textsuperscript{43}

A subsequent survey carried out by DACST on 17 large corporations showed that R&D expenditures between 1997 and 2001 had declined from 1.46 percent of the total company budget to 0.97 percent. Over the same period of time the research work outsourced by the same companies had increased from 7 percent to 26 percent.

The complex flow of funding to the performing sectors in the South African R&D system is represented in Figure 6.

\textsuperscript{43} FRD (1996), DACST (1998), and DACST (2000)
From this information we can conclude that mainly the Government funds the higher education system. By contrast the Higher Education system contributes only minimally to its own research funding (only about 7 percent from non-contract income sources, e.g. student fees, interest, donations, and so on).

Approximately, 56 percent of the funding for science councils is channelled through the parliamentary vote highlighting the importance and influence of the Government in Research and Development activities.

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CENIS (2002)

The total estimated yearly expenditure of R 5,725 million excludes military R&D of approximately R 300 million (2002E) and research performed by NGOs and research consultancies.
6.3.1 Research Outputs

Pouris (1996) identified a steady decline in comparative research output. He showed how the number of publications by South African authors in ISI (Institute for Scientific Information) journals has been relatively stable (approximately 3,300 per year) between 1987 and 1994. When compared with other countries and calculated as a proportion of world output, however, these figures reveal a steady decline. One indicator of such a decline is the fact that countries that were below or at the same level as South Africa in 1987 have subsequently surpassed it. These countries are Norway, South Korea, Brazil, Taiwan and China.

Pouris’s analyses clearly show how South African scientific output experienced a gradual growth between 1980 and 1987 (increasing from 2,200 publications in 1980 to 3,400 in 1987). Over that period, South Africa’s output as a proportion of world output increased from 0.4 percent to nearly 0.7 percent. However, after peaking in 1987, overall output has remained stable at an average of 3,300 publications per year until 1994. In effect, this resulted in a drop in proportion of world share from 0.7 percent in 1987 to 0.4 percent in 1994. In 1994 South Africa had about 0.5 percent of the world’s scientists.

The data on which Pouris’s analyses were based provide only a partial perspective on South African scientific output. Given the very small representation of South African journals
in the ISI indices\textsuperscript{46} the analysis would need to be corrected by taking into account also the South African journals not represented in the ISI data.

In 1985 the Department of National Education, which was responsible for the national education system under Apartheid, introduced a new funding formula for universities that incorporated a number of incentives to stimulate research output. Known as the South African Post-Secondary Education (SAPSE), the new funding formula made explicit provision not only for teaching outputs but also for the contribution made by research. Research outputs were subsequently subsidised on the basis of the number of scientific articles published. Only articles published in refereed journals accredited by the Department of National Education qualified for subsidy purposes. Some blacks and English-speaking social science and humanities academics refused on principle to publish in SAPSE-accredited journals during the Apartheid era. This constraint affects the accuracy of SAPSE data in a significant way. The comparison between SAPSE data and SAKBase\textsuperscript{47} data is shown in Figure 7.

\textsuperscript{46} Only 31 South African journals out of a total of 205 accredited journals are indexed by the ISI.
\textsuperscript{47} The South African Knowledgebase (SAK), developed by CENIS, is a database containing information about more than 72,000 articles published by South African researchers, i.e. authors with a South African address at the time of publication from 1991 until 1999.
Figure 7: Total Output (science articles and books)

Table 6 shows that even by expanding the set of available data to that not included in the ISI the overall conclusion that scientific research output, measured by the number of publications has remained – in absolute terms – stable over the period analysed, holds. Furthermore, in comparison to other countries the productivity of South African researchers in absolute and relative terms has decreased since 1996.
### Table 6: Scientific publications (books and articles) per million of population

Understanding the causes of the decrease in output in both relative and absolute terms might be helpful to understand whether this trend is linked to the “brain drain”. However, there are various factors that have influenced this trend. The most simple factor is that top academics do not complete the forms to obtain the subsidies and thus their research papers

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>South Africa</td>
<td>141</td>
<td>137</td>
<td>123</td>
<td>119</td>
<td>126</td>
</tr>
<tr>
<td>South Africa</td>
<td>171</td>
<td>165</td>
<td>155</td>
<td>160</td>
<td>n/a</td>
</tr>
<tr>
<td>EU-15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Austria</td>
<td>599</td>
<td>657</td>
<td>686</td>
<td>171</td>
<td>n/a</td>
</tr>
<tr>
<td>Belgium</td>
<td>734</td>
<td>741</td>
<td>788</td>
<td>810</td>
<td>n/a</td>
</tr>
<tr>
<td>Denmark</td>
<td>1,089</td>
<td>1,117</td>
<td>1,200</td>
<td>1,214</td>
<td>n/a</td>
</tr>
<tr>
<td>Finland</td>
<td>1,005</td>
<td>1,048</td>
<td>1,080</td>
<td>1,157</td>
<td>n/a</td>
</tr>
<tr>
<td>France</td>
<td>610</td>
<td>618</td>
<td>653</td>
<td>652</td>
<td>n/a</td>
</tr>
<tr>
<td>Germany</td>
<td>584</td>
<td>608</td>
<td>661</td>
<td>657</td>
<td>n/a</td>
</tr>
<tr>
<td>Greece</td>
<td>282</td>
<td>297</td>
<td>336</td>
<td>340</td>
<td>n/a</td>
</tr>
<tr>
<td>Ireland</td>
<td>448</td>
<td>479</td>
<td>527</td>
<td>542</td>
<td>n/a</td>
</tr>
<tr>
<td>Italy</td>
<td>420</td>
<td>424</td>
<td>453</td>
<td>457</td>
<td>n/a</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>117</td>
<td>170</td>
<td>161</td>
<td>133</td>
<td>n/a</td>
</tr>
<tr>
<td>Netherlands</td>
<td>935</td>
<td>972</td>
<td>977</td>
<td>963</td>
<td>n/a</td>
</tr>
<tr>
<td>Portugal</td>
<td>156</td>
<td>179</td>
<td>199</td>
<td>248</td>
<td>n/a</td>
</tr>
<tr>
<td>Spain</td>
<td>387</td>
<td>415</td>
<td>446</td>
<td>471</td>
<td>n/a</td>
</tr>
<tr>
<td>Sweden</td>
<td>1,328</td>
<td>1,335</td>
<td>1,402</td>
<td>1,431</td>
<td>n/a</td>
</tr>
<tr>
<td>UK</td>
<td>930</td>
<td>896</td>
<td>929</td>
<td>949</td>
<td>n/a</td>
</tr>
<tr>
<td>USA</td>
<td>726</td>
<td>709</td>
<td>709</td>
<td>708</td>
<td>n/a</td>
</tr>
<tr>
<td>Japan</td>
<td>445</td>
<td>47</td>
<td>485</td>
<td>498</td>
<td>n/a</td>
</tr>
</tbody>
</table>

48 SAPSE  
49 SAKbase  
50 Source: Department of Education (SAPSE); CENIS: 2002a
are not accounted for in the statistics. A second set of factors relates to the ongoing restructuring and rationalisation of academic and research institutions. The latter appear to have a much stronger influence on research output and translate into a clear shift in the research landscape and in a more equitable education sector.

6.3.2 Shifts in Research

The National Research and Technology Audit performed in 1995/1996 found a significant increase in applied and strategic research being undertaken. The audit classified half of all research in the higher education sector as basic research. This constituted a substantial decrease in comparison to 1991 where 75 percent of higher education sector research was classified as basic research. According to the classification used during the audit, applied research made up 37 percent

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51 The following OECD (1992) definitions apply:
- Basic research: original investigation with the primary aim of developing more complete knowledge or understanding of the subjects) under study;
- Fundamental research: basic research carried out without working for long-term economic or social benefits other than the advancement of knowledge, and no positive efforts being made to apply the results to practical problems or to transfer the results to sectors responsible for their application;
- Strategic research: basic research carried out with the expectation that it will produce a broad base of knowledge likely to form the background to the solution of recognised current or future practical problems;
- Applied research: original investigation undertaken in order to acquire new knowledge, and directed primarily towards specific practical aims or objectives such as determining possible uses for findings or basic research or solving already recognised problems.
and product-related work, 13 percent of all research done in higher education as fundamental or curiosity-driven research. However, the definitions applied vary from research to research and therefore it is not possible to consider these numbers as indices but must be considered at most as an indication of a trend.

The establishment of the National Innovation Fund, the THRIP and the way the National Research Foundation distributes its resources, are clear indications that there is a redistribution of research resources toward the applied and product related end of the spectrum. This reflects the drive towards responding to local needs and to global changes in the knowledge systems. The data in Table 7 reflects the significant increase in the contract income over the period 1995-2000.

<table>
<thead>
<tr>
<th>Institution</th>
<th>1995/96</th>
<th>1998</th>
<th>2000</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretoria</td>
<td>27</td>
<td>61</td>
<td>92</td>
<td>480%</td>
</tr>
<tr>
<td>Stellenbosch</td>
<td>46</td>
<td>78</td>
<td>119</td>
<td>258%</td>
</tr>
<tr>
<td>Natal</td>
<td>46</td>
<td>83</td>
<td>138</td>
<td>300%</td>
</tr>
<tr>
<td>Cape Town</td>
<td>102</td>
<td>139</td>
<td>190</td>
<td>186%</td>
</tr>
</tbody>
</table>

Table 7: Contract income at four institutions in 1995 - 2000 (Rand million)

Despite the lack of reliable, comprehensive and recent comparable data, a number of conclusions can be drawn:

➢ The objective of the Government to focus on strategic and relevant research seems to have an impact on funding sources within the sector. The National Research and Technology Audit conducted in 1997
picked up this shift. Recent initiatives, like THRIP, are likely to have strengthened this trend;

- There is an increase in contract research. Even adjusted for inflation, the increase showed in the Table 6 is still more than 100 percent. However, very few institutions can provide systematic information as to how much of the contract research gets published in reports or in accredited journals, and how much is consultancy rather than research. Therefore, it is not possible to assess the scale of the increase and whether this shift is having an impact on published research output; and

- These trends are increasingly putting basic and fundamental research within higher education under severe strain and could seriously constrain the growth of the knowledge base in the sector.

6.3.3 Equity in Research

The task of improving quality and equality of quality in education is part of the South African Reconstruction and Development Programme. In order to achieve this objective the Department of Education and the Department of Arts, Culture, Science and Technology and the respective White Paper promoted greater access to knowledge production at the institutional level and among individuals. Output figures disaggregated by “institutional groupings” show that the
relative contribution of historically white Afrikaans universities to published research has increased moderately from 37.2 percent in 1986 to 41.5 percent in 1999. However, the proportion of outputs from the historically white English universities declined substantially from 53.3 percent in 1986 to 37.9 percent in 1999. Although the contribution of the historically black universities to the overall output is still low, three institutions have more than doubled their contribution from a base of 5.1 percent in 1986 to 10.7 percent in 1999. The output from the technikon sector has increased quite substantially from 23 publication units in 1991 (0.4 percent of the total) to 174 units in 1999 (3.1 percent of the total). Especially the relatively high increase in the technikon sector suggests that attempts to raise both awareness of research and research output have been successful. While these comparisons by institutional categories are useful, five historically white universities continue to produce approximately 60 percent of all scientific output within the university sector. Similarly within the historically black university sector the University of Durban-Westville and the University of the Western Cape continue to produce the bulk of the output representing approximately 44.3 percent of the total output of the historically black universities.

52 University of Cape Town, University of Natal, University of Stellenbosch, University of Pretoria and the University of Witwaterstand
As far as the technikon sector is concerned, five technikons (most of them historically advantaged technikons) dominate scientific production generating together approximately 70 percent of all articles and books produced by technikons.

The research suggests a modest increase in research output by two historically disadvantaged institutions but the overall picture is that in both the university and the technikon sectors, the six institutions that dominated the research output during the Apartheid era are still the dominant force in knowledge production.

A research performed by the Department of Education (2003) highlighted that although the provisioning of education input is between 3 and 20 times more equitable than the distribution of income, educational output is often as badly distributed as income in society. This finding underlines the massive problems that the schooling system is experiencing in translating resources into outputs, or into learner performance.

Other measures of inequality and lack of change in the education system are given by the data on output by race, gender and age.

6.3.3.1 Output by Gender

The greatest proportion of the scientific publications recorded by SAK and published in the years 1990 and 1998 was authored by men with a share of total output of
approximately 83 percent. Although the number of SAPSE publication units declined from 490 in 1994 to 335 in 1998, the overall proportion by women remained constant at 17 percent.

In an attempt to deal with race and gender imbalances a significant effort was made with institutional redress and capacity building. The Department of Education established a redress fund for capacity development, while the national science councils focussed on redressing research activities of the historically disadvantaged institutions.

6.3.3.2 Output by Race

White authors produced by far the largest proportion of scientific articles during the 1990s (approximately 94 percent) followed by Indian South Africans (3.2 percent), Blacks (2.1 percent) and Coloureds (1.0 percent). A comparison of the data for 1980 and 1998 in Figure 8 indicates that no significant shift toward authorial demography that is more representative of South Africa’s population as a whole has taken place. However, the output by African authors increased from 20 publication units in 1990 to 59 units in 1994 and to 63 units in 1998. For Indian South Africans the number of units decreased from 93 in 1994 to 71 in 1998.
Figure 8: Percentage of publication units by race of authors

6.3.3.3 Output by Age of Researchers

The production of research papers as a function of the age is a key indicator of the overall state of the research system and of its sustainability in the medium and long term. The overall position for the period 1990 to 1998 is summarised in the Figure 9. The results show that authors in the 40 to 49-age bracket produced more than 10 percent of all articles. Approximately a quarter of the output was produced by each of the 30-39 and 50-59 age-cohorts. Furthermore, the results show a decline in the proportion of scientific publication that were recorded in the SAK database and produced by authors in the 30 to 39 and 40 to 49 age cohorts, and a concomitant
increase in the output of authors in the 50 to 59 and over 60 age cohorts.

Figure 9: Percentage of publication units by age of author in year of publication\textsuperscript{53}

The proportion of publication points to a gradual “ageing” of the publishing population, which becomes clearer when we collapse the age intervals. In 1990, for example, authors in the 30 to 49-age bracket produced 77 percent of the publications in the SAK database. The corresponding proportion in 1998 was only 54 percent. Similarly, whereas 18 percent of the 1990 authors were in the above 50-age bracket, this proportion increased to 45 percent in 1998. The most

\textsuperscript{53} Source: CENIS (2002a)
immediate explanation is that the same authors are still producing the majority of publications. If this were the case, it would point to stagnation in the Research and Development workforce, where insufficient rejuvenation is taking place, and it would indicate an urgent need for decision-makers in science policy to avert the possibility of a radical decline in South Africa’s scientific output over the next decade.

![Figure 10: Percentage of research outputs and the ageing of the R&D workforce](image)

Another indication of a potential gap in the product of research outputs is the stagnating number of students enrolling the higher education sector. After peaking in 1998 at just over 600,000, the total number declined mainly owing to

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54 Source: CENIS (2002a)
the fall in university enrolments. The disciplinary field that experienced the sharpest decline was human sciences, which accounted in 2000 for approximately 45 percent of total enrolments, down from 58 percent in 1995.

<table>
<thead>
<tr>
<th>Disciplinary field</th>
<th>1995</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science, engineering, and technology</td>
<td>20%</td>
<td>26%</td>
</tr>
<tr>
<td>Commerce and business sciences</td>
<td>22%</td>
<td>28%</td>
</tr>
<tr>
<td>Human sciences</td>
<td>58%</td>
<td>46%</td>
</tr>
</tbody>
</table>

Table 8: Student enrolment in percentage by disciplinary field

Figure 11: Student enrolments in the higher education sector

55 Source: CHE (2002)
Higher Education Research Policies

The higher education research system is very much a part of the national science system. However, this sector underwent its own policy development process and attempts were made to ensure that the different processes were consistent and articulated among each other – largely through the individuals who were involved in both. After 1994, the higher education policy process, beginning with the National Commission on Higher Education (NCHE), was influenced heavily by the relatively unconstrained discussion that characterised the policy debates that occurred under the aegis of the National Education Policy Investigation (NEPI) and the Union of Democratic University Staff Association (UDUSA). Many of these ideas were carried into the later process.

