

CHAPTER ONE

Rationale and Background

1.1 Introduction

This study seeks to explore the professional and personal nature of leadership that enables and stimulates high-quality research performance within the context of the research enterprise. Research performance is one of the defining characteristics of academic excellence, and strong universities are characterised by strong research cultures. It is generally recognised that universities with strong research cultures have high research performance. Research universities are those that offer a full range of baccalaureate (undergraduate) programs, are committed to graduate education through the doctorate, and give high priority to research. Although usually part of differentiated academic systems, they are viewed as integral knowledge generating institutions of the 21st century with a role to “provide access to global science, produce basic and applied research and educate key leaders for academe and society” (Altbach, 2007:111).

Research universities are characterised by their top graduates, ground-breaking research and vigorous transfer of technology, with critical dimensions cited as a concentration of talent, abundant resources and favourable governance. It is felt that the combination of these factors generally assures excellence in graduate education and research output (Kearney, 2009). Successful academic researchers are generally those who publish in the leading journals, develop quality postgraduate students, garner large external grants, create intellectual property, create publicity for their institutions, and are selected for the nation’s elite academies. “It is also usually the same academics who are able to attract large teams of research associates, post-doctoral researchers and graduate students, as well as professorships and chairs” (Pourciau, 2006:3).

Hence it can be seen that research performance refers not only to the presence of material resources, but also to individuals and research teams with the necessary knowledge, research skills and talents. David King (2004), in measuring the quality of research on national scales and locating this within an international context, made the key point that “sustainable economic development in highly competitive world markets requires a direct engagement in the generation of knowledge” (p.314). One measure of a nation’s knowledge base is its output of doctoral students.

Available data show that South Africa produces only 23 to 27 doctorates per million of the population per annum. In addition it is projected that a five-fold increase of graduates is required in science, engineering and technology (SET) alone in order to make a significant difference to the country’s development (ASSAF, 2010). Discussions at the United Nations Educational, Scientific and Cultural Organisation (UNESCO) forum on trends in higher education, research and knowledge reiterated the importance of this research investment. This is because the overall objective of postgraduate education is to “educate highly-skilled citizens and professionals who are able to address specific issues within their national contexts as part of the wider globalised society” (Kearney, 2008:4). Thus research institutions that are able to compete effectively in the global production of knowledge can be viewed as part of the national assets of a country. When countries lose their base for academic excellence – “through outdated policies, neglected institutions, the exodus of their best graduates and inadequate investment in university research – their competitiveness in a global knowledge society will dwindle and finally disappear” (Kearney, 2009:6).

Higher education is also seen as a powerful engine for transformation “particularly suited to powering wider social change” (Jonathan, 2001:37), and research excellence and its social manifestations and supporting policies, ‘[are] more often than not politically and culturally grounded’ (Tijssen, 2003:94). The changing landscape of higher education in South African has been a much-contested space with regard to a differentiated landscape for further and higher education institutions. According to Kraak (2006),

commentators on higher education argue that there are only five South African universities that qualify as research universities, even though the Department of Science and Technology has identified seven South African institutions as part of its “national system of innovation” (Kraak, 2006:151). Kruss (2005, 2006) argues for a further set of emergent universities with evolving capacity to do cutting edge research using new technology platforms. Despite inherent limitations, flaws and biases of global university rankings, people the world over pay attention to rank positions, and South African universities that endeavour to be research-led have joined a globally competitive system. The Top 500 universities identified by the Academic Ranking of World Universities included only three South African universities in the elite global list for 2008, namely, the universities of Cape Town, Witwatersrand and KwaZulu-Natal (<http://www.universityworldnews.com>, 2007). Four South African universities (17% of the country’s institutions) were ranked in the top 500 of the Shanghai Jiao Tong, and in 2007 Cape Town University made it into the Times Higher Education Supplement – QS top 200 at position 107. This was the first time an African university had made it into these rankings. Although acknowledging the subjective biases of the ranking systems, the vice chancellor of the University of Cape Town was of the opinion that “our good performance in the rankings sends the message that they (South Africans) can get a world-class education at home” (<http://www.mg.co.za/article/2010-09-24>). Hence, given the large diversity of external criteria and varying external environments, an important starting point for selecting dimensions of research performance is the research mission of the university itself and its key research areas. A perusal of some websites of South African universities shows that within the local context, research aspirations are made visible through vision and mission statements. The following examples illustrate this trend:

“The Premier University of African Scholarship” (University of KwaZulu Natal <http://www.ukzn.ac.za>)

“..a leading university in South Africa, in Africa, and in the world by sustaining globally competitive standards of excellence in learning, teaching and research” (University of Witwatersrand <http://www.wits.ac.za>)

“..to be an internationally recognised South African teaching and research university and a member of the international community of scholarly institutions...” (University of Pretoria <http://www.up.ac.za>)

Thus it seems that many South African higher education institutions have identified the need to strengthen their research capacity and capability as being critical to their institutional missions and to their survival as institutions. In all instances, academic leadership and productivity are regarded as critical indices by which to measure research success (Hazelkorn, 2005). According to an early work by Bland and Ruffin (1992:392) “leadership is the one variable that affects all of the other organisational characteristics that influence research productivity”. There is evidence to suggest that the absence of strong leadership is one of the key barriers to research success, with a number of studies pointing to the crucial role of academic leadership in maintaining morale, enhancing productivity and helping university staff adapt during periods of organisational change (Hansson and Monstead, 2007; Goodall, 2007; Lee, Gambling and Hogg, 2004). An investigation of the management of research in six international research-intensive universities found that a key characteristic of these institutions was “powerful, visionary leadership with a firm, unwavering commitment to the research-led mission...”. (Taylor, 2006:13). Ramsden (1998) captures this essence when he states that “the most substantial advantage a university in a competitive and resource-hungry higher education system can possess is capable academic leadership”(p.363). However, we have very little understanding of the extent to which academic leadership impacts on research performance. In addition, the changing nature of the global research enterprise continues to introduce new perspectives on research leadership. Studies have found that academic leadership poses problems that are distinctly different from leadership in business or government agencies, despite some recent shifts towards more executive styles of leadership and decision-making in higher

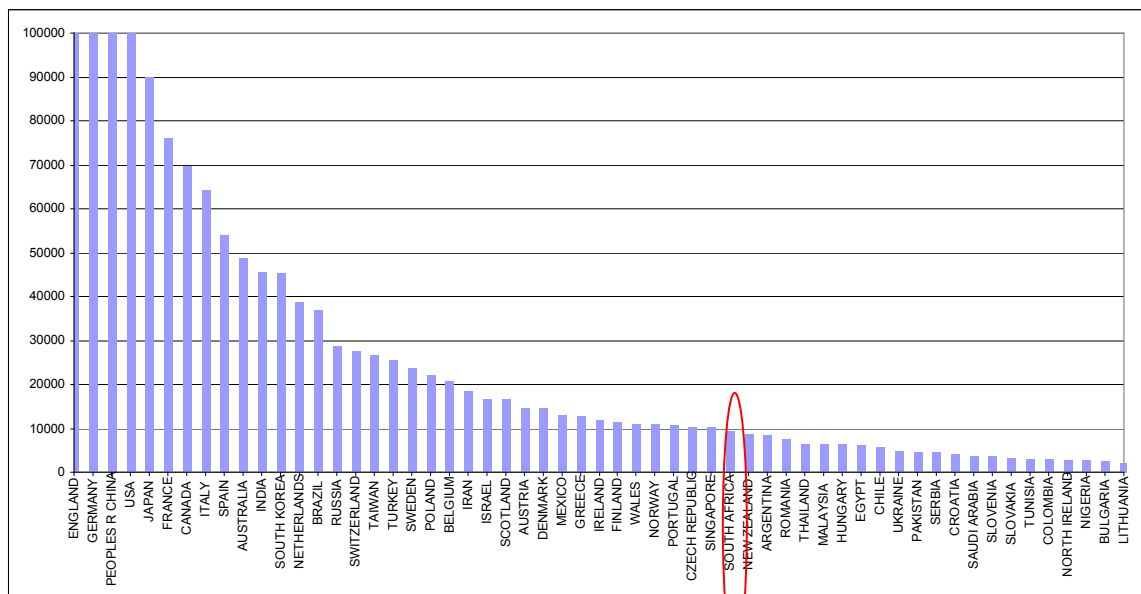
education (Sathye, 2004; Johnson and Cross, 2006; Smith and Adams, 2008). Thus, given the “multilayered, dynamic nature of higher education leadership at individual, group and organisation levels”, a more nuanced understanding of its role in driving excellent research performance remains paramount (Bolden, Petrov and Gosling, 2008:358).