The White Paper on Higher Education Transformation (1997) drew heavily on the Report of the National Commission on Higher Education (1996) and attempted to extend the substance of the proposals for research. The White Paper stated that "the production, advancement and dissemination of knowledge and the development of high level human resources are core functions of the higher education system". It went on to reaffirm that research plays a key role in these two functions and identified the key capacity difficulties:

- The fragmented national system;
➢ The lack of research capacity in the higher education sector;

➢ The “stark race and gender imbalances”; and

➢ The skewed distribution of the capacity between the historically black institutions and historically white ones.

The White Paper picked up the “mode one/mode two” knowledge generation debate and made a strong argument for a shift towards the mode two research type\(^{56}\).

More specifically the document supported the following:

➢ The development of a national research plan, which was meant to be an outcome of the Research and Technology Foresight exercise carried out by the Department of Arts, Culture, Science and Technology;

➢ The development of a framework to facilitate greater articulation between the higher education research system and the rest of the science system. The development of the National System of Innovation, described above, provides such a framework. Furthermore, the creation of various funding drivers such as the Innovation Fund, fuelled this specific transformation strategy; and

\(^{56}\) Research defined in the context of applications rather than in the framework of academic imperatives.
The establishment of mechanisms to increase both public and private funding of research.

The expansion of the higher education research base was seen as a crucial policy proposition and the White Paper indicated that it saw earmarked funding as a mechanism to achieve this. However, state spending on the national science system did not impact directly on research in the higher education system for two reasons:

- The “blind” component earmarked for research within the Higher Education Vote requires no direct accountability on the part of universities and technikons. There are no mechanisms in place to establish whether the amount that has theoretically been allocated for research does in fact get allocated for research activities at the higher education institutions (“HEI”). Until such time as such mechanisms are put in place, it will in fact remain a “blind” allocation; and

- Most of increases in research funding within the science system occurred in the areas of directed, strategic funding.

Two funds benefited from these increases:

a) The Technology and Human Resources for Industry Project (THRIP)\(^57\); and

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\(^57\) The objectives of THRIP are:
b) The National Innovation Funds (“NIF”). Both funds are still open for applications to institutions outside the higher education sector including, for example, the science councils. Substantial funding from the National Innovation Fund was awarded to the science councils, rather than to universities and technikons.

Furthermore, earmarked funds were allocated to build capacity and to develop potential centres of excellence in research and postgraduate training at the historically black universities. Access of blacks and women was made a priority.


- To contribute to the increase in the number and quality of people with appropriate skills in the development and management of technology for industry;
- To promote increased interaction among researchers and technology managers in industry, higher education and SETIs, with the aim of developing skills for the commercial exploitation of science and technology. This should involve, in particular, to promote the mobility of trained people among these sectors; and
- To stimulate industry and government to increase their investment in research, technology development, technology diffusion, and the promotion of innovation.

The Priorities of THRIP are:
- To support an increase in the number of black and female students who intend to pursue technological and engineering careers;
- To promote technological know-how within the small, medium and micro enterprise (SMME) sector, through the deployment of skills vested in higher education institutions (HEIs) and SETIs;
- To facilitate and support multi-firm projects in which firms collaborate and share in the project outcomes; and
- To facilitate and support the enhancement of the competitiveness of black owned enterprises through technology and human resources development.
However, by 2001 it was well documented that participating effectively in the global environment depends on the way that four elements interact: information technology, knowledge production, human resources and institutions (Castells, 2001). Knowledge and “informationalism” have become central to globalisation and to development. The sources of productivity and competitiveness are increasingly dependent on knowledge and information technology being applied to productivity.

The increased generation of knowledge and access to knowledge has led to what is often referred to as the “knowledge society” (Castells, 1991). Therefore, it had to be expected that the new higher education policies would pay particular attention to these developments. Responding to this expectation, the National Plan for Higher Education identified human resource development, high-skill development and the production, acquisition and application of new knowledge as the key challenges facing higher education.

"These challenges have to be understood in the context of the impact on higher education systems worldwide of the changes associated with the phenomenon of globalisation […]. Higher education has a critical and central role to play in contributing to the development of an information society in South Africa both in terms of skills development and research”  
Department of Education (2001, pp. 5-6)
However, the National Plan for Higher Education made only a cursory reference in the introduction to information technology and its importance to research and to teaching. Apart from not mentioning a national approach to or policy for the use of information technology in higher education, the National Plan did not insist that individual institutions should develop their own policies about how to utilise and develop information technology strategies for teaching, learning and research.

The National Plan put forward two main strategies to improve the research endeavour:

- The first strategy deals with a new approach to funding. Research funding is to be a separate component, based on research output and postgraduate students. Earmarked funding will also be made available for research capacity-building and for inter-institutional collaboration. The measurement of research output would be improved, and postgraduate enrolments will receive considerable greater funding; and

- The second strategy deals with improving postgraduate quality and quantity, through the activities of the Higher Education Quality Committee, and by improving postgraduate enrolments through planning, increased funding and the recruitment of foreign students.
7.1 Foreign Students as a Policy Issue

The issue of foreign students at South African tertiary institutions must be seen in terms of the universal nature of university education and the need for cross pollination in the Higher Education system. By its very nature, university education in particular, demands the refraction and transcendence of all boundaries, be they physical, cultural, real or imaginary. It is transnational, transcontinental and transcultural. Universities have an international responsibility as generators of new knowledge for the international community. Their fundamental role is the pursuit of the truth, the advance and growth of knowledge and its dissemination.

While maintaining their primary mission of the advance of knowledge, universities continue to take on a far more global mission of education and training. There is increasing emphasis on the internationalisation of academia. It is imperative that universities adapt accordingly for their survival. This drive to internationalise higher education has since permeated the South African society as evidenced by the recent formation of the South African Association of International Education. The other side of the same coin, however, is that the challenges, opportunities and pressures of globalisation both overwhelm traditional socio-political structures and put a strain on the economy of the country.

The university is global and universal as well as local and regional. For this and other reasons, it is important, especially
in the case of South Africa, to take cognisance of the fact that although in essence universities are international, they are also integrated in a given society, region and social, political and economic system. All these factors impact on their activities and dictate in large measure the nature of their mission. The consequential challenge for South African institutions is to balance international imperatives with the demands imposed on them by prevailing local social, economic and political conditions.

7.2 Boundaries of “Foreignness“

Students at South African tertiary institutions can be grouped into two major categories: students from the developed world and those from the less developed African countries. The immediate significance of this is that while most African countries with the exception of Botswana, have weaker currencies in comparison with the Rand, students from developed European countries and the US would have had a relatively cheap education in South Africa owing to the weaker Rand compared to their currencies. This also means that very few South African students have been able to go and study in developed countries because of the disadvantageous Rand exchange rate.

Within the education sector, the definition of foreign students used is consistent with that used by the South African Department of Home Affairs. According to this definition, a
foreigner would be anyone who is not a South African citizen, not a permanent resident, and one who does not have diplomatic exemption. This is the same definition most universities and technikons subscribe to in their efforts to determine who should and should not get subsidies from the government.

Varying degrees of foreignness suggest that the definition is malleable and susceptible to manipulation. An examination of what has been factored into the definition of foreign students for the purpose of state subsidies is crucial to our discussion. It can be established immediately that the individual's residence status and country of birth are the overriding considerations defining a foreigner. There is evidence to suggest that the definition has been economically and politically constructed. It is a functional and instrumental definition of foreignness. Citizenship and residence status are both appealed to as resources, which are used to exclude or give students access to subsidies.

The situation is more complex than it appears on the surface. The real issue is not about foreigners *per se*, nor the crossing of international boundaries. It is important to note that some local students do not perceive all students, who cross international boundaries for purposes of education, as foreigners. For this category of local students, the primary determinant of foreignness is the ability to fulfil his or her own financial obligations. Foreign students not being able to fulfil
their financial obligations would in most cases be black students from neighbouring African countries. However, the definition of neighbouring country is problematic because it is politically and economically constructed.

The result has been the fomentation of tension deriving from competition for shrinking resources between a section of largely black South African students and black students from neighbouring African countries. There is a feeling of deprivation on the part of the South African students who legitimately resort to invoking and appealing to their citizenship or South Africanness as opposed to the competition's foreignness to remove foreign students from the equation. This deprivation is blamed on the other - the foreign student who does not belong to.

An "our people first" approach resonates throughout the drive to restructure the allocation of state subsidies to local and foreign students. This approach also reiterates the differences between foreign and local students. It pits two communities against each other: one is South African, largely black, historically disadvantaged and deprived; the other, also largely black and African, but foreign and supposedly "parasitic". The latter have added to the aggressive competition for dwindling resources.

At the beginning of each academic year, foreign students at the University of Cape Town ("UCT") can be divided into
roughly five categories each with a certain level or degree of foreignness;

- foreign students applying for residence;
- foreign students with permanent residence;
- foreign students with temporary residence;
- foreign students registered at UCT but not resident in South Africa;
- South African citizens, who are permanent residents of other countries and only come to South Africa as visitors and for purposes of education.

It is apparent that citizenship and residence status are used resourcefully to gain access to benefits and resources that only some students and not others can enjoy. Some rights and benefits are reserved for citizens and other foreigners who satisfy certain criteria. This also explains why South Africans who are permanent residents of other countries can still enjoy state subsidised education at South African institutions. Should the same logic for granting permanent residence to foreign students be used, the subsidisation of foreign or non-resident South African students would appear to be a contradiction in terms since they or their non-resident parents represent *brain drain* and contribute not to the South African economy but that of their adoptive countries. However, even if citizenship alone was not enough to make them eligible for government subsidies, South African students who are
permanent residence of other countries would still be eligible for subsidies in South Africa because they are nationals of a SADC member state, South Africa.

If education is to be considered an export commodity, which it is, then long distance foreign students must come into the fold. UNISA and sister institutions would have noted with concern that proposed changes to the fees and subsidy structure concentrate on residential universities, with an emphasis on available places, to the exclusion of the position and unique role of distance teaching. A significant portion of students at UNISA is foreign. To this category can be added foreign students who are registered at residential institutions but remain in their respective countries and only occasionally visit for consultation. These are mostly postgraduate students, although there is the odd undergraduate too.


<table>
<thead>
<tr>
<th>University</th>
<th>Total students</th>
<th>Foreign students</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cape Town</td>
<td>2'334</td>
<td>221</td>
<td>9.47%</td>
</tr>
<tr>
<td>Burban-Westwille</td>
<td>2'424</td>
<td>16</td>
<td>0.66%</td>
</tr>
<tr>
<td>Fort Hare</td>
<td>1'272</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>Medunsa</td>
<td>394</td>
<td>3</td>
<td>0.76%</td>
</tr>
<tr>
<td>Natal</td>
<td>2'722</td>
<td>101</td>
<td>3.71%</td>
</tr>
<tr>
<td>North</td>
<td>5'825</td>
<td>68</td>
<td>1.17%</td>
</tr>
<tr>
<td>Orange Free State</td>
<td>1'508</td>
<td>20</td>
<td>1.33%</td>
</tr>
<tr>
<td>Port Elisabeth</td>
<td>996</td>
<td>6</td>
<td>0.60%</td>
</tr>
<tr>
<td>Potchefstroom</td>
<td>1'577</td>
<td>10</td>
<td>0.63%</td>
</tr>
<tr>
<td>Pretoria</td>
<td>3'593</td>
<td>48</td>
<td>1.34%</td>
</tr>
<tr>
<td>Rand Afrikaans</td>
<td>1'672</td>
<td>6</td>
<td>0.36%</td>
</tr>
<tr>
<td>Rhodes</td>
<td>873</td>
<td>140</td>
<td>16.04%</td>
</tr>
<tr>
<td>UNISA</td>
<td>13'669</td>
<td>424</td>
<td>3.10%</td>
</tr>
<tr>
<td>Stellenbosch</td>
<td>2'562</td>
<td>75</td>
<td>2.93%</td>
</tr>
<tr>
<td>Witwaterstand</td>
<td>2'638</td>
<td>64</td>
<td>2.43%</td>
</tr>
<tr>
<td>Zululand</td>
<td>1'560</td>
<td>1</td>
<td>0.06%</td>
</tr>
<tr>
<td>VISTA</td>
<td>4'240</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>49'859</td>
<td><strong>1'203</strong></td>
<td><strong>2.41%</strong></td>
</tr>
</tbody>
</table>

*Table 9: Enrolment figures: students entering undergraduate studies, 1993*

Linked to the problematic determination of foreignness is the cumbersome definition of “neighbouring countries”. The problem here lies in attempting an acceptable definition of neighbouring countries. For purposes of state subsidies to foreign students, a diplomatic definition encompassing economic and political aspects has to be used. Thus South Africa's neighbouring countries are not only Botswana, Swaziland, Lesotho, Mozambique, Namibia and Zimbabwe, countries with which it shares common borders, but all the SADC member states. The implications of this for continued state expenditure on the education of foreign students are
profound. According to 1996 UCT enrolment figures for foreign students, 1,024 (48 percent) were from the SADC countries, beneficiaries of preferential treatment with respect to the withdrawal of subsidies from foreign students.

7.3 Changes in Visa and Study Permit Policies

The biggest problem facing prospective foreign students is the acquisition of study permits and visas. The situation is made worse by the fact that in South Africa, all foreigners are increasingly being perceived as potential illegal immigrants. The immigration policies are thus indiscriminately and unnecessarily punitive.

The entry of foreigners who wish to study in South Africa is governed by the Department of Foreign Affairs. The overriding consideration in processing an application for study permit is that no foreign student should displace or be admitted to a local institution at the expense of a South African student. This is another case indicative of the pervasion of the "our people first" approach in the drive to achieve an acceptable allocation of educational resources. Proof of adequate funds to support the student during his/her stay in South Africa and to cover at least one year's tuition fees (or proof of a bursary) is a prerequisite. In addition, a cash deposit or bank guarantee to defray possible repatriation and incidental costs prior to consideration of study permit must be arranged.
Provision for the issue of study permits is made in Section 26(1)(d) of the Aliens Control Act, 1996 (Act 96 of 1991), as amended, which stipulates that a study permit may be issued to an alien who applies for permission to enter and temporarily sojourn in the Republic as a student. In terms of Section 26(2)(a) of the same Act, application for a study permit may only be from outside the Republic and prospective students are not allowed to enter the Republic without a valid permit. A fee of R360 is levied on study permits, the renewal thereof and in respect of applications for a change of permit conditions. In addition, foreign students are also required to show proof of medical cover when they apply for study visas.

The Minister of Education determined a revised policy on the admission of foreign students to South African tertiary institutions in 1995. The previous policy was that foreign students could not be admitted for undergraduate or pre-diploma study. Exceptions were made if the intended fields of study of applying students were not offered in these students' countries of origin.

Pursuant to the revision of the policy, the Department of Home Affairs left the admission of foreign students to the discretion of respective institutions. Notwithstanding the fact that they might be displacing local students, it has been determined by law that a quota of 10 percent of the total number of students admitted to specialised or selection courses may be foreigners.
The implications for South African tertiary institutions of this change of policy are of immense significance. The legislation is in a way a recognition of the financial and cultural benefits to be gained from foreign students. Over the last decade, tertiary education has become a major export commodity. According to figures provided by Transworld Education, approximately a million and half students travel overseas for their education every year. Of these, about 22 percent come from Asia and the Pacific Rim, 17 percent from North America, and 14 percent from Europe. This is a phenomenon, which presents host institutions with both financial gains and problems.

The changed political climate which was instrumental to the new admissions policy combined with people's curiosity about the country's new democracy make South African tertiary institutions favourites with many foreign students. The UCT International Academic Programmes Office is inundated with requests from foreign institutions to set up exchange programmes, or semester programmes to paying foreign students.

Foreign students have legitimate reasons to feel aggrieved by some of the recent legislation. The spectre of repatriation continues to haunt them throughout their student life and the repatriation arrangements they are required to make in advance compound their anxiety. Foreign students understandably fail to separate these measures from the more stringent and punitive ones designed to halt the influx of illegal
immigrants. The feeling among some foreign students is that the Department of Home Affairs is pursuing a policy of "discouragement". They feel that the legislation is not only unnecessarily punitive and deliberately designed to break their spirit but also tinged with xenophobic motives deriving from feelings of deprivation.

Based on the grievances of foreign students reported through the recently launched Foreign Students Group (FOSAG) at UCT, it would appear that their relationship with the Department of Home Affairs is silently and latently acrimonious. Foreign students expect their host institutions to negotiate better deals with the Department of Home Affairs on their behalf. The university authorities' failure to secure favourable deals for their foreign students has the unfortunate consequence of being perceived as collusion with the Department of Home Affairs.

7.4 Foreign Students at South African Tertiary Institutions

About 11,000 foreign students were studying at South African universities and technikons in 1994. Of these 45 percent were distance tuition students. Sixteen per cent were undertaking postgraduate studies. At the University of Cape Town alone, 15 percent of total enrolments for 1996 were foreign students of which 803 were postgraduates. Students from the SADC region (excluding South Africa) accounted for
48 percent of all foreign students. Including South Africa, there are twelve SADC member states. Figures from UCT suggest that the other eleven states contribute nearly half of the university's total foreign complement.

In 1996 there were 132 foreign students out of a total of 10,163 students at the Cape Technikon alone and the figure stood at 145 out of 9,600 students for 1997 attending one of the 21 universities and 15 technikons in South Africa.

Statistical evidence provided by UCT enrolment figures for 1996 although in no sense conclusive is useful to our understanding of the financial implications of having foreign students attending South African tertiary institutions.

These statistics suggest that most foreign students with permanent residence are originally from the developed countries, about 500 from a total of 549. This weakens the institutions' potential "fund-raising" power from students who come from developed countries, who are expected to pay their full fees. However, it can still be argued that that the loss is compensated for as these students or their parents are now taxpayers in South Africa and are thus entitled to subsidies.

7.5 The Proposed Fees Structure and Subsidy Formula

Until and during 1996 foreign students were being subsidised by the South African government to the same extent as South African students. It was estimated that the
cost to the South African taxpayer of subsidising foreign students at universities and technikons was about R96m for the 1995/96 financial year. In 1996 it cost the government about R14,000 a year in subsidies for a first to third year social sciences student.

Legitimate questions are being asked about the wisdom of continued state subsidies to foreign students while South African students are in dire need of financial aid. This practice has been likened to a mother who feeds her neighbour's children with the little food she has while her own are starving to death. The temptation exists for people to take the analogy literally and whip up emotions, especially when the catchphrase is "our people first". It is a very persuasive and appealing one, but simplistic too as it fails to take into account the complexity of the issue.

Several considerations have helped to shape the interim subsidy formula. Continued subsidies to some foreign students have had to be motivated for and various arguments have been advanced to support the continuation or preferential treatment. However, there is still no coherent policy in place for all South African institutions.

The contentious issue of state subsidies has been dealt with extensively within the tertiary education sector. What is not a subject of debate is the fact that the new admissions policies and continued state subsidies will have the effect of encouraging the influx of foreign students to South Africa and
put additional strain on the South African government and the
country's finite pool of resources. There is general agreement
that the subsidisation of foreign students at the expense of the
South African taxpayer and South African students cannot be
allowed to continue. However, it is the opinion of most people
involved in the formulation of the interim formula that
withdrawal of subsidies must be carried out with great
sensitivity and that a national coherent policy needs to be
formulated to guide the process and make it as painless as
possible for all stakeholders.

In mitigation of continued subsidies to SADC students, one
argument promulgates the advantages for South Africa of
providing educational opportunities to neighbouring countries
within a broader Southern African economic framework. The
definition of neighbouring countries here is synonymous with
SADC member states to which South Africa is a signatory.
The rationale of this "politics of indebtedness" argument is that
South Africa owes its neighbouring countries an incalculable
debt of gratitude for their invaluable contribution to the demise
of Apartheid forces. It is further argued that many exiled South
Africans were also educated in these countries at the expense
of these countries' taxpayer. Moreover, the Apartheid regime's
policy of destabilisation, the wrath that neighbouring countries
incurred for supporting anti-Apartheid forces, did a lot to derail
these countries' development plans, especially those countries
which share common borders with South Africa.
An extension of the above argument is that since co-operation within the Southern African Development Community (SADC) countries is at present being promoted and also expanded to other fields within government and society, it would be counterproductive (?) to terminate all the subsidies to students from these countries.

All things considered, the following categories of students will continue to be subsidised;

- Foreign students from the SADC region will continue to be subsidised. The proposed subsidy level for undergraduate and pre-diploma students from this region would be 80 percent of the corresponding amount to South African students. It is the opinion of most that the subsidy level for this category should not go below 80 percent;

- There is unanimity that all foreign post graduate and post-diploma students should continue to receive state subsidies to the same extent as South African students. The argument is that they enrich the academic activities of universities and technikons;

- Foreign students with permanent residence status will continue to be subsidised to the same tune as South African students;
Children of diplomatic representatives in South Africa will according to diplomatic custom be subsidised in the same way as South African students;

Exchange students will also be exempt from payment of full fees since hosting them will not involve any additional costs as South African students with whom they would be exchanging will have their subsidies paid for them by their hosts; and

Foreign students already in the system will continue to be subsidised with a view to phasing out subsidisation over a three year period. The argument is that it is unfair to ask students to pay increased fees at such short notice.

Notably, the new subsidy formula does not make provision for non-resident foreign students who are registered at residential institutions. It also does not make provision for foreign students registered with long distance institutions such as UNISA.

As from the 1997 academic year, the University of Cape Town started to charge all foreign undergraduates a premium fee of USD 3,250 (R15,500)\(^{58}\) in addition to the academic fees. This figure will be charged to foreign undergraduates who are not permanent residents of South Africa, those who do not have diplomatic exemption, and are not nationals of or

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\(^{58}\) In 2004 the premium had almost tripled to approximately USD 10,000.
residents in SADC countries. SADC students are exempt from this premium fee. It is also not charged in 1997 to students who were registered in 1996 for degrees or diplomas at UCT and who are continuing with the same degree or diploma. Also exempt are foreign students who were registered in 1995 for a UCT degree or diploma and who had received an official long leave of absence from studies for 1996. Although this premium fee does not apply to postgraduate degree and diploma programmes in 1997, it is intended that it will be levied in 1998 on postgraduate programmes that are not entirely research based.

The premium set and fixed in US dollars will cover the subsidy loss and additional administration costs associated with foreign students. There are also other non-academic costs that are required to complete an overseas package such as accommodation, food and living costs for which foreign students will have to pay more (more or in addition?).

The other problem is that state subsidies by their very nature, particularly from the students' point of view, both foreign and local alike, are an invisible government contribution. Students feel that the fees they are paying are ridiculously exorbitant and the suggestion to increase them even further to cover the costs incurred by the Government for their education sounds ludicrous. Aggrieved foreign students see the withdrawal of subsidies as a deliberate attempt to make fees prohibitive. This is another of South Africa's thinly
disguised excuses and convenient instrument to curb the influx of foreign students.

However, it must be made clear what the benefits of the removal of subsidies are going to be for South Africa. Applying the proposed formula, what has been agreed upon by the various stakeholders, and using UCT's 1996 enrolment figures as an example, should give an indication of the benefits to be accrued from the change of policy. Had the policy been applied in 1996, only 236 students out of 2,140 would have been asked to pay their full fees, which are about 11 percent. The state would still have differentially subsidised about 1,904, who have varying degrees of exemption. This represents 89 percent of all foreign students at UCT in 1996.

Although the term "foreign student" is legitimate, one can feel that in South Africa it is increasingly beginning to assume some negative connotations. Out of the substantial collection of prospectuses that I consulted from Universities in the US no mention was made of foreign students. They are simply referred to as “international students”. This term has started to appear on the application brochures of most South African universities as well, although the description of the term has remained largely unchanged.

However, what is important to note is that the route South African institutions are embarking on with regards to differential fees and withdrawal of subsidies for foreign
students is, in fact, long overdue and consistent with trends at other international institutions.

7.6 Massification of Higher Education

The real challenge for South African tertiary institutions is posed by the massification of higher education. The system of education in South Africa has been elitist and exclusionary. The massification process - the transition from elite- to mass-based education - entails increased participation and greater expenditure. The most important aspect of this transition is that increasing numbers of students from financially disadvantaged backgrounds are not only seeking admission to universities and technikons but also looking to the government to cover the costs associated with it.

It is crucial that tertiary institutions respond decisively and efficiently to the demand for tertiary education from the home front without sacrificing or abandoning their obligation to neighbouring countries and their international duty. Foreign students are an integral part of any internationally recognised institution. It is therefore crucial that South African institutions balance their duty to the global village with the demands imposed on them by a local unevenly educated citizenry, the devastating legacy of the Apartheid education.

Universities and technikons have to grapple with the imperatives of redressing Apartheid inequalities, as well as restructuring existing provisions and resources in order to
meet student demand. The university is no longer the preserve of a few privileged students. The goals of equity to which South African institutions have so often expressed rhetorical commitment entail huge financial costs that are sometimes too difficult to be borne by society, even in South Africa where education is a priority.

As a nation, South Africa has committed itself to educating more and more people while its resource base is growing narrower and narrower. The education sector is grossly underfunded. The scramble for funds in South African higher education has the potential to exacerbate deep, historical divisions between institutions and their stakeholders.

University managers have their work cut out for them. They must ensure that these divisions do not get any worse than they are by finding alternative forms and sources of raising funds. The costs associated with the imperatives of greater participation and redress of current inequalities will have to be met from a strategic mix of funding sources, including increasing private sector contributions, introduction of premium fees for foreign students which some universities have started doing, and the withdrawal of subsidies from foreign students. An opportunity also exists for South African institutions to exploit in mercenary fashion, the favourable conditions that they offer and convert demand for their places by foreign students from developed countries into tangible financial gains. If sensibly managed, this category of foreign
students has the potential to yield huge financial rewards for the host institutions. However, the possible economic and social advantage for South Africa in hosting and subsidising some foreign students must be considered against the relatively limited places available at South African institutions.

The tertiary education sector is currently experiencing the tension between rising numbers of students requiring sponsorship and a finite pool of public resources. Global trends show that rapid growth in students’ enrolments is often experienced without a corresponding increase in the public resources allocated to tertiary education. Reproduction of this pattern can be seen in South Africa. Universities and technikons all over the country have been affected by government subsidy cuts. UCT for example, was allotted approximately 60 percent of its allocated formula funding in 1997, as opposed to 66.4 percent in 1996. Institutions also received funding from the Tertiary Education Fund of South Africa (TEFSA). At UCT this money was earmarked for student financial aid. The TEFSA allocation to UCT for 1997 was reduced by R2 million amid increasing numbers of students in need of financial aid.

It is also important that universities and technikons retain the confidence of their foreign students.

Foreign students have always voiced concerns about what they perceive to be punitive immigration controls through their respective host institutions. Some legislation by the
Department of Home Affairs has given rise to effects, which contradict some of the principles and ideals individual institutions treasure and stand for. Most institutions have expressed commitment to ridding their campuses of all forms of discrimination. According to new legislation, foreign students can only be employed in areas, which have a direct bearing to their studies. The legislation makes perfect sense as it seeks to make more opportunities available to South African students. The downside of that, however, is that if foreign students are going to be excluded from certain forms of employment offered by universities and technikons they are attending, then that is discrimination on the basis of their nationalities. This has the unfortunate effect of making university authorities appear like hypocrites who cannot live up to the rhetoric of their mission statements.

The cosmopolitan nature of South African tertiary institutions and the multiculturalism inherent in diversity give these institutions an opportunity to show their tolerance of other cultures. The character of one's own culture can only be recognised by being exposed to and juxtaposed with foreign cultures. In the wake of what foreign students are increasingly beginning to perceive as xenophobic rhetoric and discriminatory behaviour by all and sundry, and at a time when the term "foreign" is beginning to assume some negative overtones, South African universities and technikons must remain the havens of tolerance and embrace heterogeneous discourses and cultures. Xenophobic sentiments feed on
perceived and real differences and prey on feelings of deprivation, which is caused by the other, for instance, the foreign student who does not belong to. The stage is set for tension to mount and the challenge for university and technikon administrators is to manage that tension creatively.

The dichotomy between developed and less developed countries with respect to students' ability to pay their fees is slightly flawed and warrants exploration. The assumption that all foreign students from the developed countries are able to pay full fees is not entirely correct. It fails to take into account the fact that there are some students from less developed countries who can afford to pay their full fees and some from developed countries who cannot afford to pay more than the subsidised fees that they are paying now. Generally, university fees at US universities seem very high, and for some students South African universities and technikons represent their only hope of getting the necessary and affordable education and training they need. Not all students from the developed countries are motivated by a sense of adventure to study at an African university. For some it is a necessity more than a luxury.

7.7 Policy Implications of Massification and Openness of Higher Education

The debate on the massification of higher education and distribution of scarce resources among the various
stakeholders and the clear intention to reach the objectives set in the Reconstruction and Development Programme and subsequent Green and White Papers have various policy implications:

- South Africa's role in Africa and especially its commitment to development in Southern Africa must be clearly defined. The crucial question for South Africa is whether the political, social and economic benefits of being a SADC signatory tally with the costs to be incurred by hosting students from countries which belong to the same political club. A clear indication of the real benefits to be accrued is crucial;

- It may be necessary for South Africa and other SADC member states to forge an educational agreement whereby South Africa will commit itself to paying subsidies for a fixed quota of students from the SADC region. Beyond that quota other member states should pick up the additional costs of subsidies. It may not be financially prudent for South Africa to assume financial responsibility, though partial, of all SADC students at South African institutions. Statistics suggest that students from the SADC region contribute about 50 percent of South African tertiary institutions' foreign students. The financial implications of this large share must be considered;
Revision of the fees and subsidy policy must be informed by all stakeholders and by international trends. This policy must also be tampered by prevalent social, economic and political conditions on the home front. The absence of a national coherent fees and subsidy policy is bound to foment tension not only between foreign and South African students but also between institutions themselves. The position of long distance education institutions and their foreign based clients must also be clarified;

Enrolling foreign students at tertiary institutions is a matter of principle and must continue. It is for this reason that clear and coherent policies regulating the admission of foreign students at South African institutions must be aligned with policies governing foreign students in other parts of the world. Unnecessarily punitive legislation, which appears like a policy of "discouragement" to make foreign students feel unwelcome and victimised, must be revised; and

The withdrawal of state subsidies from foreign students should be tampered by sensitivity considering the hardships that already exist for some foreign students and the problems likely to be caused by the false assumptions emanating from the dichotomy of students from the developed and less developed countries.
There is the danger that attention would be diverted from the sheer impossibility to fund the growing demand for education and that the removal of subsidies from foreign students seen as a lasting solution to the funding woes of universities and technikons. The massification of the education system is the real challenge. The role of the Government must be clearly defined in the drive to reconcile the imperatives of redressing and diminishing resources.

The proposed new funding formula released by the Department of Education in 2001 indicated that earmarked research funding would depend on submissions to the Ministry; no criteria were provided at that stage. In terms of encouraging postgraduate enrolments, the formula proposed to increase substantially the subsidy for postgraduate students.

In summary, the new policy regime aimed at the national level to reorganise science and to enable government to make science more responsive to the needs of the majority. The main policy aims of the Department of Education were to expand and strengthen the research base, develop a national research plan and make access to knowledge production more equitable, both at an individual and an institutional level. However, the policy framework has not touched the issue of globalisation and how to respond to it and has failed to put in place the mechanisms to put policies into operation.
8 Conclusions on the Role of Education

Providing education to all South Africans is a key promise of the new South African Government. This objective goes far beyond the pure need to build a skilled pool of resources for a sustainable economic growth but also includes the need to rebalance the distribution of resources and opportunities to all categories, which have been excluded from access to them during the Apartheid era.