Research universities have emerged on the policy agenda of many developing countries, mostly as part of growing national efforts to compete in the global knowledge economy. Since the late 1990’s the higher education context in South Africa has been subjected to a number of interventions to transform research at policy and implementation level. There have also been large amounts of funding provided by National Government and organisations like the National Research Foundation (NRF) for programmes to develop research capacity. These can be viewed as collective attempts to build the quality of researchers and scholars, improve research performance, and grow research leadership as required by the transformation agenda. However, by the early part of the 21st century South Africa was faced with declining research productivity (Pouris, 2003:425), institutional academic staff profiles that remained largely constant, challenges to local supervision capacity and a research population that consisted largely of white, ageing males. South Africa also continued to lose a significant number of highly skilled people to other countries: for example there was an outflow of 2100 people during 2000 (Mouton, 2003). In addition, 65% of all publications were produced by only 6 universities in South Africa (Council for Higher Education, 2004) and there was the overall feeling that despite the overt official changes, institutional cultures of higher education institutions had remained more or less the same. At the time, there was general agreement that “viewed from the inside of institutional life at the turn of the century, there is little evidence of a substantial shift in the ways South African universities and their counterparts produce knowledge” (Jansen, 2002b:519).

By 2010, there was still broad consensus in the science community in South Africa that not enough high quality doctorates are being produced in relation to the developmental needs of the country (ASSAF, 2010). According to the

PhD study carried out by the Academy of Science of South Africa (ASSAF), this problem is compounded by multiple factors at numerous levels within the national education system such as the school system, undergraduate programmes, high dropout and repetition rates, supervisory capacity as well as numerous exit levels along the qualification pipeline. In addition, the overall trends towards improved race and gender representation in this sector remain very small. The number of articles published in journals on the Institute for Science Information (ISI) index, places the scientific productivity of South Africa below the requirements of the ten-year plan of Government and makes a strong case for increased research output to address this situation. Figure 1 below illustrates ISI output per country and the standing of South African scientific publications in relation to other countries in 2010.

Figure 1: ISI Outputs per Country, 2010



Source: National Research Foundation (NRF). Annual Performance Plan, April 2011

These factors emphasise continuing challenges to research performance in higher education in South Africa. However, we have little understanding of the extent to which academic leadership impacts on research performance. Thus, the purpose of this study is to explore the professional and personal nature of leadership that enables and stimulates high quality research performance

within the context of the research enterprise. The emphasis of the study is on South Africa's academic research leadership as it attempts to explore and understand the influence of leaders on research performance within a transforming research context. This study comprises case studies of research leaders and their mentees within the university research enterprise.

1.2. Rationale

Universities face increasing pressures from various sources, including the “policies of government, employers seeking capable graduates, levels and bases of funding, increasing student intakes, efficiency drives, and the continued quest for improved effectiveness in teaching, business development and research” (Ball, 2007:449). While universities have to underpin the role of higher education as a key economic driver, governments are placing greater focus on science and technology disciplines, the balance between basic and applied research, activities that promote the transfer of knowledge and technology and the protection of intellectual property. Institutions able to match research priorities with national priorities, as determined by technology foresight studies, are well rewarded (Hazelkorn, 2005).

It seems that higher education in South Africa has taken on most of the features identified in the comparative international literature on new managerialism (Council for Higher Education, 2006:14). The expectation of increased efficiency in the production of research and research candidates means that the tasks of formulating production goals and of mobilising resources and support by means of incentive systems become crucial concerns (Bleiklie and Henkel, 2006).

Researchers argue that the “evidence shows that the conditions under which research and scholarly work are undertaken have been constrained by this shift” (Johnson, 2006:69). There is little evidence to indicate that the much-needed efficiency and effectiveness is reaching fruition. In many cases

“research output remains either stagnant, or is dwindling, and student throughput has become a major concern” (Johnson and Cross, 2006:54). These pressures and other changes within the global context have increasingly focused attention on the importance of leadership. The complexity of leadership in higher education is well articulated, and this complexity is challenged by the changing institutional, national and global character of the academic workplace. Since research is a key area of university performance, and research leadership is a critical variable in achieving research excellence, the rationale for this study can be viewed as being four-fold.

1.2.1. Policy context

“An investigation of academic productivity reveals the mood of the policy makers, usually with some visible evidence of national concern over productivity and accountability in higher education” (Pourciau, 2006:68). The decade of transformation of higher education in South Africa has provided a very fluid and dynamic context that includes a number of policy imperatives concerning research. These include:

- ✚ the national policy imperative (as contained in the National Plan on Higher Education) to increase research outputs while maintaining standards of excellence;
- ✚ the increasing shift within public sector research towards more strategic applied research (National Research and Development Strategy), to the possible detriment of fundamental research;
- ✚ the high level goals for transforming the science system in the country, that includes human resource profiles and the relationship between its outputs and the needs of a democratic society (this imperative cuts across the higher education and science and technology policy) (CHE, 2005:17).

Higher education leadership *per se* and leadership of the research enterprise more specifically has not been the focus of policy attention in the reconstruction of South African higher education. The debate on leadership

was subsumed under broader governance struggles and there was very little, if any, engagement with the role of leaders in the transformation agenda (Kulati and Moja, 2002). This is a grave vacuum, since achieving significant change of the kind required by the transformation agenda requires leadership at many levels. Middlehurst (1997) points out that serious engagement in the process of ‘tearing down walls’ in higher education will not occur without leadership and the kind of leadership that engages people in a large-scale change agenda. This research study explores research leadership as it is considered one of the key requirements for addressing these change imperatives for research in higher education.

1.2.2 Scholar- Leader debate

International studies (Bassey, 1995; Ramsden, 1998) point to the crucial role of academic leadership in maintaining morale, enhancing productivity and increasing research output. An empirical study of leaders and how they affect university performance (Goodall, 2007) documents a positive correlation between the lifetime citations of a university’s president and the position of that university in a world ranking. “This study appears to be the first longitudinal evidence that the appointment of university presidents who have been successful researchers improves the performance of their universities” (Goodall, 2007:18). Thus it appears that, internationally, active researchers lead the world’s top research universities. Although the Goodall study does not show performance of universities to be causally linked to the actions of their leaders, it does offer some basis for studies to investigate research and/or scholarship and leadership in the university context.