8.1 The Case for Higher Education: Democracy, Knowledge and Skills

The South African government has committed itself to a better life for all. Already some important improvements in the quality of life and the collective well-being of South Africans have taken place. Much remains to be done and ongoing social and economic transformation remains South Africa's central challenge. The long history of inequality, injustice and oppression continues to present an enormous challenge to the goals of societal reconstruction and development.

Dramatic and far-reaching improvements in the quality of outcomes throughout the educational system are a crucial part of solving the complex problems arising from South Africa's past. Higher education itself has a vital role in producing the knowledge, generating the socially committed graduates and providing various services for enabling the country to pursue social equity, justice and higher standards of living for all and
contributing to the revitalisation of the African continent. A monumental effort is required by the government, educators and by the society as a whole to address these challenges with creativity, courage and determination.

The Task Team is mindful of the demands on higher education to be responsive, play a developmental role and be publicly accountable. The demand for public accountability is a necessary and legitimate demand in respect of the use of scarce public resources. Many higher education institutions are doing valuable work. However, there must be greater levels of responsiveness and accountability within the overall system, and higher levels of trust in higher education and between higher education and the government and public.

The lack of trust in higher education is the result of a number of factors. There is a perception that institutions have in various ways remained largely unchanged from their Apartheid past. There is also concern about the quality of the outputs of institutions. Numerous inefficiencies plague the system. Various institutions evince governance and financial problems, inadequate financial systems, the unwarranted duplication of programmes and the lack of optimal use of infrastructure and human resources.

These problems of trust and accountability occur in a new context of the entry of private higher education institutions and the erosion of the historical monopoly enjoyed by public higher education institutions. If they are to maintain their pre-eminent
position within South African higher education, public institutions will have to earn the status of being institutions of first choice for students.

Higher education and public higher education have an immense potential to contribute to the consolidation of democracy and social justice, and the growth and development of the economy, despite the problems and challenges it faces. These contributions are complementary. The enhancement of democracy lays the basis for greater participation in economic and social life more generally. Higher levels of employment and work contribute to political and social stability and the capacity of citizens to exercise and enforce democratic rights and participate effectively in decision-making. The overall well-being of nations is vitally dependent on the contribution of higher education to the social, cultural, political and economic development of its citizens.

8.2 Higher Education, Democracy and Social Justice

Higher education contributes to the enhancement of democracy in many ways. It fosters open and critical intellectual debate, contributes to a vibrant and engaged civil society and increases the possibility of participating in decision-making. Through creating the opportunity for social advancement it also enhances equity and social justice.
The role of higher education in the defence and advancement of democracy is closely related to promoting good citizenship, a function that is accorded to it in the White Paper of 1997. Such a role is also intrinsically related to higher education's ability to deliver programmes that are essential to the promotion of a critical citizenry, and to ensure that the higher education system is firmly rooted within South African society and its particular development challenges.

Higher education can play an important role in supporting social policy development and monitoring and evaluating the implementation of policy. In this way it contributes to society by engaging with the actual problems and challenges of social reconstruction and development as well as by functioning as a social critic. This ability is essential to the long-term role of enhancing society's capacity to consolidate democracy and promote prosperity. The rich tradition of social dialogue and tripartism can also benefit significantly from an effective higher education system through its research, critical thinking and community service functions.

President Mbeki has, on a number of occasions, referred to the role of higher education in society, and especially in emerging democracies such as South Africa. He considers it essential to the stimulation of critical discussion, engagement with social policies and to the reinvigoration of the African continent. The African Renaissance is inconceivable without
knowledge and a critical mass of intellectuals being produced or enriched by higher education institutions.

The role of higher education is to develop greater complementarity between the economic and humanising goals of society. Both these goals are of critical importance to the survival and sustainability of nations, and to their ability to participate effectively in a competitive global arena and to meet the needs of citizens.

Democracy is also essential to the evolution of a learning society. Such a society engages broad social layers of its population in the process of learning and promotes tolerance for differing viewpoints. Democratic learning processes engage wide layers of society in the resolution of its problems and rely on the collective experience and wisdom of communities. Democracy creates the best environment for the achievement of a better life for all and democratic societies have a better chance to sustain and renew themselves.

The value and legitimacy of the higher education system in South Africa will also be judged by the extent to which it provides greater access and opportunity for blacks, and especially Africans and Coloureds, South Africans, women and other socially disadvantaged groups. The higher education system is a potentially powerful agent to enhance the life opportunities of increasing numbers in society over time. High quality, equitable higher education promotes social
mobility and the well-being of larger social constituencies, and thereby increases the stability of such a society.

Some success has already been achieved towards the goals of equity and social redress through developments in higher education in South Africa. In terms of 'race' and gender the student body has become much more representative since 1994. In 1999, 52 percent of students in universities and technikons were female, compared to 43 percent in 1993. In 1999, 59 percent of all students in universities and technikons were African and only 29 percent white, compared to 40 percent African students and 47 percent white students in 1993. These changes in student composition within such a short period are unparalleled in the world and constitute a promising platform for greater equity.

The expansion of access to - and equality of opportunity within - higher and further education for historically and socially disadvantaged groups is essential to long-term development. Equity and access must also reflect greater participation by groups not traditionally well represented in higher education. These include students from working class and rural backgrounds and adults who possess work-related knowledge. The extent to which equity and access are actively promoted or frustrated will determine the nature and extent of social and class stratification and have a direct bearing on the nature of South Africa's democracy, labour market and social stability.
Higher education has private individual and public social benefits. The former relate to enhanced employment possibilities, better salaries and benefits, improved working conditions, improved health and quality of life and greater capacity to participate in policy and decision-making. These private gains also generate public (social) gains such as higher employment rates, higher savings, increased contributions to national revenue and incomes, greater workforce flexibility, a decreased reliance on government financial support and more active citizenship.

Recent studies suggest that in South Africa in 1996, only 2.9 percent of graduates were unemployed and looking for work. This is a remarkably low percentage. Unemployment rates below 3 percent are regarded as full employment since 2-3 percent of any cohort is not employable due to physical or psycho-social problems. The HSRC graduate study further reported that more than 80 percent of all graduates, irrespective of field of study, perceived higher education to be of great benefit to them. This is demonstrated by the huge differences in employability and in the income of graduates relative to non-graduates. Table 10 shows that the average national monthly income of a graduate is more than double that of a matriculant.
### Table 10: Average Income by qualification

<table>
<thead>
<tr>
<th>Level of education</th>
<th>Average monthly income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matriculation only</td>
<td>R 2,904.63</td>
</tr>
<tr>
<td>Matric + certificate</td>
<td>R 4,170.19</td>
</tr>
<tr>
<td>Matric + diploma</td>
<td>R 3,956.11</td>
</tr>
<tr>
<td>Matric + bachelors degree</td>
<td>R 6,535.36</td>
</tr>
</tbody>
</table>

In most developing countries, especially in the African continent, access to higher education has continued to be limited to a relatively small social stratum, which has sometimes used authoritarian forms of government to defend its privileged position. In South Africa, the social and political challenge is to avoid excessively polarising society by closing off avenues of social advancement - indeed, the challenge of the South African tertiary education system is to significantly increase access.

### 8.3 Higher Education, Economic Growth and Development

Studies on the relationship between knowledge production and economic and social development have demonstrated the critical importance of the creation of new knowledge. The growth of knowledge, enhanced by the wider diffusion of information and communication technologies, has been the catalyst for high levels of social and economic development in regions such as the Pacific Rim over the last two decades.

The growth of capital in the global economy is increasingly dependent on knowledge based on a range of disciplines in
the humanities, commerce and the social and natural sciences, and on information and communication technologies. The integration of knowledge is necessary to deal with the complex socio-economic problems of modern societies. The increasing generation and accessing of knowledge has led to what is often referred to as the 'knowledge society', promoted mainly by higher education institutions. Castells (2001) asserts that “if knowledge is the electricity of the new informational international economy, then institutions of higher education are the power sources upon which a new development process must rely”. Such knowledge production is especially important for developing countries where the return on investment in higher education is much higher. In South Africa, a considerable proportion of intellectuals and knowledge production, dissemination and application are located in higher education institutions. The development of a knowledge society could contribute significantly to managing and mediating the impact of globalisation.

A central feature of South Africa's economic policy is meeting the challenge of international competitiveness. An inability to compete will increasingly marginalise the South African economy, have profound effects on its rate of growth and consequences for the social well-being and stability of South African society. The acquisition of knowledge and access to new knowledge and technology creates new global power relations. Those countries that cannot gain access to
knowledge and information technologies will continue to be dominated by countries that can adapt to its demands. Unequal access to knowledge and power reinforces inequality both globally and within countries. In the words of Brazilian President Fernando Cardoso, these countries will “not even be considered worth the trouble of exploitation, they will become inconsequential, of no interest to the developing globalised economy”. Castells warns that the “systematic logic of the new global economy does not have much of a role for the majority of the African population in the newest international division of labour. The experience of Africa's transition into the new global economy is that 'structural irrelevance' is a more threatening condition than dependency”.

The South African labour market has been undergoing major restructuring. Increasingly capital and knowledge intensive production and services have created a growing demand for skilled professionals in the scientific, technological, technical, and business fields. Professional and managerial occupations have been growing at 5 percent per annum. It is estimated that their share of total employment will increase from 15.2 percent in 1997 to 22 percent by 2002.

From an economic perspective, the private and public returns on many higher education programmes are, at present, greater than other levels of the education system. The availability of skills in the sciences and the technological, technical and business fields, is a precondition for competitive
success in the production of a wide range of internationally traded goods. The manufacturing, processing and service sectors, which will have a dominant impact upon the country's economic future, will depend much more on the knowledge produced and applied in and by higher education institutions. This is not so in the primary sectors, where South African output and employment has, in recent years, been stagnant or in decline.

It has been argued that international competitiveness could be achieved via short-term steps such as downsizing, privatising, retrenching, cutting of budgets and reducing deficit (also known as the 'low road'). The government's avowed policy is instead to pursue the 'high-road' in its industrial, science and technology, trade, investment and other strategies. This requires the expansion and improvement of higher education to alleviate one of the major present constraints on economic expansion: the shortage of good quality high-level skills. Such expansion and improvement would promote the possibility of jobs for many less skilled and unskilled workers, and a net improvement of economic welfare and equity could be the likely result.

As the share of intellectual value-added-in economic processes continues to grow, the ability to think abstractly will be increasingly important across all professions. Educational experience should span the natural and human sciences and promote the integration of knowledge. The resolution of many
developmental problems is dependent on recognising that it has to be inter- and multi-disciplinary. The knowledge and adaptability and flexibility of skills acquired through life-long learning can enable graduates in developing democracies to operate in diverse social settings and develop complex notions of identity and citizenship. Educational systems that are responsive to social needs and the development challenges are much more likely to be vibrant. Overall, higher education contributes to social and economic development by increasing the level of cognitive skills throughout the society.

The process of democratic transformation and globalisation has placed new demands on the state and on the public service. The development of an honest, efficient, effective and innovative public service is crucial to overcoming the legacy of Apartheid. The ambitious social transformation agenda of the reconstruction and development programme can only be tackled through a professional and skilled bureaucracy. Higher education can play a major role in generating the high and medium-level conceptual, policy development, planning and implementation capacities and managerial, administrative and financial competencies and skills that are needed in the public sector.

Higher education also has a crucial role to play in improving the quality of schooling, healthcare, welfare services and other public services at national, provincial and local levels. This requires more active promotion of continuing
education and the upgrading of professional knowledge and technical skills, and creating flexible opportunities for life-long learning for practicing education, health, social services and other public sector personnel. It also requires thoughtful applied and strategic research around key social policy issues and the concrete problems of social reconstruction and development. Such research and the upgrading, consolidation and continuous enhancement of the knowledge, competencies and skills of public sector personnel is necessary for innovation, improved social delivery and development. Giving effect to life-long learning will require concentrated effort, the development of flexible continuing and adult education programmes and support and resources for such work.

Higher education is critical to the resolution of many of the unique and complex problems and challenges that South Africa and Africa face as a whole. These problems require solutions that take into account the African context. While the ability to access and apply knowledge and technologies is extremely important, the solution to many problems lies in the generation and application of knowledge and technologies appropriate to the peculiar conditions of the continent. The African renaissance will not be possible without higher education producing sensitive and committed intellectuals, scholars, writers, dramatists, artists, musicians and critics.
8.4 Public and Private Partnership for Economic Development

Globalisation and the development of knowledge-based economies have opened up unprecedented opportunities for business and universities to enter into a series of mutually beneficial relationships. South Africa can make gains out of proportion to its own investment by using a variety of practices pioneered and developed in other parts of the world.

Many of South Africa's competitors in the developed and developing worlds have recognised that their higher education institutions are major economic resources. First, universities educate and train people to be more productive in the real, new economy. Increasingly, university programmes focus on re-training and lifelong learning for adults, as well as on the traditional university intake of young people. Secondly, universities are sources of new knowledge that can be turned into economic growth.

8.5 Business Requirements to Higher Education

It is important and necessary to distinguish between the specific training needs of business and industry, and the role of higher education in developing critical thought and the generic skills that make graduates flexible and adaptable. The higher education system cannot - and must not - be reduced to servicing business's immediate needs. However, it should
be responsive to them, as well as to broader changes in the economy.

A report published by the American Council on Education, “What business wants from higher education” is directly relevant to current debates around higher education in South Africa. It makes the important point that higher education, viewed in terms of business’s interests, “is about more than productivity in the workplace”. The quality of life for individuals and the societies in which they live is linked to higher education in many ways - including their ability as citizens in a democracy to contribute to public debate and make informed decisions.

The report then goes on to make the case that business needs:

- Employees who are intellectually equipped to work in the 21st century; who are ‘successfully intelligent’ and can think analytically, creatively and practically;
- Graduates with excellent communication skills; who are flexible, able to work in teams and with people from diverse backgrounds; who have received a sound ethical training, and have an informed understanding of globalisation and its implications;
- Teachers trained to lay an excellent foundation in the school system - a dimension often neglected in discussions around higher education;
A system of life-long learning in the changing world of work;

A society with a large proportion of highly educated people, because among other things they are important for the economy as high earning consumers; and

Institutions that produce knowledge and information with business applications. While HEIs are only one element in the institutional mix, there is a growing emphasis in many countries on the role of universities in this context.

How successfully are South African universities and technikons meeting these requirements?

And to what extent does South African business understand the ways in which its own interests are linked to the health and efficiency of the higher education system?

8.5.1 South African Business and Higher Education

The Centre for Development and Enterprise ("CDE") recently commissioned two research studies to establish how South African business currently thinks about its relations with higher education, and what it needs from higher education in the context of global economic competition. The first study involved a substantial number of interviews with business leaders in the corporate sector and professional organisations.
A second smaller study focused on business people serving on the councils of seven South African universities. The findings were not encouraging.

Fierce competition among businesses to recruit suitable graduates from a shrinking pool means that many companies are reluctant to divulge their recruitment strategies or information about their relations with specific HEIs. However, it is evident from CDE’s research that South African business in general has no clear sense of what it wants from higher education, apart from a few obvious points: more effective preparation for the world of work; more maths and science graduates; and a greater emphasis on business and technical courses - all too often narrowly conceived in terms of a Bachelor of Commerce degree. Many senior people in business appear to have a limited understanding of the information age and its implications for economic activity. Only a very small proportion of people interviewed mentioned the importance of critical thoughts as something required by business in the 21st century.

While business is not unwilling to interact with HEIs, especially in discussions around curricula, this is generally thought of as involving a dialogue with specific institutions and faculties, rather than a system-wide concern. Companies tend to put their money into individual students through bursaries and scholarships, into individual members of academic staff through salary supplementation and sponsored chairs in
specific disciplines, and into particular institutions through strategic bilateral arrangements - generally those institutions which they see as having proven track records. By and large, business is very narrowly focused in this regard, though there are notable exceptions.

Organised business doesn't talk directly to universities about its needs or what should be provided. The National Business Initiative's focus in the educational sector is on schools, colleges, and further and technical education, not on the university sector.

In large corporations it is unusual to find anyone who can take a view of business's overall needs in relation to the higher education system. Inside these corporations, various structures deal with such matters from their own different perspectives - recruitment is a human resource issue, research is dealt with by the R&D people, educational matters as such go to corporate social investment programmes, and so on.

There is little awareness that business might be able to play an active role in response to the crisis in higher education, or in influencing education to meet the challenges of globalisation. No coherent sense of direction emerges, except in a few specific sectors and professions.

Business leaders, perhaps understandably, would rather look to government to develop a vision and formulate policy. They're hesitant to adopt a common position or strategy. They
are reluctant to put forward unpopular or critical views in public, especially where they perceive that issues are politically sensitive.

In the second CDE study, interviews were conducted with seven senior business people, most of them with very lengthy periods of service on university councils across the spectrum of historically differentiated institutions. The most significant finding for the purposes of the present discussion was their general perception that business has not established its claims as a primary stakeholder in higher education in the eyes of administrators, academic staff and other interests represented on councils.

The real question that emerges from CDE's research is whether South African businesses can rise to the challenge of defining not only their individual but also their collective interests in the higher education system and then find ways to promote them effectively.

8.5.2 South Africa's Universities

Business in every country needs the state to make an investment in tertiary education. However, the way in which South Africa's universities are handling that investment comes close to being a liability as far as business's interests are concerned. Most South African universities have not adapted to the economic challenges facing South Africa. They are not utilising ways to generate additional income by making
themselves viable partners with business. They are not oriented to developing partnerships with business or industry beyond traditional business school and engineering faculty links, and are still a long way from conceiving of themselves as 'entrepreneurial' in their relations with business. Given the financial pressures in higher education, the strategic question for our universities must be how to diversify their financial base. They can learn from impressive examples showing how this has been done in other parts of the world over the last two decades with positive spin-offs for teaching and research programmes, without compromising the academic endeavour in either respect. South Africa's HEIs must build on their individual strengths, with a special emphasis on responsiveness to needs in their local and regional economies. In this respect as in others, institutions must define their missions realistically to meet different needs, playing complementary roles in the national system of higher education. Each must aim for excellence in delivering its own particular mission. South Africans are hesitant to talk about merit and the need for excellence. However, how many world-class centres of excellence can South Africa realistically aim to have? Probably not a single university in South Africa can currently assemble critical mass at international levels in its key departments and research centres. South Africa has to nurture and strengthen centres of excellence - institutions, departments, and programmes. This will require some hard choices; but these are postponed at the nation's peril.
8.5.3 Business-University Partnerships

The overwhelming majority of business people in South Africa still think that the only thing business can do for higher education is to provide grants or donations, but this is only a very small part of contemporary business-university relationships worldwide. A comprehensive international survey undertaken for CDE shows fourteen major ways in which business currently engages with higher education worldwide. And in every country surveyed, governments are attempting to create conditions in which business and universities can work together to an even greater extent.

Major ways in which businesses engage with universities include:

- Working with universities in local or regional economic development. In fact, some of the most fruitful relationships are regional or local rather than national;
- Influencing the strategies and missions of universities by playing an active part in governing bodies or acting in an advisory capacity;
- Helping university management to become more business-like, for example by focusing on adding value to their core business as universities and outsourcing other functions;
Promoting the concept of lifelong learning and providing ongoing access to higher education for employees;

Providing opportunities for work-related learning to students;

Using university staff in a consultancy capacity;

Using university facilities for production plants, workshops and laboratories, which allows to avoid the duplication of facilities at the companies and providing at the same time income to universities;

Influencing the quality, quantity and direction of university research through grants or contract funding;

Working with universities and academics to jointly develop and commercialise the intellectual property they produce, which allows to generate income for the university and its staff involved;

Developing ideas from university research in the public domain, and subsequently converting these into economically productive products or services; and

Influencing public policy on higher education through policy forums and task teams.
At the public policy level, highly influential business-higher education partnerships have been set up in many countries to meet the challenges of the knowledge-based economy. Examples include the Council for Industry and Higher Education (“CIHE”) in UK, the Business-Higher Education Forum (“BHEF”) in USA, the Corporate-Higher Education Forum in Canada, the Business-Higher Education Roundtable in Australia, the Business-University Forum in Japan, and the Polish Higher Education-Business Forum, among others. It is worthwhile to look a little more closely at two of these business-higher education forums, which are closer to the South African reality.

8.5.4 The Experience of the United Kingdom and USA

It is valuable to compare the South African Governance Model with the governance model already in place in other developed countries, in particular the United Kingdom and the United States.

8.5.4.1 The Council for Industry and Higher Education (“CIHE”)

The Council for Industry and Higher Education in UK is founded on the belief that Britain's future depends on the development and application of knowledge. CIHE is not just a pressure group for business. It has a much wider vision of the role of higher education in society in a creative partnership
with business. It was formed in the 1980s by a small number of business leaders who felt that higher education and business were talking at or past each other - and that establishing the process of dialogue was as important as specific outputs or even an agreed agenda. Membership is by invitation, and comprises leading business people, vice-chancellors of universities and heads of other HEIs and of four Further Education Colleges. CIHE has some 40 members from private sector companies representing a cross-section of British business ranging from financial institutions, IT and engineering companies, through to the service sector; and it deliberately includes three small or medium sized enterprises so as to engage with their rather different perspectives. Similarly, the fifteen vice-chancellors represent institutions ranging from internationally recognised research centres such as Cambridge University, Imperial College London, and Edinburgh, through to the University of Westminster (a former polytechnic), and Glasgow Caledonian (whose mission is largely to serve the inner-city population) - institutions with very diverse missions, recognised as all equally valid and having complementary functions in the system of higher education. The heads of the Quality Assurance Agency and the Higher and Further Funding Councils are also present at CIHE meetings. A government minister normally attends, together with senior officials from the Department of Trade and Industry or the Department for Education and Employment depending on the issues being discussed. Various working
groups support CIHE, including a policy forum composed of senior human resources representatives from business, and representatives from the academic world. Other sub-groups are formed to work on specific topics. Issues tackled by CIHE have included:

- The need to increase participation rates in higher education to 50 percent to match the best of Britain's international competitors such as South Korea and Singapore; an objective which has been adopted by Tony Blair's Government;

- Increasing access for disadvantaged groups - seen as both a social and an economic imperative - so that as businesses implement flatter organisational structures, individuals throughout the organisation will have the knowledge, power and confidence to take decisions; and

- Defining the kind of skills needed by graduates, such as academic depth and critical ability, flexibility, high-level transferable skills, problem-solving skills, communication skills and the ability to learn for themselves.

CIHE promotes collaboration between business and academia to help develop relevant skills, among other things by trying to provide opportunities for quality work experience for every student. It has a subsidiary, the National Centre for Work Experience, which focuses on this issue. It has also
encouraged partnerships with HEIs in developing real life case studies and simulations, refreshing the curriculum and helping the system to become more flexible. CIHE considers that students must not only be equipped with skills that make them more employable; their academic training should also encourage them to become entrepreneurial, to think about starting their own businesses and create wealth. CIHE is increasingly concerned with issues of quality, as it believes that too many institutions in UK are trying to do too many things. They lack critical mass in world terms, and haven't thought enough about comparative advantage either as institutions or at the departmental level. The CIHE stresses that HEIs in Britain must decide on their focus and missions, and that, like businesses, they must outsource and buy in courses from other institutions where they don't have critical mass. To achieve economies of scale and share best practice they need to engage in partnerships with institutions sharing the same mission, with other institutions in their locality and with private companies.

8.5.4.2 The Business Higher Education Forum

In USA, the Business-Higher Education Forum ("BHEF") was established in 1978 by 20 presidents, chairpersons or chief executives of business corporations, and 20 presidents or chancellors of universities. Membership has now grown to 90, by a process of invitation. It acts under the auspices of the
American Council on Education and the National Alliance of Business. The BHEF has 3 main goals:

- To identify and act on public policy issues of joint concern to business and universities;
- To enhance public awareness of such public policy issues; and
- To guide the evolution of relationships between business and higher education in USA.

Since its inception, the BHEF has published influential reports in areas such as higher education and global economic trends (America's Competitive Challenge) and relationships between business and higher education (Corporate and Campus Co-operation). One of its major initiatives at present is a study of university-industry research collaboration. Observers credit the BHEF with major influence on public policy, especially in the area of legislative change to permit easier commercialisation of research results. Globalisation and the macroeconomic policy environment with its strong emphasis on an outward-looking economy, export-oriented industries, inflation targeting and control of public expenditure, brought about a profound reorientation in business-university relations in UK in the late 1970s and early 1980s, a little later in USA, in Canada and Australia at the end of the 1980s, and are now doing so in a large number of Latin American countries. The adoption of a macroeconomic policy that is outward-oriented and globally competitive is almost
always followed by a corresponding decision to reduce university funding as part of reducing public expenditure overall. This forces a reorientation of universities towards more beneficial relationships with business. In many cases legislation helps to drive the process forward through laws such as the Bayh-Dole Act, which made it possible for American universities to benefit from intellectual property produced from federally funded research and similar legislation in many other countries. Governments in pursuit of an entrepreneurial and outward-looking economy encourage universities to become entrepreneurial themselves. Measures include the establishment of new government agencies to promote relations between business and universities, generally under the auspices of the department responsible for trade and industry.

8.5.5 The “Triple Helix”

Industrial innovation is becoming as important as teaching, research, and community service in modern universities' range of activities; and governments are encouraging businesses to outsource research to universities through policies and funding provisions that further stimulate the process. The relationship is therefore not between two partners but three: business, universities and government. A number of thinkers have developed the concept of the 'triple helix' to describe this relationship, implying that a new kind of intellectual and
economic life is being created. The protagonists of this view believe that there is evidence that this process has now developed an autonomous life of its own, no longer dependent on continuous planned support from any of the three parties involved. Every time a successful business-university-government project is developed, this creates more opportunities for further projects, which multiply in their turn. Argentina, Australia, Brazil, Canada, Costa Rica, France, Hong Kong, Japan, Malaysia, Singapore, the United Kingdom, USA and Venezuela all have specific government agencies working with universities and business to encourage various kinds of partnerships, primarily in technology transfer and the commercialisation of research results. Examples include grants to 'technology incubators' in Brazil; support for research centres developing technologies for regional industries in Japan; the ambitious development of the Johor 'technopolis' in Malaysia; the promotion of 'smart partnerships' between academia and industries by the Malaysian Industry-Government Group for High Technology; the Teaching Company Scheme in UK; and the Government-University-Industry Research Roundtable in USA. Two very different examples serve to illustrate ways in which governments are promoting business-higher education partnerships: namely, the Teaching Company Scheme in UK, and the National University of Singapore. The Teaching Company Scheme (TCS) is a government programme that enables high quality students to work in companies for an average of 2 years while
completing graduate studies or immediately after graduating. Government grants are made to educational institutions to cover their costs. Other costs are borne by participating companies. Participating students (known as TCS Associates) work on projects which are central to the company's needs. The academic institution and corporate personnel provide supervision. The TCS aims to increase the transfer of up-to-date knowledge and skills to companies, to provide the TCS Associate with work experience, and to stimulate co-operation between business and universities. To date, 367 academic departments from 95 higher education institutions have been involved with more than 650 companies. In 1998/9, government expended GBP 16 million and participating companies GBP 29 million on the scheme. The National University of Singapore (NUS), like most Asian universities, has no hesitation in identifying that the main reasons for its existence is "to play a role in the development of the national economy". In this effort, it works with guidelines provided by the government's Economic Development Board and in close conjunction with business. The main areas of co-operation are R&D, technology licensing, technical services and project management, specialist training courses, the formation of joint business-university companies to commercialise research results and technology venture development. This applied research (as well as the more usual basic research) is used to strengthen the teaching methods and provide work experience for students. NUS works with over 100 private sector
companies through its Industry and Technology Relations Office. NUS has some 34 research partnerships with local, national and international businesses. NUS and its business partners have jointly launched 9 spin-off companies based on commercial exploitation of university research. These companies are selling processes and products in fields as diverse as genetically engineered micro-organisms, treatment of waste water, capillary electrophoresis, ruby and optical crystals, and body implants. While the focus is on business-university partnerships, it is important to note that economic collaboration between universities and business is not restricted to the area of private entrepreneurship, with a dominant profit driver. Many universities have brought knowledge and skills into partnerships with private sector finance to provide support and development opportunities to poor communities in search of a sustainable economic base. For example, Carleton University in Ottawa and the University College of Cape Breton in Nova Scotia, Canada, have worked together with community development enterprises on Cape Breton Island to halt and reverse economic decline in the area. These two universities have now extended their activities to a very different marginalised community in the Yucatan area of Mexico, home of the remaining Mayan people who were living there when the first Spanish colonisers arrived. In every country surveyed for the CDE’s report, governments are attempting to create conditions in which business and universities can work together to an even greater extent. By
contrast, South African universities currently have a low level of co-operation with business. At the same time, South African business has not thought seriously enough about the kind of universities that both business and the country need. It has put minimal effort into influencing either state policy on universities or the ways in which universities manage themselves or define their missions. In this context it is therefore encouraging that in the field of science and technology, government policy post-1994 has been designed to encourage and support innovation, inter-disciplinary studies and cross-sectoral co-operation among research institutes and HEIs, and that there is also a growing recognition of the importance of promoting links between HEIs and business. Research links between universities and external bodies are multiplying in a very encouraging way. The volume of contract research commissioned by industry and government is growing. There has also been a considerable increase in state funding for programmes that promote collaborative work between industry and academia. THRIP is a major example, stemming from a Department of Trade and Industry policy initiative, and run by the National Research Foundation on behalf of DTI. Another example is the Innovation Fund run by the Department of Arts, Culture, Science and Technology. In programmes of this kind there is a clear shift from pure research towards research with an eye to practical applications, innovation and entrepreneurship. But the field is still underdeveloped, and could be expanded even more vigorously. A key issue is how
HEIs can organise their operations to find synergies with the business sector. In the past few years, there have been a number of exciting instances of universities, technikons, and research councils responding to this policy framework. For example, incubation work in the engineering faculty at Pretoria University is an important development in the relationship between the university sector and business. The Gauteng innovation hub, another recent initiative, is the result of an alliance between the CSIR, Pretoria University, and other stakeholders. This aims not only to transfer technology but also to transfer entrepreneurial capability, interacting with established companies and creating start-up opportunities for new ventures and new technologies. Initiatives of this kind can make an important contribution to the country's competitiveness.

8.6 Conclusion on the Co-operation between Business, Universities and Government

International experience shows that economic globalisation is the key force behind the changing relationship between business, universities and government. Economic globalisation has created a greater drive for competitiveness in business and a relentless search for niche export areas, often involving high technology production, marketing and sales. In turn companies are seeking more highly qualified employees and require access to 'lifelong learning' and skills improvement for their employees throughout their careers. Universities must
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respond to these needs and to the other increasing demands of a knowledge-based economy. This does not only apply to areas of high technology. Both knowledge and technologies of implementing it are just as vital in programmes of poverty relief and the development of markets in communities previously excluded from the benefits of modern innovation. A better quality of life for all has to be based on better knowledge, better products and better economic growth. Business and universities could co-operate fruitfully in all these areas, even if the demands of economic growth were not actually compelling them to do so. If South Africa believes that its future lies in a knowledge-based industry, and more particularly in small knowledge-based enterprises, then business and government should invest in universities. But there are critical issues that have to be faced:

- South Africa needs more and better educated people in all avenues of life. In particular, South Africa needs more graduates to support the development of a knowledge-based economy, both in organisations and as entrepreneurs. However, the harsh reality is that the national participation rate in higher education is dropping towards levels found in the least developed countries. At only 15 percent in the relevant age group, this must ring alarm-bells for South Africa’s future competitiveness. By contrast, the average participation rate in OECD countries is 51 percent, over 70 percent in USA, and 21 percent
in middle-income countries. South Africa must recognise that a well-educated population is crucial to the country's future. Increasing the participation rate must become a major policy-driver;

- The skills crisis in even the most reputable universities and in academic departments critical to the economy must be tackled as a matter of urgency by business and higher education; and

- A national innovation system hinges on collaborative interactions among tertiary institutions, government and industry. If the lack of effective communication between these sectors persists, South Africa's chances of becoming a really innovative country will be minimal.