The institutional landscape of higher education in post-apartheid South African has had to confront the scholarship/leadership debate in the public (media) domain. In the appointment of the Vice Chancellors of Northwest University and the University of Johannesburg, a labour matter arose out of contentions between criteria of strong research backgrounds and strong management. When the post Vice Chancellor and Principal was advertised at the University of Johannesburg, there was an emphasis on an excellent

academic and research record and proven academic leadership. However, the final appointment carried much public controversy especially on the issue of an alleged lack of academic credentials on the part of the newly appointed vice chancellor. In the case of North-West University, the Council emphasised that it was looking for a strong manager. The final appointment was also contested openly through the legal systems on the issue of research background and scholarly leadership. The Council argued that it was looking for a strong manager and the candidate supported this view by the statement that he ‘was not an academic’ (Jansen, 2004). Researchers such as Harman (2002) suggest that it is likely that an increasing number of senior staff with less impressive academic records will be heading academic units and will be called on to make academic as well as management decisions. Amongst major scientific facilities and laboratories there is a view that “today facility heads are often selected less for their intellectual brilliance than for being good committee men or women who can cope with the bureaucracy now inherent to the task” (Macilwain, 2010:919).

These changes have been in contrast to the restructuring (2007/08) of leadership positions at Rhodes University. The creation of two Deputy Vice Chancellor positions reflects Rhodes’ determination to put academics at the head of management of the institution, to enable two highly capable academic minds to focus their attention on keeping the university competitive and desirable as a place for study and research. According to the university, the appointments are part of the Vice Chancellor’s plans to create a leadership team for the university composed of academics rather than professional managers (Rhodes University, 2008). The challenge for such efforts, though, is to train talented scientists in the more mundane aspects of management without scaring them off or ironing out the personality traits that make great leaders (Macilwain, 2010).

Hence, in the South African context, it is opportune to look more closely at research leadership and research performance in light of the constant and continuing tension that is played out in the national higher education system.

1.2.3 Personal interest

At the beginning of the 21ST century (2001-2006) the Focus Areas Programmes were created through a decision by the NRF to change course from support of unrestricted disciplinary oriented, self-initiated research to funding of steered, relevant and multi-disciplinary oriented research. This represented a significant change of course for academic research in South Africa, although the change was in line with international practices. At the time the international trends indicated that national research funding agencies were increasingly steering their national research systems towards collaboration and socio-economically relevant research (Marias, 2007). It was also the first time that the NRF supported natural and social sciences as well as the humanities. The macro-economic context in South Africa at the time was influenced by the Reconstruction and Development Programme (RDP) that aimed to provide a socio-economic framework by which to steer economic growth and redistribution. The Focus Area Programme consisted of nine focus areas that were used to align research to societal needs and national imperatives more closely. As the researcher of this study was the manager for the NRF Focus Area, *Education and the Challenges for Change* from 2001-2003, there is a personal interest in the present study. During this period responsibilities included awarding education research grants as well as developing and supporting initiatives to build research capacity. Some challenges faced at the time included:

- ✚ the poor quality of many research proposals;
- ✚ annual grants that were awarded to only a few 'established' researchers;
- ✚ the inability to increase the base of new, young researchers who were able to qualify for support;
- ✚ not being able to lobby for a 'bigger slice of the limited funding pie' without an increase in the quantity and quality of proposals.

At the time the situation painted a gloomy picture of support for education research. As a result the question of the type of leadership needed to drive change in research performance was formulated. During 2008 the Centre for

Education Policy Development, commissioned by the NRF, undertook an audit and analysis of education research in South Africa from 1995-2006 inclusive, with the aim of determining the gaps, strengths and general research trends over that twelve-year period (Deacon, Osman and Buchler, 2009). The findings suggested that although a vibrant education research community had been built over the years, much of the scholarship was “diffuse small scale and individualised, with a dearth of large scale research projects that could consolidate knowledge about issues of national and global importance” (p.1073).

The present study can contribute to the rather limited knowledge base of effective research leadership in developing countries. This information will be useful to research support agencies whose individual and institutional investments are meant to contribute towards improving research performance and establishing sustainable research cultures.

1.2.4. Gaps in the literature

Much of the current literature reviewed on leadership focuses on school leadership and leadership and management within the corporate sector, with emphasis on North American and Australian research. Researchers such as Hopkins (2001) and Harris (2004) reinforce the importance of leadership in schools. The results of effective schools research has been a strong driving force behind political efforts to improve public education, emphasising the strategic role of strong principal leadership in improving student outcomes (Heck, 1992;21). Grant (2006) is of the opinion that leadership is a critical issue in the transformation of South African schools. However she also argues that there is a perception that leadership is equal to headship. Traditionally, leadership has been most commonly understood in terms of position, status and authority. She is of the opinion that a different view of leadership is needed: a shift from leadership as headship to a distributed form of leadership (p.512).

Studies that focus exclusively on leadership in higher education are somewhat sparse. To date, no attempt has been made to assess the management of research in research-intensive universities (Taylor, 2006). Literature on the leadership of department chairs is growing but most higher education leadership research has focused on the role of the college or university president (Goodall, 2007; Ramsden, 1998). According to a recent literature review of effective leadership in higher education in the United Kingdom (UK), the United States of America (USA) and Australia (Bryman, 2007), there are numerous studies that examine what leaders in higher education do, but these studies did not always explore links with performance, as the present research attempts to do. There is also a need for more and better research on the characteristics of leadership effectiveness and the contribution of leadership to academic and organisational goals (Middlehurst, 2008).

A common criticism of studies on leadership is that they are often based on anecdotes and personal experiences, or that, because they are only loosely connected to empirical investigation, they might be too simple to provide much value in the higher education context. Some clarification of the relationship between leadership theory in general and leadership as it relates to higher education in particular would be valuable and could help place research findings in a relevant theoretical framework. According to Bryman (2007), “what is needed is the generation of new categories of the behaviour which relate directly to higher education, instead of those that have provided the language of leadership theory for many years” (p.15).

There is also concern about the lack of rigorous research on leadership, especially in the Third World context. Tirimizi (2002) notes that “while several theories and models and their respective measurement instruments have been developed and used to measure leadership behaviours, the controversy about validity and availability of leadership theories and instruments across cultures makes a strong case for developing new models of leadership outside the western context” (p.270).

Metcalfe and Metcalfe (2005) raise some concerns about the volume of the charismatic–transformational models of leadership that began to dominate leadership literature. In brief, their concerns were that these studies were:

- ✚ dominated by studies of leadership conducted in organisations in the USA;
- ✚ often based on data collected in military and commercial organisations;
- ✚ largely influenced by observations of top managers or ‘distant leaders’;
- ✚ based pre-dominantly, if not solely, on studies about men;
- ✚ based on studying only, or pre-dominantly, white managers;
- ✚ developed by focusing only on leaders themselves (p30).

In the South African context these findings resonate with Jansen’s description (2005) of his experiences as a black dean in a dominantly white institution. They highlight the following key concerns regarding research on leadership:

- ✚ the ethnocentric character of Western research on leadership;
- ✚ the paucity of critical literature on deanship; and
- ✚ the lack of studies on educational leadership in post-conflict societies.

These concerns echo the main limitations of research in the wider field and point to the critical gaps in the field of leadership. This study can contribute toward an understanding of the current notions and practices of leadership as enacted through research leadership within higher education in the context of a developing country. Little is known about South African leadership values in higher education, leadership profiles or leadership philosophies and guiding theories and practices that may have emerged/are emerging in response to the changing educational landscape.

Thus, in a context where South Africa’s scientific research publication output has not increased nor excelled at many levels internationally, where there is a dearth of literature and rigorous study of the practice of academic leadership and where a trend towards the ethos of ‘new managerialism’ has arisen, a deeper exploration of the professional and personal nature of leadership that

enables and stimulates high quality research performance within the context of the research enterprise is felt to be opportune.

1.3. Research Questions

The South African research context is characterised by limited research capacity and is infrequently punctuated by pockets of research excellence. Resources are scarce for a large section of the academe; individual researchers and institutions compete with each other, while some institutions are elevated to centres of excellence. Research of good quality is lacking across many faculties; the research 'gap' between the natural and social sciences and humanities persists. With all this in mind, what is the relationship between leadership and research productivity? In investigating this question, we need to acknowledge that leadership plays itself out in complex, dynamic and changing social systems.

This study then, focuses on the leadership of the academic work of the research enterprise, in particular research leadership, with special attention to how this influences research performance in a transforming context. It explores the dynamics of leadership and influence in the South African research enterprise. In particular, it aims to understand the nature of quality research leadership and to identify a range of leadership factors that contribute towards research productivity and, in doing so, highlight likely areas of tension or challenge as well as opportunities for improvement. This study will thus be guided by the following research questions:

1. How have research leaders emerged i.e. what are the career experiences and academic pathways that they have traversed?
2. What are the characteristics (attributes) and leadership experiences of effective research leaders in the context of the research enterprise?
3. Why are some research leaders more effective than others in influencing and stimulating research performance?

1.4. Brief overview of chapters

The next chapter (Chapter 2) sets the scene for the research study by providing an overview of salient features of the South African research context. It provides a short contextualisation of the early research arena under the apartheid government and then shifts to the changing research context (transition period) of the post 1994 period. The post 1994 period is described through the identification and discussion of a number of key research indicators related to the unique requirements for higher education in South Africa. The research system that was designed to address the inherited, deeply systemic inequalities of the past are also discussed. The chapter shows that, in spite of some growth, it has been much more difficult to significantly address the legacies of the past with regard to the research context of higher education than initially imagined.

Because the leadership field is expansive, Chapter 3 provides a short review of leadership theories before focusing on issues of academic leadership in general and on research leadership in particular. This genre of leadership is discussed with regard to research productivity, and highlights the main tenets of research productivity within higher education.

Chapter 4 draws together the main indices of research leadership and research productivity and provides a theoretical framework for the exploration of research leadership in relation to research performance. The chapter considers the development of conceptual models that include the role of leadership as a key contributing factor in increased research performance.

Chapter 5 sets out the research design and methodology used for the research study. The research findings emerged from the analysis of interviews with the research leaders and questionnaires completed by graduate students (mentees) of the research leaders in the sample. The findings are then presented in three separate chapters viz. Chapter 6, 7 and 8. This choice of individual chapters allows the findings to be presented in a

systematic way that starts with researchers on their way to becoming leaders and ends with the preparation of the next generation of leaders.

Chapter 6 presents an overview of the research leaders in the sample and draws attention to their research development over time. This will highlight findings that include both personal and contextual influences on their growth as researchers. In this chapter the influence of the social and political environment on the development of individual researchers or groups of researchers is revealed.

Chapter 7 presents discussions on the research leader from the perspective of intellectual leadership. This presents a description of the personal scholarship of researchers by reviewing their research contributions to the development of their particular field of interest and the recognition received from their peers.

Chapter 8 focuses on what is considered to be one of the main roles of research leaders, namely the preparation of the next generation of researchers. In this context, mentoring is seen as a leadership development tool; the chapter outlines various mentoring models used by leaders, efforts to encourage the research performance of early career researchers, and the pathways available for the emergence of independent researchers. The research development pathways for mentees and research leaders are located within the transformation requirements of the higher education system of South Africa.

Chapter 9 provides an overall analysis of the main findings of the three previous chapters. It also links these findings to the research productivity models discussed in Chapter 4 in efforts to understand more succinctly the role of research leadership in enhancing research productivity within transforming research contexts.

CHAPTER TWO: SETTING THE SCENE

The South African Research Context

2.1. Introduction

The purpose of this chapter is to locate the research leaders and the post-graduate students/mentees who participated in my study in the context of their research experiences. As places of learning, knowledge production and innovation, universities play key roles in providing critical intellectual leadership to guide the transformation both of themselves and broader society. Leaders of the future are educated in the universities of today, and the relevant national policies and institutional practices provide the overall context for knowledge production and research in the country, hence *context* matters in leadership research. This is illustrated throughout the literature on both school and university research. Grace (1995:5), in researching school education leadership, emphasises the following: “it is essential to place the study and analysis of educational leadership in its socio-historical context and the context of the political and moral economy of education. We need to have studies of (school) leadership which are historically located and which are brought into a relationship with wider political, cultural, economic and ideological movements in society”. Jansen’s research (2007) with high school leaders in South Africa focuses on educational leadership in the context of social transition and highlights the importance of context in any theory of transition leadership that may emerge. He contends that “the context shapes the kind of leadership possible or even desirable in educational systems: generic or normative statements about leaders must be contextualised” (p.102). Middlehurst (2008) is adamant that “the first and most important point about leadership research is that it is clearly associated with its context” (p.324). He outlines how cognitive theories have shifted leadership from being construed as an objective phenomenon to a concept seen as being socially constructed. However, he points out that much of the literature, particularly on higher education, does not specifically address or problematise the different aspects of “context”. Badat (2009), in theorising institutional change in

education in post-apartheid South Africa draws attention to the context of change since "... context is a matter of seeing that the past is not just the womb of the present, but the only raw material out of which the present can be constructed" (p.457). Findings from the studies cited demonstrate the need to take the issue of context seriously in the domains of leadership theory and practice.

The context of higher education research in South Africa has its roots in the nation's colonial and apartheid past that shaped a deeply fragmented legacy on which the (re)building blocks of the post-1994 system would need to draw. The remaining parts of this chapter will thus seek to provide the broad context that has affected the dynamics and nature of change in higher education, with the main emphasis on the context of research.

In South Africa the history of structured support for research in universities goes back to the Second World War that stimulated high-level research in applied areas of the military. This period also saw the establishment of the Council for Scientific and Industrial Research (CSIR) in 1945, the biggest science laboratory in the country outside university centres. In addition, research in secondary industries increased and this led to the development of an indigenous nuclear research industry and the building of a small number of atomic bombs. It is estimated that spending on military and defence research and development (R&D) during the mid-1980s was higher than all civil R&D expenditure combined at the time (Mouton and Gevers, 2009). Thus scientific research, in the name of strategic and relevant priorities of the government of the time, was harnessed to bolster the apartheid regime. "The development of science councils and the rapid development of a world-class energy and military/defence research industry together with an increasing focus on research at most established universities led to a major increase in national knowledge production in the 1960s and 1970s" (Mouton and Gevers, 2009:40). South Africa's share of world science (in terms of publications) peaked in the period between 1985 and 1990 at around 0.77%.