It is important that this situation changes. All stakeholders involved can gain very positive outcomes from sensible alliances, partnerships and commercial transactions between business and universities without loss of identity or autonomy. Much of the learning about what works has already taken place in other countries.
9 New Strategies: Creation of Intellectual Networks to Capitalise on the Diaspora

The political pressure generated by the brain drain phenomenon requires innovative solution approaches that are faster and easier to implement than complex governance models between industries, government and academic institutions.

Alternative solution approaches are also important because of the uncertainty around the number of highly skilled people who are working beyond the borders of their home country.

However, these alternative approaches need to be effective on two issues, i.e. maintain access to the pool of know-how and limit the outflow of skilled resources.

The most recent studies on alternative solution approaches are based on the hypothesis that the number of skilled resources, in particular Scientists and Engineers, originally from a developing country and working in R&D in the United States, in Japan and in the EU, are close to 400,000 individuals. In comparison, the total – home based – R&D personnel for all developing countries amount to 1,224,000 Scientists and Engineers (O.S.T. 1996). One must not forget that this "triad" does not include countries such as Australia, Canada, New Zealand and Switzerland, among others, which are also well known for their high rates of highly skilled foreigners. Therefore, to assume that the R&D workforce originally from developing countries and currently employed in
highly industrialised countries represents one third of the home-based one, is a reasonable and rather low, hypothesis.

The figures presented above give an order of magnitude for the overall expatriate population of developing countries, which is involved in R&D. These quantitative estimates must be combined with qualitative aspects. The expatriate Scientists and Engineers to whom it is referred here work in an environment, which is far better than that of their peers in the country of origin. They indeed have access to funding, technical support, equipment, scientific networks, experimental conditions, and many other resources which are much more limited at home. The productivity of the "triad" R&D sector is, for instance, 4.5 times higher in terms of publications and 10 times higher in terms of patents than it is in the same sector for the developing world. This obviously only refers to both mainstream science and technological innovation. But these are precisely the ones that count for the international competitiveness of organisations and countries in a global knowledge-based economy. Consequently, for the developing nations as a whole and under the assumption described above, the R&D expatriate capacity is significantly higher than the one that is based at home.

The importance of accessing and retaining access to remote pools of knowledge points to both the quantitative and qualitative importance of this new form of diaspora. Skilled emigrants constitute for the developing countries a huge
potential of additional resources, provided that the home country manages to systematically tap even only a part of these resources. Such a scenario appears to be realistic.

### 9.1 Capitalising on the Intellectual Diaspora

Since the beginning of the 1960s, the *brain drain* has been identified as a problem, hence something against which policies had to react and struggle through voluntaristic decision-making. Until the late 1980s, national or international policies have focused on countermeasures, either to prevent/regulate flows of skills or to cancel their negative effects through taxation. Though their design had often been thoroughly studied, they failed to bring feasible or effective solutions (Meyer et al., 1997). Today, it appears that these repeated failures are mainly due to the partially wrong underlying theoretical assumptions on which these policies were based. They basically referred, indeed, to human capital approaches where the skilled person is conceived as an individual capital asset, made of all her qualifications and professional experience, which are the result of prior investments (Gary Becker). Accordingly, the two ways to counter the loss of human capital is either to restrict the flows through authoritative or negotiated decisions or to evaluate its monetary cost and get financial compensation. This model simply could not work because the human capital approach reflects only a small part of the phenomenon.
For the past two decades, the sociology of science and technology has brought a new understanding of the process of knowledge creation, transmission and application. It insists on the collective nature of such a process, emphasising the role of scientific communities (Robert Merton, for instance). They show that these are socio-cognitive communities, not only social or institutional ones (Thomas Kuhn’s paradigm). They demonstrate that this socio-cognition is very specialised and thus enacted in local – not easily duplicable or replicable – conditions, involving partly collective tacit knowledge built through daily group practice and requiring the individual’s enculturation (Harry Collins’ core sets\(^{59}\)). This individual’s abilities and activities only make sense and generate results with regard to the human and non-human entities to which she is linked (Michel Callon and Bruno Latour’s actor-network theory).

The approaches presented above reveal that – especially in the field of science and technology – the embodied knowledge of the people (human capital) is but one resource amongst many and one whose value and effectiveness is relative to its combination with the others. Empirical proof of this is provided by numerous examples of talented scientists or engineers being misused or underutilised when they go back to their country of origin where their abilities are disconnected from what used to make them powerful (see for

instance Gaillard, 1991). This leads to an approach emphasizing connectivity and which departs from the traditional brain drain assumptions.

For the last two decades, the conception about the migration of skills has evolved, putting stronger emphasis on brain gain, which is based on the idea that the expatriate skilled population may be considered as a potential asset instead of a definite loss. The Scientists and Engineers abroad appear as human resources educated, trained through professional practice, and employed in much better conditions than those that the country of origin could have provided for. If such a country is able to use these resources largely shaped through others’ investments, it would then gain a lot. There are two ways to implement the brain gain: either through the return of the expatriates to the country of origin (return option) or through their remote mobilisation and association to its development (diaspora option in combination with intellectual networks).

The return option has been successfully realised in various new industrialised countries (NICs) such as Singapore and the Republic of Korea or large developing countries such as India and China (Charum, Meyer, 1999). Strong programmes to repatriate many of their skilled nationals abroad have been put in place since 1980. In fact, they have created at home the networks in which these individuals could effectively find a place and be operational. However, these countries are not
surprisingly the ones that could afford to significantly invest in Research and Development material as well as human infrastructure. They had started to build the research and technical-industrial web, which could appropriately sustain such R&D activities employing returning Scientists and Engineers. Obviously the success of that option depends very much on this specific capacity. Such a prerequisite is not easily matched by many developing countries.

The diaspora option is more recent and proceeds from a different strategy. It takes for granted that many of the expatriates are not likely to return. They have often settled abroad and built their professional as well as their personal life there. However, they may still be very concerned with the development of their country of origin, because of cultural, family or other ties. The objective, then, is to create the links through which they could effectively and productively be connected to its development, without any physical temporary or permanent return. This type of distant cooperative work is now possible as cases of international research projects or multinational corporations’ daily activities have already demonstrated clearly. Moreover, relationships between expatriate intellectuals and their mother country have often existed in the past. What is new today, is that these sporadic, exceptional and limited links may now become systematic, dense and multiple as shown in the establishment of intellectual networks.
A crucial advantage of the diaspora option is that it does not rely on a prior infrastructural massive investment, as it consists in capitalising on already existing resources. It is thus at hand for any country, which is willing to make the social, political, organisational and technical effort to mobilise such a diaspora. A promising perspective in such a strategy is that through the expatriates, the country may have access not only to its individuals' embodied knowledge but also to the socio-professional networks in which they are inserted overseas. This is quite an extensive version of a connectivity approach and represents what is at stake in such initiatives around the world today. In fact, a number of countries have indeed made use of the "diaspora option".

Forty-one expatriate knowledge networks have been identified around the world to date. These networks, listed on Table 11, have the explicit purpose of connecting the expatriates amongst themselves and with the country of origin and of promoting the exchange of skills and knowledge. Other recent expatriate networks do exist without any emphasis on knowledge, pointing to the rise of diasporic links as a more general and global phenomenon (Cohen, 1997).

The expatriate knowledge networks are tied to 30 different countries, some of these having more than one network. Two networks refer to a world region rather than a specific country: The Arab Scientists and Technologists Abroad (ASTA) and the Latin American Association of Scientists (ALAS). The
networks were all initiated recently, during the late eighties and mostly the nineties. They emerged very spontaneously and independently of each other, thus they are all diverse and heterogeneous. These networks differ in size, scope, objectives, activities and structure. The initiators, sponsors and participants of such networks often ignored the existence of similar initiatives elsewhere. In an attempt to make sense of this vast array of information, typologies of expatriate knowledge networks needed to be defined.
<table>
<thead>
<tr>
<th>Country</th>
<th>Name of Network</th>
<th>Type of Network</th>
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<tbody>
<tr>
<td>Arab Countries</td>
<td>The Network of Arab Scientists and Technologists Abroad</td>
<td>Intellectual/Scientific Diaspora Network</td>
</tr>
<tr>
<td>Argentina</td>
<td>Programa para la Vinculacion con Cientificos y Tecnicos Argentinos en el Exterior (Program for the Linkage of Argentine Scientists and Technologists Abroad) (PROCITEXT)</td>
<td>Developing Intellectual/Scientific Diaspora Network</td>
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<tr>
<td>Assam</td>
<td>Transfer of Knowledge and Technology to Assam</td>
<td>TOKTEN Programme</td>
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<tr>
<td>China</td>
<td>Chinese Scholars Abroad (CHISA)</td>
<td>Student/Scholarly Network</td>
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<td></td>
<td>Society of Chinese Bioscientists in America</td>
<td>Local Association of Expatriates</td>
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<td></td>
<td>Chinese American Engineers and Scientists Association of Southern California (CESASC)</td>
<td>Local Association of Expatriates</td>
</tr>
<tr>
<td>Colombia</td>
<td>The Colombian Network of Researchers and Engineers Abroad (Red Caldas)</td>
<td>Intellectual/Scientific Diaspora Network</td>
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<tr>
<td>El Salvador</td>
<td>Conectandonos al Futuro de El Salvador (Connecting to El Salvador’s Future)</td>
<td>Developing Intellectual/Scientific Diaspora Network</td>
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<tr>
<td>France</td>
<td>Frognet</td>
<td>Student/Scholarly Network</td>
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<tr>
<td>India</td>
<td>Silicon Valley Indian Professionals Association (SIPA)</td>
<td>Local Association of Expatriates</td>
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<td></td>
<td>Worldwide Indian Network</td>
<td>Intellectual/Scientific Diaspora Network</td>
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<td></td>
<td>The International Association of Scientists and Engineers and Technologists of Bharatiya Origin</td>
<td>Developing Intellectual/Scientific Diaspora Network</td>
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<td></td>
<td>Interface for Non Resident Indian Scientists and Technologists Programme (INRIST)</td>
<td>Developing Intellectual/Scientific Diaspora Network</td>
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<td>Country</td>
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<tr>
<td>Iran</td>
<td>The Iranian Scholars Scientific Information Network</td>
<td>Intellectual/Scientific Diaspora Network</td>
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<tr>
<td>Ireland</td>
<td>The Irish Research Scientists’ Association (IRSA)</td>
<td>Intellectual/Scientific Diaspora Network</td>
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<tr>
<td>Japan</td>
<td>Japanese Associate Network (JANET)</td>
<td>Student/Scholarly Network</td>
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<tr>
<td>Kenya</td>
<td>Association of Kenyans Abroad (AKA)</td>
<td>Developing Intellectual/Scientific Diaspora Network</td>
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<tr>
<td>Korea</td>
<td>Korean Scientists Engineers Association of Sacramento Valley</td>
<td>Local Association of Expatriates</td>
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<td></td>
<td>The Global Korean Network</td>
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<tr>
<td>Latin America</td>
<td>Association latino-americaine de Scientifiques (Latin American Association of Scientists) (ALAS)</td>
<td>Intellectual/Scientific Diaspora Network</td>
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<tr>
<td>Lebanon</td>
<td>TOKTEN for Lebanon</td>
<td>TOKTEN Programme</td>
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<td>Morocco</td>
<td>Moroccan Association of Researchers and Scholars Abroad</td>
<td>Student/Scholarly Network</td>
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<td>Nigeria</td>
<td>Association of Nigerians Abroad (A.N.A)</td>
<td>Intellectual/Scientific Diaspora Network</td>
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<td>Norway</td>
<td>Association of Norwegian Students</td>
<td>Student/Scholarly Network</td>
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<tr>
<td>Pakistan</td>
<td>Return of Qualified Expatriate Nationals to Pakistan</td>
<td>TOKTEN Programme</td>
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<tr>
<td>Palestine</td>
<td>Programme of Assistance to the Palestine People</td>
<td>TOKTEN Programme</td>
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<tr>
<td>Peru</td>
<td>Red Cientifica Peruana (Peruvian Scientific Network)</td>
<td>Developing Intellectual/Scientific Diaspora Network</td>
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<tr>
<td>Philippines</td>
<td>Brain Gain Network (BGN)</td>
<td>Intellectual/Scientific Diaspora Network</td>
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<td>Country</td>
<td>Name of Network</td>
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<tr>
<td>Poland</td>
<td>The Polish Scientists Abroad</td>
<td>Intellectual/Scientific Diaspora Network</td>
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<td>Romania</td>
<td>The Forum for Science and Reform (FORS)</td>
<td>Developing Intellectual/Scientific Diaspora Network</td>
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<tr>
<td>South Africa</td>
<td>The South African Network of Skills Abroad (SANSA)</td>
<td>Intellectual/Scientific Diaspora Network</td>
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<td>The Reverse <em>Brain drain</em> Project (RBD)</td>
<td>Developing Intellectual/Scientific Diaspora Network</td>
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<td>Association of Thai Professionals in America and Canada (ATPAC)</td>
<td>Intellectual/Scientific Diaspora Network</td>
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<td></td>
<td>The Association of Thai Professionals in Europe (ATPER)</td>
<td>Intellectual/Scientific Diaspora Network</td>
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<td>The Association of Thai Professionals in Japan (ATPIJ)</td>
<td>Intellectual/Scientific Diaspora Network</td>
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<tr>
<td>Tunisia</td>
<td>The Tunisian Scientific Consortium (TSC)</td>
<td>Intellectual/Scientific Diaspora Network</td>
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<td>Uruguay</td>
<td>Red Academica Uruguaya (Uruguayan Academic Network)</td>
<td>Developing Intellectual/Scientific Diaspora Network</td>
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<td>Venezuela</td>
<td>In Contact with Venezuela</td>
<td>Developing Intellectual/Scientific Diaspora Network</td>
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<td></td>
<td>El Programa Talento Venezolano en el Exterior (Program of Venezuelan Talents Abroad) (TALVEN)</td>
<td>Developing Intellectual/Scientific Diaspora Network</td>
</tr>
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</table>
9.2 Intellectual Diaspora Networks

The expatriate knowledge networks that were identified were classified into five categories: student/scholarly networks, local associations of skilled expatriates, expert pool assistance through the Transfer of Knowledge Through Expatriate Nationals (TOKTEN) program of the UNDP and intellectual/scientific diaspora networks. Among the latter, distinction is made between those networks which have not as yet stable or precise features (developing) and those which seem more established and organised. These provide material for a deeper analysis.

Student/Scholarly networks offer assistance to students studying abroad and encourage the sharing of information and dialogue between scholars. They often facilitate studies abroad and/or reintegration into the highly qualified labour market afterwards. They have a limited scope in terms of activities and contributions to the country of origin. Also, this category of networks is the only one that includes highly industrialised countries' initiatives.

Local associations of skilled expatriates are groups of highly skilled professionals who meet regularly on both a professional and social level. The aim is to promote the professional interests of members as well as to socialise on a more personal level. CESASC (China) for example organises various technical and professional meetings such as an
Annual Technical Conference and provides employment listings in various professional fields, which might interest members. The SIPA (India) however goes a step further: it aims to develop co-operation and exchange not only between highly skilled expatriate Indians, but also between USA and India in high technology areas. Sometimes, these local associations constitute a nucleus on which global and more systematic networks may develop, as is the case of the Colombian Red Caldas network, the South African Network of Skills Abroad and the Philippines Brain Gain Network (BGN).