The major legacy of this era was the huge inequality spawned by the polarisation between the historically white institutions (separate English and Afrikaans medium institutions) and the introduction of universities that the apartheid government established for separate ethnic groups. By the beginning of 1985, a total of 19 higher education institutions had been designated for the exclusive use of whites, two as being for the exclusive use of coloureds, two for the exclusive use of Indians and six as being for the exclusive use of Africans (Bunting, 2002). Different institutions were allocated different ideological, economic and social functions. There was clear differentiation between institutions with high-level research functions and the associated funding and support of mainly white students and the white professoriate, and the historically black universities conceived of “primarily as producers of civil servants, professionals to serve the local (own) populations and certainly not as institutions to drive the production of knowledge” (Bawa, 2005). In 1918, the establishment of the University of Cape Town mainly for English-speakers and the University of Stellenbosch for mainly Afrikaans-speakers marked the beginning of university teaching and research in South Africa. The four historically white English medium universities were referred to as the ‘liberal universities’ and according to Ohav (2009) these institutions were well endowed due to their urban location, their historical networks, their links to business, their alumni and their research capacity. They sought to distance themselves from the apartheid agenda and “very little of the research undertaken by these institutions had direct links to government”(Bunting, 2002;43) These institutions developed strong international disciplinary teaching and research links. They enrolled limited numbers of black students in protest against government policy of the time. However, there is a school of thought, as expressed by commentators such as Mamdeni (1998), who believe that the “historically white English medium universities were never major agents for social and political change in South Africa, despite the anti-apartheid stance they had adopted” (Bunting, 2002: 44).

The six white Afrikaans institutions were smaller (except UNISA), mainly conservative in orientation and run in strongly authoritarian ways, with strong

management and administrative systems in place. They also had networks with business and alumni. They did not admit any black students. They did engage in research activity, with growing capacity and potential. However, much of the research agenda focussed on the local South African context, covering largely policy work for government and/or government agencies and technological work undertaken on contract for defence-related industries. “This generally resulted in a lack of critical discourse in the disciplines as well as in more public spheres with respect to pressing social and human problems” (Jansen, 2001:4). The first academic boycott saw these institutions being disconnected from the international academic community. Their implementation of the government’s race-based policies is shown by the fact that the combined student enrolment of the six universities was 96% white in 1990 and 89% in 1993. (Bunting, 2002:40).

The broad category of historically white institutions also included a group of seven technikons. Technikons were part of the outcome of the government’s particular notion of the nature of knowledge. The technikons were assigned an emphasis on technology (in the sense of the application of knowledge) whereas universities were seen to be emphasising science (systematic or scholarly approach to the development of knowledge). This differentiation led to the notion of separate, but equal qualification structures across the higher education system. These technikons tended to be conservative institutions with authoritarian governance structures and a very high proportion (89% in 1990) of white students. “These institutions had no intellectual agenda other than that of offering vocational training programmes to young white South Africans. They undertook little research and offered very little by way of postgraduate training” (Bunting, 2002: 47).

The government’s establishment of the ethnic institutions (referred to as historically disadvantaged institutions or (HDIs) was overtly political and instrumental: “they were instrumental institutions in the sense of having been set up to train black people who would be useful to the apartheid state and political in the sense that their existence played a role in the maintenance of the overall apartheid socio-political agenda” (Bunting, 2002:44). They were

disadvantaged by their low capacity, their low level of research, and their rural locations placing them at the margins of the South African economy and by their lack of financial and other networks (Odhav, 2009). Because their academic staff members tended to come from primarily Afrikaans speaking universities in the early years, instrumentalist notions of knowledge were easily adopted. As a consequence research and postgraduate programmes in these universities were minimal. The challenges of inequality continually manifested themselves through geographical location, staff qualification, student quality and general financial and educational disadvantages.

Historically black technikons were created along the same ethnic lines as the universities; five technikons with 100% African student enrolments and one each for Indian (73% in 1990) and coloured students (73% in 1990) enrolments. The intellectual agenda of these institutions was as narrow as those of the historically white technikons, with no research and very little postgraduate training. The creation of this racially divided public higher education system faced resistance through protracted student protests, strikes and resultant leadership changes resulting in periods of closure of these institutions. As a consequence, many months of teaching and learning were lost affecting students and staff alike. This volatile period (roughly 1994-99) heralded many significant political shifts in demographic profile, culture of leadership and modes of decision-making in universities and technikons (Nkomo et al. 2006)

During the 1980s, South Africa also had two dedicated distance education institutions. Although they were in effect historically white institutions they could admit black students who qualified for admission (all off-campus studies). The university of South Africa (UNISA) was seen to be more strongly aligned to the Afrikaans universities with an instrumentalist intellectual agenda. Even though it had a very large well qualified staff, they engaged in very little or no research, and maintained few international linkages. Technikon South Africa aligned more strongly with the white technikon grouping, focussing primarily on vocational training and upgrading

programmes for the civil service.). Yet, despite the oppressive policies and stratification described, Nkomo et al (2006) point out “whatever the intentions of the apartheid rulers, the fact is that individual students and professors – black and white – made and continue to make, valuable contributions from these venues that were intended as dumping grounds” (p1).

Hence it can be seen that in pre-1994, South African higher education institutions were an integral part of a system which was “ shaped, enlarged and fragmented with a view to serving the goals and strategies of successive apartheid governments “(Bunting, 2002 :52).

In the research context, there was further ideological polarisation, as the social sciences were visibly split either by loyalties to the apartheid system or by resistance against the system. Evidence of this is that most disciplines had two journals and two professional associations. Inter-sectoral and institutional collaborations across these polarisations were non-existent. The relationship between state and scientists at this time could be seen as either that of ally (supporting one’s knowledge production, both functionally and morally) or adversary (threatening one’s autonomy). The choice of ally or adversary was largely one of race, language and ideology, or a combination of these, in selected institutions.

During the late 1980s most South African researchers were isolated by academic boycotts that included selective exclusion from international conferences, forums and international scientific collaborations. This also included the rejection of scientific publications. Equally, if not more serious, however, was the lack of contact within the science community in South Africa. Collaboration with colleagues across political and racial divides was minimal to non-existent, leading to an isolationist scientific culture in a system that was compartmentalised in the extreme (Mouton and Gevers, 2009). The climate of increasing international isolation put pressure on the many areas of science, as well as on funding, with increasing focus moving to the development and monitoring of skilled high-level (white) researchers (Krige and Morrow, 2007). This type of discrimination and inequality of race and

gender contributed to what Badat (2009) correctly refers to as one of the key 'binding constraints' on economic and social development post 1994. The constraints included the shortage of skills, for example, professional skills such as engineering and scientific; managerial skills such as financial, personnel and project management; and technically skilled personnel such as artisans and IT technicians. According to the Council on Higher Education (2004), on the eve of democracy the gross participation rate (i.e. total enrolments as a proportion of the 20-24 age group) in higher education was about 17% and highly skewed by race (70% whites, 9% Africans). In addition, gender and race imbalances were more stark at academic staff levels with 80% of professional staff being white and of those, 34% were women. Although experienced in different ways, during this period both historically black and historically white institutions were "punctuated by major critical changes which could best be described as focussing on the democratisation of higher education" (Nkomo, Swarts and Maja, 2006:130)

This short contextualisation of research in South Africa is presented to highlight the fact that the changing South African context has been uniquely characterised by a strong drive to redress deep inherited systemic inequalities. After 1994 higher education was called on to address and respond to the development needs of a democratic South Africa. The following section briefly maps the changing higher education landscape (mainly post-1994) with particular reference to the research context and leadership issues only as this is the focus of the present research. Research leaders and their mentees who participated in this study were located in disciplinary research environments in various South African research institutions and hence this description provides an overall context.

2.2. South African Research Context (Post 1994)

2.2.1 Policy perspective

The early period of democracy in South Africa (1994-1999) is considered by many as a period of policy vacuum, framework development and weak steering. The new ANC-led government had to take the initiative in policy development beginning with the National Commission on Higher Education and culminating with the Education White Paper 3 of 1997 and the Higher Education Act of 1997. The key levers for transforming higher education were to be national and institutional level planning, funding and quality assurance (Badat, 2009). The Education White Paper, *A Programme for the Transformation of Education* (DOE, 1997) outlines the main research concerns of the inherited system as:

- ✚ insufficient articulation between the different elements of the research system;
- ✚ insufficient research capacity in higher education;
- ✚ stark race and gender imbalances in demographic composition of researchers across the research enterprise;
- ✚ a skewed distribution of research capacity and resources in higher education institutions, with black universities having limited research capacity and technikons no research culture at all for most of their history.

Hence, the main research policy aims of the then Department of Education (now known as Department of Higher Education and Training) in the new dispensation 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” (Cloete, Fehnel, Maasen, Moja, Perold and Gibbon, 2002:306). The National Plan placed a strong emphasis on the value and importance of research: “Research, in all its forms and functions, is perhaps the most powerful vehicle that we have to deepen our democracy. Research engenders the values of enquiry, critical thinking, creativity and open-mindedness, which are fundamental to building a strong democratic ethos in this country” (Ministry of Education 2001, section 5, par 5.1). The critical education and research documents of the time (Education White Paper 3, White Paper on Science and Technology) made it clear that a new mode of knowledge production was at play, and that higher

education planning, programmes and funding should encourage innovative ways of producing knowledge. The research system, therefore, must "...keep abreast of emerging global trends, especially the development of participatory and applications-driven research addressing critical national needs which requires collaboration between knowledge producers, knowledge interpreters and knowledge managers and implementers" (Department of Education, 1997:31-32). This policy position agrees with the view that research and scholarship are important drivers in the endeavours to make the national economy globally competitive.

But the new (post 1994) South Africa inherited a varying range of post-school institutions (21 universities, 15 technikons, 120 colleges of education and 150 technical colleges) with considerable differences in capacities for teaching, research and development. Government espoused a vision of a rational, seamless higher education system that purposefully dissolved the racial inequalities that existed among institutions. In addition, there was the need to incorporate South African higher education in the fast-changing, technology-driven and information-based economies described under the rubric of globalisation (Jansen, 2002b). The Council for Higher Education (CHE), a statutory body that advises the Minister of Higher Education and Training, was approached to provide advice on the reconfiguration of the higher education system. The emphasis on these policy and planning instruments for reshaping higher education was emphasised by the Education Minister, Kader Asmal, in January 2000, when he requested a set of concrete proposals for the shape and size of the new higher education system: "...until we reach finality on institutional restructuring, we cannot take action and put into place the necessary steps to ensure long term affordability and sustainability of higher education" (CHE, 2000a:2). In March 2001 the Minister appointed a National Working Group (NWG) consisting of eleven persons from business, labour, higher education and Government "to advise on the appropriate arrangements for restructuring the provision of higher education ...including institutional mergers." (Department of Education, 2001:4). The final report of the NWG recommended the reduction of higher education institutions from 36 to 21 through the specific mechanism of mergers. As a

result, the turbulent South African merger experience ensued, dominated in most instances by the 'steering role' of the State and marked by a lack of effective mediation between concerned parties. At the same time, the number of existing Colleges of Education was rationalised, and in January 2001 many colleges were incorporated into the higher education system. These processes resulted in a reconfigured higher education system which includes three types of public higher education institutions:

- Eleven(11) so-called traditional universities with strong(er) research cultures;
- Six(6) universities of technology (previous technikons); and
- Six (6) comprehensive universities (universities merged with technikons).

Not all eleven traditional universities are equally research-productive. The top five research-producing institutions include three historically English medium universities and two historically Afrikaans medium universities. The universities of technology and the comprehensive universities do not have a research culture that is as well-established as the traditional universities, but they have the potential to develop into research institutions. In January 2010 there were also 78 registered and 22 provisionally registered private higher education institutions in South Africa (CHE, 2010). In addition, research is also carried out by 12 major public institutions, including science councils that are dedicated to research and development. There is also a limited number of unique national research facilities that concentrate on specific areas such as astro- and geosciences, biodiversity and the nuclear sciences.

The government's transformation agenda for the research context of higher education was also driven by the introduction of a new funding framework that explicitly linked the allocation of funds to academic activity and output. It is widely acknowledged that the measurement of research output, although common practice among public institutions, is increasingly contested and controversial. There is no automatic consensus about the indicators of

research output. In addition, the case continues to be made for the promotion of diversity in creating and discovering knowledge (Weber, 2008).

The Policy for Measurement of Research Output of Public Higher Education Institutions (Government Gazette No 25583) was gazetted in 2003 and came into effect in January 2005 for the research produced in 2004. The purpose of the policy is to encourage research productivity by rewarding high quality research output at public higher education institutions. Subsidies can be claimed from the government for recognised research output from academics, researchers and research students. The policy states that recognised research outputs consist of publications in journals, books (including monographs), chapters in books and edited works as well as conference proceedings (DOE,2005). Higher education institutions receive units and funding based on their research productivity in categories of research output. According to Madue (2006), although the new policy for the measurement of research output of public higher education institutions in South Africa has shown some significant improvement from previous policies, there are many flaws or gaps in its implementation as well as in its relation to other policies such as the Science and Technology Policy (p.90). While the number of publications and their impact through citations may well be legitimate indicators of a country's research outputs and quality the government's new funding mechanism has failed to steer most of South African universities in a more desirable direction in terms of quality research output (Oancea, Hoffman and Engelbrecht, 2009). Several criticisms of policies refer to what is seen as a strong positivist, technicist discourse that is often associated with the use of quantitative methodologies. It seems as if there is a strong emphasis on science and technology and there are concerns that the quality or scientific significance has been sacrificed at the altar of quantitative measures; in other words the largest possible number of articles is produced in the shortest time (Weber, 2008).

The more recent of the policy initiatives, The Higher Education Qualifications Framework (HEQF) was published on 5 October 2007 and signed into effect in June 2009 by the Minister of Education (Gov Gazette Vol 508, No 30353).

The policy operates in the context of a single but diverse and differentiated higher education system and provides the basis for integrating all higher education qualifications into the National Qualifications Framework (NQF) and its structures for standards generation and quality assurance. Its aim is to improve the coherence of the higher education system and to facilitate the articulation of qualifications, thereby enhancing the flexibility of the system and enabling students to move more efficiently over time from one programme to another as they pursue their academic or professional careers. It applies to all higher education programmes and qualifications offered in South Africa by public and private institutions (CHE, 2007). According to the policy, the HEQF is designed, among others, to enhance the development of a vibrant high quality research system. It came into operation in January 2009. Early implementation has seen some rumblings of discontent with specific issues such as the phasing out of the Bachelor of Technology degree, some broad policy concerns and workloads required.

However, policy and practice do not flow as linear activities, and research studies continue to reinforce the complexity of implementation of policy. Policy implementation occurs in a context and is implemented at different levels by various participants across systems and governments. Literature consulted shows that governmental policy is not always congruent with institutional practice. Often laudable policy goals struggle to find expression in practical contexts that are governed by a range of political and strategic considerations (McLaughlin, 1998; Jansen, 2002a; Jansen, 2007; Badat, 2009). A brief analysis of relevant associated research indicators of the post-1994 higher education research sector follows next. It serves to explain the developments in the South African higher education research context during this period.