The *Transfer of Knowledge Through Expatriate Nationals* (TOKTEN) programme of the United Nations Development Programme (UNDP) uses the expertise of highly skilled expatriates by assisting them to return to their home country for short visits. These visits usually last between three weeks and three months during which the expatriates engage in various development projects or undertake teaching assignments at local universities. Dozens of countries have successfully used this programme occasionally, during the last two decades. However, recently some of them such as Palestine, Pakistan and Lebanon have started to set up more permanent structures to tap their expatriate human resources through the TOKTEN programme more systematically. The list of databases of people, organised by area for example, constitute embryos of real networks.
Developing intellectual/scientific diaspora networks are classified as such because they share certain characteristics with intellectual/scientific diaspora networks, but due to certain constraints have not fully developed into this type of network. Their aim is to make use of the highly skilled expatriate pool of their countries to contribute to the development process of the home country. The RBD project of Thailand initially only aimed at bringing highly skilled Thai expatriates back to their country for short visits to assist there in the development of science and technology. It has since turned its focus to setting up projects between Thai scientists at home and their counterparts abroad, without necessarily bringing the expatriate scientists back to Thailand.

The above-mentioned networks were classified as "developing" because insufficient information was available to assess whether or not they can be classified as real intellectual/scientific diaspora networks. However, they have a similar goal and purpose as these. The FORS Foundation (Romania) for example seeks to involve Romanian scientists both in Romania and abroad in contributing to the process of economic reform and socio-economic development in Romania.

This discussion will be restricted to the analysis of the intellectual/scientific diaspora networks that were identified. In order to be classified as such, networks must fulfil the following criteria:
Members must be mostly nationals of a particular country living and working or studying abroad;

Members must be highly skilled, active in a number of professional fields, specifically conducting scientific research;

The networks must have as their main purpose the economic and social development of the country of origin;

There must be a degree of connection or linkage between different network members and between network members and their counterparts in their country of origin.

These networks will be compared and contrasted in terms of their organisation and administration, their membership and their objectives and activities.

9.2.1 Administration and Organisation of the Network

All of the networks studied were set up in the early 1990s and were in some cases like the BGN of the Philippines initiated by a group of expatriate students or scientists and researchers who recognised the need for an initiative of this kind. The Internet is the main tool used by all the networks for promoting and making visible the networks to potential network members. All the networks have a website which is
the initial entry point for potential members. These websites differ in terms of the presentation as well as the amount of information they offer. They usually contain an on-line membership application form which prospective members are required to fill in. After completing the form they officially become network members and are entered on a database.

IRSA (Ireland), the Global Korean Network and ANA (Nigeria) are completely independent and are not affiliated to any political party nor to the national government. The other networks do have linkages to particular governmental agencies, notably the State Committee for Scientific Research in the case of the Polish Scientists Abroad network, the Ministry of Higher Education in the case of Iran, the Science and Technology Advisory Council in the case of the BGN and the Higher Council for Science and Technology in the case of ASTA. These linkages are important because they facilitate the implementation of joint development projects, however network members in many cases prefer that the network retain some degree of autonomy from government and other political organisations.

The networks are managed by an executive committee or executive council, which varies in size according to the size of the network. ANA for example, which has a huge, well-dispersed network membership, is managed by an executive council consisting of 18 members. The fact that most of the networks are independent organisations means that all of
them, except for the Tunisian Scientific Consortium, do not receive any funding from the national government and thus require their members to pay a fee which is the only source of income for most of the networks. The amount that individual members have to pay usually depends on the type of membership, which can range from student, professional or associate to corporate membership.

9.2.2 Network Membership

Membership for most of the networks is open to researchers, scientists, students, business people and in some cases such as IRSA, ATPAC (Thailand) and the Tunisian Scientific Consortium to research and business organisations interested in the development of the country of origin. Membership of some of the networks is exclusively for people in the fields of science and technology while other networks are more "multi-disciplinary". Most of the networks are oriented towards the natural sciences, except for SANSA and the BGN, which cover a wider scope of disciplines. A significant number of their members are active in humanities and social sciences as well as management and administration.

Network members are in many cases dispersed all over the world, except for ATPAC, ATPER and ATPIJ (Thailand), which are more regional networks. For example, members of Red Caldas (Colombia) are located in 30 countries and those of
SANSA in 57 countries, five main world regions and 800 different cities.

Most of the networks restrict membership to expatriate nationals of their particular country, except for SANSA, Red Caldas, the Tunisian Scientific Consortium and the BGN, which allow anyone who is interested in the development of the particular country to join the network. Some networks, such as IRSA and the Tunisian Scientific Consortium, have quite a complicated membership structure.

Members of these networks are highly skilled and highly qualified with a number of members holding advanced degrees (masters and doctorates). More than half of the membership of the BGN and SANSA for example hold advanced degrees.

9.2.3 Objectives and Activities of the Networks

Intellectual/scientific diaspora networks aim at establishing and fostering communication and exchanges between members living abroad and linking them to their counterparts in their country of origin. Also, the educational, social, cultural and professional advancement of their members is high on their list of priorities. These are closely related to the main objective of all the intellectual diaspora networks, which is the economic, political and social development of the countries of origin.
To ensure that the above-mentioned goals are met, network members engage in various activities and organize different educational, developmental, social and cultural events. These include conferences, seminars, workshops, focus group discussions as well as social events such as dinners, Christmas parties and picnics. Networks like the Global Korean Network, the BGN, ASTA (Saudi Arabia) and the Tunisian Scientific Consortium organise annual conferences, which focus on specific issues of interest to members as well as the country of origin. ASTA for example organise collaborative conferences between itself and the Jordan University for Science and Technology, the International Energy Conferences and Exhibition in collaboration with the University of Bahrain, the Water Conference and an Environmental Conference. The BGN organises focus group discussions where members can share information and ideas regarding topics such as the opportunities for software development, opportunities for integrated circuit design, electric vehicles, public policy for technology transfer and alternative forms of power generation in the Philippines.

All the networks have a newsgroup or newsletter, in either a paper or an electronic version, to foster communication between network members and to inform members about the latest developments at home. In addition, particular networks like the Tunisian Scientific Consortium and ASTA have specific digests and periodicals in which scholarly articles and
books written by network members are published. These disseminate research results and information and facilitate dialogue and discussion between members and between them and their counterparts at home.

To ensure the economic and social advancement of the country of origin, network members engage in various joint developmental projects with government agencies and private and non-profit organisations at home. BGN members devote themselves to projects involving the creation of companies in the Philippines, the provision of consulting services to Filipino corporations and government/academic agencies and the formation of foreign-based companies to do business in the Philippines. The Tunisian Scientific Consortium, in its drive to boost the economic and social development of Tunisia, organises short courses and training courses in the practical application of science and technology. They are offered to individuals in the academic as well as the industrial sectors. ANA has a number of committees such as an Education Committee, Technology Committee, Finance Committee and a Health Affairs Committee dedicated to specific areas of concern to Nigeria. On joining the network, each member has to indicate on the application form which committees he/she wishes to join.

Members of the Red Caldas network are encouraged to engage in collaborative research projects. Two such projects are the Bio 2000 project and a project for the transfer of
technology in the area of robotics. The aim of the former was to apply instrumentation, developed for physics and engineering in the fields of biology and medicine (Granes et al., 1998). The latter project involves robotics, automation and industrial networks and aims at designing and constructing a multi-purpose industrial robot (ibid). The network members of all the different networks thus engage in purposeful actions and activities in order to contribute to the economic and social advancement of their country of origin.

The above-mentioned development projects are concrete examples of the role that highly skilled expatriate nationals can play in the transfer of knowledge from the more industrialised countries they work in to their home countries. However, there is not enough evidence that these kinds of projects are numerous and not enough information to assess the extent to which they are successfully implemented. Networks may face certain limitations and difficulties in their efforts to arrange and implement more developmental projects of the kind mentioned above.

9.3 Prospects and Policy Implications of the Diaspora Option

The fact that so many countries have set up intellectual/scientific diaspora networks at the same time, with comparable characteristics and structures, would indicate that the diaspora option is a significant strategy. To our knowledge,
none of these networks has dissolved and a number of them have been around for almost a decade. Although some of them are not as dynamic in terms of activities and projects, the fact that they still exist today means that the purpose of their creation has not disappeared and that they still enjoy some form of support.

All these networks have achieved their initial goal of mobilizing highly skilled expatriate human resources, to varying success. Their sizes range from a few hundred to 2000 members. As far as the South African and the Colombian networks are concerned, they have managed to get between 10 percent (for the former) and 50 percent (for the latter) of the identified potential members. Therefore, it is realistic to expect that only a part of the diaspora would respond positively to an initiative of this kind. However, those who do respond are usually very motivated and the evidence shows that their level of skills is indeed very high. So it is really a case of capturing the best expertise rather than the greatest number of expatriates.

It is difficult to determine the success of these networks in terms of input or impact on the development of the home country. The type of exchanges that take place between network members and the national community – for example scientific meetings, email information/data exchanges, training sessions, informal advisory opinions – not always bring tangible, visible or immediate results and do not allow for a
statistical assessment. This does not mean, however, that these exchanges are not significant.

In terms of developmental projects and activities, the evidence has shown that attempts at co-operative projects between expatriates and the national community are indeed made. These consist of research projects, technology transfer and expert consulting. As these experiences are fairly recent and not enough information is available on their undertakings, their success is difficult to assess. However, it appears that these projects are not numerous and that they are in many cases spontaneous, isolated, initiatives. In fact, in order to generate joint projects between diaspora and national based actors, two elements are required: an information system and an incentives scheme. The information system displays the scope of potential partnerships in which any user can search for those relevant to her field of activity. The incentives scheme directly provides access to resources (material or not) to fuel the projects led by the members. This is a triangle of action: to facilitate undertakings in such a widespread and heterogeneous population, besides the network membership, technical as well as political support is needed (Meyer and Brown, 1999). In this process, the commitment and involvement of national based actors and organisations is crucial. At this point in time, indeed, the networks exist and their highly skilled members are motivated. The onus is really on the national community to utilise this resource to the fullest.
The analysis of the intellectual/scientific diaspora networks shows that good organisation is required in a network of this kind in order to ensure communication, information-exchange and coordinated actions. This is where an interface or coordinating body appears necessary. The function of such a coordinating body would be to collect, organise and maintain the information needed for the systematic search of partnerships, but also to manage and promote the interests and actions of the multiple entities present in a network of this kind. The coordinating body would be responsible for opening up access to resources that can be used to generate action in the network. This body would consist of network members as well as interested parties from the national community; it would thus be a consortium of multiple partners.

While the world has become a place where information is abundant, the problem for the user is to get access to the one that is relevant, useful and eventually translatable into action. This is what the diaspora network provides to its members and users, be they abroad or at home. Technically, through its databases or information system, it focuses on the information which is useful, especially for building partnerships. Socially, through a common identification, it acts as a community of knowledge and interests breaking the anonymity which hampers consistent interaction and, as a social network, setting the confidence which is known to be crucial for human transactions and undertakings. Finally, based on a national purpose unlike a casual connection, the network and its
members may expect support from Nation-State entities such as governmental agencies, which remain the major actors in terms of capacity of resources mobilisation for R&D actions.

For both the home and the host countries, the diaspora option is a mutually beneficial co-operation strategy. On the one hand, the home country of the expatriates gains through the additional capacity that these may bring. On the other hand, the host country does not lose anything since the Scientists and Engineers working within its borders stay where they are. Moreover, their links with their country of origin may open opportunities for their country of residence. Scientific co-operation takes, indeed, advantage of the existing structure of the network, which provides stability, recognition and access to remote actors. It thus gives a higher security for the investments of any kind that this country would be willing to make than a punctual, isolated, co-operation project. This may be seen in various projects and programmes such as, for instance, between French and Colombian universities or the U.S. N.S.F. with China and India.

The diaspora strategy option allows for enhanced co-operation, this has been clearly perceived by international organisations such as UNESCO, the UNDP and, more recently, the World Bank. In fact, their increasing awareness of and support for such a strategy is proving very constructive and their contributions to its development, will be instrumental to help it keep its promises.
10 The *Brain Drain* and Role of the Government

South Africa’s immigration policies have not kept pace with change as the country has emerged from isolation to play a leading role in Africa’s globalisation. This has major consequences for internal economic and social development and for the country’s integration into the SADC region. Regional integration is becoming increasingly important in the context of globalisation, especially for smaller, developing economies such as South Africa’s. Inaccurate information on the number of immigrants living in South Africa adds to the problem.

Coping with immigration in an environment rapidly becoming global is a policy issue facing many governments. In a recent study of migration in Southern Africa, Dodson (2002) pointed out that, “[…] immigration policy is one of the last bastions of sovereign state power in an increasingly globalised world. Capital and information flow more or less freely across state borders. It is only when actual human bodies become involved that nations drawbridges are raised.” South Africa has been widely criticised for its slow response to increasing migration across its borders and the important human rights and development issues this poses.

While immigration is generally seen as benefiting the country’s economy there are widespread negative views on the issues. Fears of competition for scarce jobs and highly
publicised reports of criminal activity by immigrants (although this involves only a small minority) fuel those views. The South African government faces the dilemma of accommodating growing demands for a more flexible and humane immigration policy while dealing with this widespread hostility to foreigners. The response in the 1999 White Paper on International Migration has been to seek a balance between liberalisation and regulation allowing people who add value to stay and keeping out those that do not. The government has also recognised the need to address these concerns in the context of South Africa’s wider interest. The State of South Africa’s Population Report 2000 notes that the “national interest … needs to be debated in the context of both globalisation and the wider regional interest”.

These interests call for an urgent revisiting of immigration policy. Globalisation is driving the formation of regional blocs to enhance, or merely retain, competitiveness. Realising the benefits of these regional blocs depends largely on removing barriers to the flow of resources - goods, capital and people – between member countries. This is behind ongoing integration in Europe and it has given established associations of states, such as USA, an enormous competitive advantage. Groups of smaller, less developed countries, such as those in southern Africa, need to maximize the benefits by rapidly freeing up resource flows. Regional integration is not about one-sided political charity but about collective economic survival.
The information that helped inform the 1999 White Paper also needs revisiting. When writing on migration in southern Africa we must realise that there is no valid scientific method for estimating the number of undocumented migrants in a country. The task becomes even more difficult in countries like South Africa with strong xenophobic sentiments, where migrants, especially illegal migrants, fear to reveal their status.

Estimates of the number of undocumented immigrants – between 2 and 8 million – produced by researchers at the HSRC in the mid-1990s were invalid for two main reasons. First, the survey asked clusters of households in a national sample if they knew of any illegal immigrants living nearby. The analysts failed to correct for the probability of several households referring to the same immigrants. Second, the ‘multiplier’ to arrive at national estimates should have been based on the number of households rather than individuals in the sample. The result was substantially overestimation. Unfortunately, the particularly erroneous 8 million upper estimate rapidly gained prominence and is still often referred to although HSRC researchers publicly withdrew the figures in 2001.

However, the number of immigrants is not the most important issue. To fully understand the migration phenomenon in South Africa it is imperative to find out why they have come, how they are treated rather than what they do in South Africa. Migrants, including those from
neighbouring countries, are mostly young adults and often represent the better-educated members for the sending country’s population. Immigrants enter South Africa in search of a better future for themselves and their children. Their impact extends beyond their numbers. Some are intellectuals involved in training our youth. Others perform much-needed functions in the mining and construction sectors. Many work productively in the formal and informal sectors of the South African economy. Relatively few immigrants remain unemployed.

Negative perceptions of immigrants amongst South Africans often stem from unfounded fears of job loss. Cross-border migrants - many of whom do not wish to stay in South Africa permanently – are likely to make constructive contributions to the regional economy by increasing financial exchanges and trade in consumer goods. From both a South African and a regional perspective, cross-border migration represents an opportunity, not a threat.