2.2.2. Research Performance Indicators

Information on research and experimental development (R&D) activities is one of several available tools that facilitate the understanding of the operation of national systems of innovation. It is also possible to measure the extent of

R&D activity in an economy through a series of surveys based on internationally compatible methods and indicators. South Africa conducted its first R&D survey based on the Organisation for Economic Cooperation and Development (OECD) guidelines in 1996, with the official innovation survey conducted according to the format of the Oslo Manual in 2005 (Blankley and Khan, 2005:151). This section highlights some of the key research performance indicators such as funding, research outputs and human resource development in light of particular issues that affect research and development in this country.

2.2.2.1. Research Funding

Greater investment in research is regarded as being necessary to ensure its future growth and welfare. Since 1994 the new government has moved very actively to put into place a new funding regime that would support its commitment to national priorities. With regard to the research context, three early funding strategies that were implemented included the establishment of the Innovation Fund to support strategic collaborative research and development, the birth of the National Research Foundation with the new policy of theme-oriented funding and significant increases in funding via the Technology for Human Resource and Industrial Partnership Programme (THRIP), and the Support Programme for Industrial Innovation (SPII). The latter two programmes sought to encourage closer links between academia and industry (Mouton, 2003).

Expenditure and sources of R&D funding have shifted very noticeably towards the support of strategic and applications-driven research. There is every indication that top universities are now increasingly successful in obtaining contract funding, and that there have been shifts in R&D expenditure and sources of R&D funding (Cloete et al., 2002 pp310-315). In his budget speech of May 2007, the Minister of Science and Technology at the time stated that the amount of R&D as a percentage of gross domestic product (GDP) stood at 0.87% and was on track to reach 1% of GDP. The results of the 2007/08 National Survey on Research and Experimental

Development highlight a 12% increase in gross investment in R&D to R18.6 billion. However, South African research has fallen behind in its attempts to reach the 1% GDP target (Department of Science and Technology, 2010). In order to drive more directed efforts to reach its research goals and priorities, the government has established various new funding opportunities through the introduction of new agencies and/or interventions, e.g. the NRF (1999), Technology Innovation Agency (TIA) (2009) and the South African National Space Agency (SANSA) (2010). It is important to note that the NRF's original freedom to invest the research monies at their disposal at their discretion has been increasingly reduced as government has opted for more strategic investments. The result has been that there are severe limitations on available so-called 'free standing' research funds for academic projects (Van Jaarsveld, 2009).

The business sector now consistently spends the most on R&D (approximately 56%) followed by higher education (about 20%) and the science councils (17%) (Mouton and Gevers, 2009). The table below compiled by the same authors (p.51) list some of the key indicators of the South African science system.

Table 1: Key South African Research and Development Indicators

Indicator	Value 2006/7	Value 2005/6	Value 2004/4
Gross domestic expenditure on R&D(GERD) (Rand million)	16 520.6	14 149.2	12 010.0
GERD as percentage of GDP	0.95	0.92	0.87
Total R&D personnel(FTE)⁵	30 986	28 798	29 696
Total researchers (FTE)⁶	18 572	17 303	17 915
Total researchers per 1000 total employment (FTE)	1.5	1.5	1.5
Civil GERD as percentage of GDP	0.89	0.86	0.80

⁵ Full time equivalent

⁶ Following OECD practice, doctoral students are also counted as researchers.

Source: Mouton and Gevers, 2009:51.

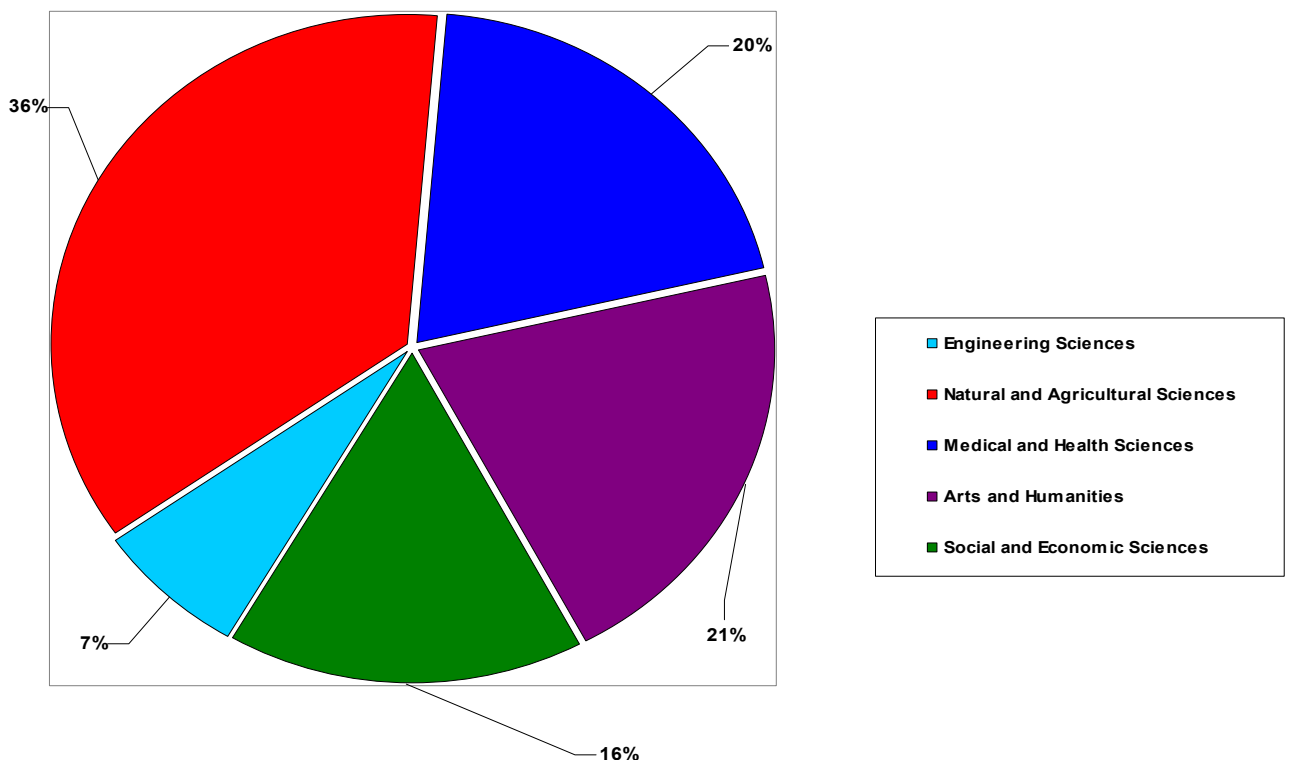
2.2.2.2. Research Outputs

The measurement of research output is usually confined to research articles in peer-reviewed journals in order to make international comparisons. The literature review elaborates on other indicators of performance. Recent surveys of the South African Science and Technology indicators put the total number of potentially publishing researchers in the country at about 16 000. This cohort of researchers publishes about 7000 papers a year, or, on average about 0.4 papers per researcher per year (ASSAF, 2006 pxiii). In a bibliometric analysis of South African science for the period 1980-2000, Pouris concluded that in 2000, South Africa's share of the world's publications, at 0.49%, was lower than its contribution two decades earlier (Pouris, 2003:426). While the absolute number of publications had increased during the previous two decades, the rate of increase had not kept pace with international growth. There is much controversy around the use of ISI-only indicators, especially since ISI journals have a significant Anglophone and developed-country bias. However, while acknowledging the use of ISI-only indicators used in Pouris' study, this downward trend was also suggested by analyses on the SAPSE and SA Knowledgebase (Cloete et.al, 2002:314).