The influx of skilled foreign students, academics and professionals has also a direct impact on the educational system of a country. International mobility of students has increased dramatically over the last decades because of the need to broaden the scope of education. Governments have realised that more education usually means more-productive individuals and thus a positive return on investment. In order to achieve these returns private and public institutions around
The world have subsidised and sponsored students. So it is not surprising that, since 1960, the combined world enrolment at all levels of education has increased fivefold. In the 1960s roughly one-third of all adults in developing countries were literate as opposed to 1990 when more than half were. This trend spans across all regions, although the variance in outcome remains large. However, economic growth has remained elusive in many parts of the world despite raising levels of schooling and other education. There are two main reasons. First, human capital can be poorly used. Greater investments in human capital can neither compensate for nor overcome an environment inimical to economic growth. Second, human capital investment can be of the wrong type or of poor quality. Expenditures on human resources often fail to provide the quantity, quality, or type of human capital that it might have if the funds had been spent better. Underutilisation of the education and kills of workers is mostly a problem of lack of labour demand due to inappropriate development strategies. This is evident in many regions, including Southeast Asia. The workforce of Vietnam and the Philippines has historically had higher rates of adult literacy and educational achievements than other countries in the region. However, both these economies have grown relatively slowly largely because both countries adopted development strategies that proved incapable of taking full advantage of their stock of human capital. Some of the best performers in Southeast Asia, in contrast, initially had released low levels of
human capital but pursued strategies that expanded education and the demand for labour simultaneously. Examples like those of the Philippines and Vietnam demonstrate that the expansion of human capabilities delivers its full potential only when there is a corresponding increase in market driven demand for labour skills.

The human resources policy of government is also part of the reason why investments in people do not always generate positive returns to the country. Excessive spending on education bureaucracies and school infrastructure, rather than on teaching staff and supplies, depresses the quantity and quality of schooling. So do poorly trained teachers and failure to set high standards for students. Finally, human capital tends to be relatively unproductive where the skills acquired at school do not match market opportunities, or where higher education is promoted at the expense of primary and secondary schooling. In all cases, improvements in education policy are needed to ensure that expenditures on schooling yield productive investments in human capital.

Finally, it is not possible to identify a “one size fits all strategy” aimed at stemming the potentially negative effects of the brain drain. Specific local social, political and historical variables influence the decisions of all stakeholders involved. The phenomenon should rather be managed over time by ensuring a coherent approach between policies (educational and migration) and objectives. Alternative solutions should be
taken into consideration and applied where possible when coherent policies and objectives at a national level are not sufficient to retain the skills required to achieve the national objectives.
11 Implications for Future Research

This explorative dissertation concentrated on a number of empirical observations on the current status of policy development in the context of a difficult transition from the Apartheid system to a new democratic society.

In such a context, theoretical reference models have proven to be insufficient to explain causes and consequences of a complex phenomenon like the brain drain in South Africa.

11.1 Implications for empirical research

The overview of research approaches outlined in the introduction to this dissertation highlights the lack of a comprehensive research approach able to capture the essence of the brain drain and to remove the emotional component typical in all countries affected by it.

In this context, the combination of qualitative and quantitative research data was the biggest challenge.

11.1.1. Reference Framework

Most of the available quantitative data on population is based on the latest available census data of 1996 and 2001. Subsequent research has been negatively affected by the restricted scope. Some of these limitations were illustrated in this dissertation and provide a wide discretion in the
interpretation of the results and have implications for policy formulation, which are then reflected in subsequent research.

The bias toward the negative effects of the *brain drain* entrenched in most the available research performed until now, needs to be overcome to allow the assessment of the phenomenon in a globalised society.

While changing the basis of past research might prove to be an almost impossible challenge due to the lack of data and various limitations affecting the available data, future research will have to focus on the results achieved under new responses to the *brain drain* phenomenon.

In particular, the traditional performance pyramid of Science and Technology system represented in Figure 12 will have to be revisited. The pyramid is based on the assumption that a domestic production of scientists will have a direct impact on the quality of life measured by the Technology Achievement Index. On the Human Development Index Table in 2004 South Africa ranked 119th out of 177 countries reviewed by the United Nations, thus positioning the country in the last tier of the countries with “medium human development” and showing no or very little improvement since 1975. The lack of improvement can be put in direct relation with the stable number of scientists in South Africa over the

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61 The technology Achievement Index (TAI) is a composite index designed to capture the performance of countries in creating and diffusing technology and in building a human skills base.
period, thus confirming that there might be a strong relation
between investment in education and development.

Figure 12: Key performance indicators of the Science and Technology System

However, the figures will have to be revisited under the
new skill import methods applied by various countries, i.e. the
establishment of intellectual networks.

Furthermore, the new White Paper on E-Education (2003)
explores new avenues for education and development by both
offering training to students all over the world and capitalising
on this new base of skilled resources.

Traditional approaches to both educational policies and
strategies will have to be challenged by comparing them to the
results achieved by alternative approaches to reducing the assumed socially and economically negative effects of the brain drain.

### 11.1.2 Human Capital Stock

The development of models linking the accumulation of human capital to the development or implementation of new technologies has not been able to explain why the adoption and diffusion of foreign technology is so crucially dependent on the stock of human capital. Theoretical reference frameworks focus their attention on the time required to adopt and distribute a new technology but not on the level of skills required. This gap in the theoretical reference framework can be partly covered by introducing the definition of appropriate technologies (Basu and Weil, 1996) and the formation process of human capital in the different nations. This argumentation leads to the discussion on the level of human capital stock required and on the quality of such a stock. While most of the research on the human capital stock focuses on its appropriate level, quality is considered by an endogenous factor.

However, evidence from internationally comparable exams shows substantial variation in schooling quality. Children in some developing countries lag far behind the OECD and East Asian countries (TIMSS, 1999)\(^{62}\). Low quality of schooling

\(^{62}\) http://timss.bc.edu/
translates into little or no wage increment from additional schooling and, thus, into a constantly low or medium quality of life.

For South Africa no comparable data since 1995 is available. However, microeconomic returns on basic education can be identified although, on a macroeconomic level, the impact of schooling on economic development remains questionable. Therefore, no immediate conclusion can be drawn on the quality of education in South Africa.

A “signalling model” can be applied to assess whether the education system is consistent with the requirements of the labour market. If workers with high initial ability have an easier time staying in school than workers with low initial ability, employers will pay more for “schooled” workers even though schooling has no impact on skills or productivity (Spence, 1974).

However, there is mixed evidence of a signalling function of schooling. “Sheepskin” effects - in which the completion of a level of education has substantially more labour market impact than would be expected from the skills acquired at that level - are common and can be taken as indication of schooling as a filter, which questions the role of schools in the domestic institutional framework.

In the decades since 1960 nearly all developing countries have already seen education attainment grow rapidly. The cross-national data show that - on average - education
contributed much less to growth than would have been expected in the standard augmented Solow model.

In some countries the institutional environment directed the bulk of newly acquired skills to privately or publicly remunerative but socially wasteful, or even counter-productive, activities, like the South African Programme on Weapons of Mass Destruction abolished in 1996 (Non-Proliferation of Weapons of Mass Destruction Act, 1993, 1995 and 1996).

The rate of growth of demand for educated labour has varied widely across countries so that countries with the same initial individual returns and equal subsequent expansions in the supply of educated labour could have seen the marginal return to education fall dramatically, stay constant, or rise.

Schooling has in some countries been enormously effective in transmitting knowledge and skills while in other countries it has been essentially worthless and created no skills.

No two countries follow exactly the same mould and each explanation contributes to explaining a part of the overall impact of schooling on growth in different countries. However all governments believe that at least basic education is a merit good so that its provision is not, and need not be, justified on economic grounds at all.

The right set of skills and educational policy are essential to ensure growth. The development of a theoretical model, that links the various aspects of education and development of
skills, will enable the government to ensure the production of an adequate stock of human capital or to ensure its availability across boundaries.

11.1.3 The Need for Universities

The unclear links between education and development and, thus, the difficult decisions by the government to allocate resources to primary, secondary and tertiary education institutions, raise the question whether universities and tertiary education institutions are needed or whether a country could capture the knowledge of foreigners by joining international intellectual networks.

The question can be answered in various ways. It is particularly important to address the question by analysing the responses of skilled and unskilled workers to the push and pull factors of migration.

How do skilled South Africans respond to regional shocks like long periods of unemployment? Some studies (Mauro and Spilimbergo, 1999) suggested that people with a higher level of skills would tend to migrate faster than people with a lower level of skills. This conclusion is not supported by the findings of other similar research. One of the reasons for a different interpretation of the results is that Mauro and Spilimbergo fail to address the issue of temporary migration. The majority of skilled South African emigrants have left the country for a number of years with the clear objective of returning to their
home country. So, while the response might be faster and accelerated by a stronger international network of skilled people, the effect might last less.

In order to obtain a clear picture of the relation between level of skills and propensity to migrate a cross-country study should be carried out. This study would have to focus on the level of skills of those emigrating and the composition of skills of the receiving country.

11.1.4 Migration in South Africa

Future research will also be challenged by the necessity to filter the emotional aspects out of the current debate on the brain drain. At the time of writing this dissertation, the South African government has intervened again with the government of United Kingdom to stop British hospitals from poaching South African nurses needed by the country to offer basic health services to the population.

The paradoxical question that needs to be investigated is whether a history of forced immobility of the domestic population has had any influence on the propensity to leave the country.

The current immigration policies reflect the segregation policies of the Apartheid period limiting access of foreigners to various activities and rights. The analogy differs mainly in that
the various racist acts of the Apartheid regime classified native South Africans as foreigners.

It should therefore not be surprising that black South Africans have the same propensity to emigrate as white South Africans but should challenge the assumption that economic growth is based on freedom of circulation.

11.2 Implications for Practice

The theoretical approach defined above will translate into the challenge of implementing new governance models for both education and migration.

The legacy of Apartheid has so far prevented South Africa from defining a coherent and consistent framework of policies to achieve the objective outlined in the Reconstruction and Development Programme, while recognising that the success of all policies and related governance models designed so far relies on the capacity of the involved institutions to implement them.

The allocation of scarce resources is the key concern of the South African government. In the introductory speech to the education budget vote, the Minister of Education stated that “the availability of student financial aid continues to be a matter of concern”. In 1994, the South African government invested 10,3 million Rand in student financial aid through the Tertiary Education Fund of South Africa, the forerunner to the
National Student Financial Aid Scheme. In 2004, just under 1 billion Rand has been invested in the national aid scheme. This amount includes an allocation from Treasury as well as money from repaid student loans. This represents a phenomenal increase and reflects a strong commitment by the South African government to invest in education and skilled resources. So far the scheme has awarded R4 billion in loans to 360,000 students.

Despite this strong increase, the scheme appears unable to accommodate the growing numbers of students from poor communities. The Department of Education is particularly concerned about improving the scheme as a mechanism for addressing access and equal opportunities for all races and genders. This is important as the scheme has a critical role to play as part of the government's broader strategy to alleviate poverty.

It has been and will be a challenge for the South African government to find the right balance in allocating the resources to the various educational institutions and levels. The answer lies in the definition of the stock and skills of the required human capital, both domestic and foreign.
12 Epilogue on the Impact of Educational and Migration Policies on the South African *Brain Drain*

The development of the South African Educational and Migration Policies is anchored to a short period preceding and following 1994. The analysis of the needs of the new South Africa and the objectives set in the Reconstruction and Development Programme are rooted in the data and information available in the same period of time.

A correct interpretation of that period of time and the decision that led to the current policies might favour a reassessment of the situation and lead to a more effective migration and education policy framework.

The impact of the current individual policies on the South African *brain drain* has been illustrated and proved extensively throughout this document. The result of such policies, despite a growing effort to invest in specific activities, has been largely negative. Academic and industrial product activities show decreasing returns because of conflicting objectives between a large scale investment and education programme, for which not enough funds are available, and a selective investment in key human and industrial resources, which would result in a breach of the objectives set in the Reconstruction and Development Programme.

The combined effect of both the educational and migration policies on the *brain drain* is much important and detrimental
to the future development of South Africa. The migration policies implemented by the new Government have not only failed to attract skilled resources, but have also made voluntary or business-driven immigration of skilled resources more difficult. The educational policies have not mitigated the negative sides of the migration policies. To the contrary, scarce investments in research infrastructure have reduced the attractiveness of South Africa as a research and development country. Scientists returning to South Africa have usually originated from a South African institution and, typically, go back to their home country towards the end of their career.

South Africa is required to fine-tune its policies in order to attract the resources required to build a sound and sustainable research and development environment, which will guarantee the future competitiveness of the country. It should not be the aim of the South African Government to permanently attract and retain skilled professionals. Migration is a flow and by definition there is always a new attraction pole. It is a challenge for a country to fight against the demons of the past and present and bring the discussion about educational and migration policies on a factual ground and ensure the development of a system capable of addressing the multiple issues involved and capitalising on the available resources without restrictions of any kind.
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Born in Lugano, Switzerland, on February 22\textsuperscript{nd}, 1968

2000 University of London, School of Oriental and African Studies (“SOAS”) - \textit{Postgraduate Diploma in Development Economics}

1995 Graduate School of Business, University of Cape Town, South Africa, \textit{MBA with Specialisation in International Finance}

1992 “Luigi Bocconi” Business University Milan, Italy, \textit{Degree in Business Administration} (Dottore in Economia Aziendale).

Professional experience

1999 – to date \textbf{Credit Suisse and Credit Suisse Fund Administration Ltd.}

\textit{Head of Sales and Relationship Management - Director}

- Structured and implemented investment funds for institutional clients
- Developed and implemented new processes for the development of new investment funds in Guernsey and Cayman Islands

\textit{Head of Business Oversight for Trading & Sales and Treasury & ALM - Director}

- Set up the Business Oversight units within the new Division Trading & Sales and Treasury & Asset and Liability Management (“ALM”)
- Managed the governance process for the development of new investment products and trading services
- Defined a control framework for all activities related to the implementation and lifecycle management of all new investment products and trading services

- Defined processes for trading and product development activities and ensured their compliance with regulatory requirements

- Managed the internal and external audit process from fieldwork to negotiation of solutions across divisions

**Head of New Business and New Product Office – Vice President**

- Set up and managed the New Business and New Product development process (structured and alternative investment products, new markets, joint ventures)

- Set up private stock markets for institutional clients

- Acted as referee for career starters and assessor for senior managers

**Legal & Compliance – Financial Product Advisory and Structuring – Vice President**

- Set up the legal and compliance department for the Finance and Treasury and Investment Management Divisions

- Structured and executed financial transactions

- Developed new structures for on-shore and off-shore business activities

- Supervised and enforced compliance procedures in line with national and international rules and regulations.

**1997 – 1999 Bank Julius Baer**

**Operational Head of Representative Offices and Investment Advisory Companies – Assistant Vice President**

- Co-ordinated the activities of the Representative Offices, Investment Advisory Companies, Agents and Intermediaries of the Julius Baer Group on a worldwide
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- Developed new business models for Eastern Europe, Latin America and the Middle East
- Supervised the acquisition of new assets, structured and managed the payment system of commissions to third parties
- Reported to regulatory bodies in Switzerland and abroad.

1995 – 1997 **Credit Suisse**

- Co-ordinated the activities of the Credit Suisse Group asset management companies on a worldwide basis
- Contributed to the creation of Credit Suisse Asset Management global strategy
- Set up reporting, performance monitoring and controlling procedures for the asset management companies
- Represented the Trading and Private and Institutional Asset Management Departments as a member of the EMU (European Monetary Union) task force
- Implemented new reporting standards and procedures for Swiss institutional clients
- Reviewed developments in the Securities Clearing Organisation (SEGA) and advised the Chairman of SEGA on strategic and operational issues
- Optimised the securities custody and clearing activities to reduce settlement risks
- Member of “Focus” project task force for the reorganisation of Securities Trading, Sales and Research departments of Credit Suisse Group. The project led to the transformation of Credit Suisse into a multidivisional structure.