More recent results that analysed the period 1995-2007 using research publications in both ISI and non-ISI journals found that the total article output at South African universities remained very stable from 1987 until about 2003. In 2003 the new policy framework was promulgated and the first significant increase in 15 years was observed. This trend continued until 2006 when the system reached a peak of 7400 article units (Mouton and Gevers, 2009). A breakdown by scientific field shows that South Africa's research output in ISI journals is dominated by the natural and agricultural sciences (53% combined), with the social sciences at 11% (Mouton and Gevers, 2009). It is

felt that this increase cannot be ascribed to a significant increase in the human resource base, but more probably to the host of policy, funding and broader research programme incentives that have emerged in the South African system. South Africa’s research output as a function of main disciplinary fields is shown in Figure 2 that represents the breakdown for the period 1990-2006 for output in all Department of Higher Education and Training (DOHET) accredited journals i.e. for journals listed locally (non-ISI) as well as on the ISI index.

Figure 2: Total South African article output by broad disciplinary field



Source: Mouton and Gevers (2009).

In the national research landscape differential research performance also exists across higher education institutions. Eleven out of 21 universities have produced 92% of the total South African output in ISI journals. ISI-indexed publication differences between universities relate to historical factors (e.g. English/Afrikaans medium) the presence or absence of specific faculties and schools, as well as the emphasis on different research niche areas. It is worth noting, though, that the institutional difference in production patterns in foreign

journals affect the extent to which universities enjoy high or low international recognition. An earlier chapter highlighted the South African position in the various ranking systems worldwide i.e. only one university was in the top 200 universities worldwide.

2.2.2.3. Research type

In the various international surveys, the breakdown by type of R&D is recommended for use in all four national sectors of performance. Three types of R&D may be distinguished viz. basic research, applied research, and experimental development. While it is acknowledged that there are some conceptual and operational challenges in this categorisation, the outline below describes general national shifts of emphasis rather than statistics per category.

With the introduction of the Growth, Employment and Redistribution (GEAR) Strategy in 1996 there was a marked shift in emphasis on the economic goals of growth, employment creation and economic competitiveness. The Department of Science and Technology is strongly committed to improving South Africa's competitiveness in the field of science and technology. The growth in South Africa's economy in recent years is predicated on the emergence of knowledge-based, high technology industries. The early interventions in the system were heralded by the National Research and Development Strategy (NRDS) of 2002, where, under the rubric of innovation, the NRDS established five new technology 'missions' that included biotechnology, information technology, technology for advanced manufacturing, technology for and from natural resource sectors and technology for poverty reduction. The ensuing period has thus shown increasing government support for strategic (read applied) and relevant research, with increasing pressures on support for basic and fundamental research. This transformation has been made possible through large funding drivers in order to encourage the system to develop large-scale projects to help create a culture of innovation. In 2008 the DST launched its *10-Year Innovation Plan* that identifies five grand challenges for the bio-economy,

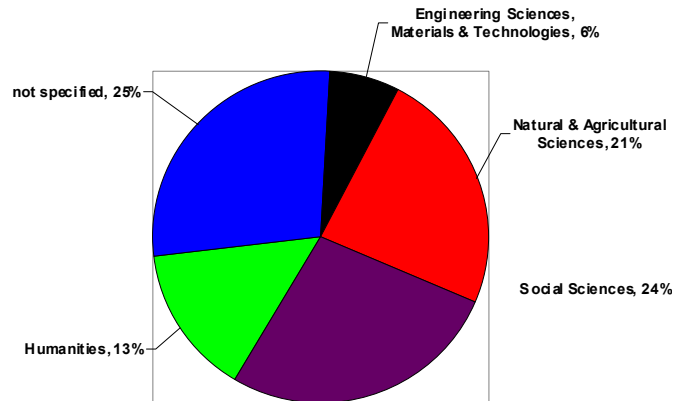
space science, energy security, global climate change science and human and social dynamics. The Plan also introduced the establishment of a Technology Innovation Agency (TIA). The agency was to incorporate, among others, the Innovation Fund and the Biotechnology Regional Innovation Centres. It is envisaged that the TIA will help to establish a network of competence centres focused on market opportunities in partnership with industry and public research institutions. South Africa also needs to find its niche in the emerging market economy. For most commentators in the higher education research sector, the concern about support for basic research and research in the social sciences and humanities remains a challenge.

2.2.2.4. Redress issues

The overwhelming race and gender imbalances at all levels of the inherited national system has meant that changing and broadening the profile of knowledge producers in the research context has been a high priority. However, indications were that the level of full-time equivalent (FTE) researchers in the National System of Innovation remained more or less static between 2001 and 2004 (there were about 17000 FTE researchers) as did the number of permanent, academic university staff with doctorates (approximately 34%) (NACI, 2006:80).

Figure 3: Share of permanent academic staff of public higher education institutions in South Africa with a doctoral qualification by broad field of study.

Source: The PhD Study. Academy of Science of South Africa, (2010)



Women researchers now comprise 38.3% of all researchers in public higher education. This compares very favourably with international trends where the population of female researchers has increased and where women account for 25% to 35% of researchers in most OECD countries, with the exception of Japan and Korea (12% each) (OECD, 2006). In South Africa, very little research has been conducted that draws gender comparisons, particularly in terms of academic publication productivity. The proportion of all papers that are authored by women and produced by traditional universities varies between 14% and 37% (CHE, 2009). There has been a general increase in the number of female authors across all fields but one (Psychology) for the period 1990-2004. However, the national average of contributions by females to research output was only 22% for the period 2002 to 2004 (Mouton and Gevers, 2009). Research conducted by Prozesky (2008) found that even the most productive women – women who were chronologically and professionally mature and at the top of the academic qualification and rank hierarchy – published less than the most productive men. Prozesky's work

explained this difference in terms of factors such as the gender-related lag in completing doctoral studies and the fact that the majority of women had discontinuous careers as a result of shaping their professional lives in relation to the lives of their partners and/or children (Prozesky, 2008 p59). The number and proportion of women among NRF-rated researchers had steadily increased from 18% in 2002 to 25% in 2006. Women were particularly well represented among doctoral graduates in both health and social sciences, but only about 33% of graduates in natural and agricultural sciences and in humanities were female (ASSAF, 2010).

Although there have been small shifts towards improved gender and race representation, progress towards the racial transformation of the human resource base seems to be slow, especially at senior and experienced levels (NACI, 2006:56). Black academics comprised 35% of the university workforce, with 10% of black scholars contributing towards knowledge production (Mouton and Gevers, 2009). The fields of chemical sciences, basic health, education, social sciences and language and linguistics had the highest proportion of black authors by 2004. The figures concerning the race and gender composition of NRF-rated researchers suggested that by 2006 only 12.8% (or 205) of rated researchers were black (National Research Foundation, 2007). It must be pointed out that this increase from 8% in 2002 was influenced by the inclusion of the social sciences and humanities in the rating system.

The production of knowledge has continued to be dominated by white male scientists at five historically advantaged institutions. It was estimated that less than 50% of academics at top producing institutions were productive in publishing and winning contracts (Cloete et.al 2002:437). In addition, the fact that nearly half of the total research output in the country was produced by scientists over the age of 50 remained a major matter of concern (Mouton, 2008:1079). This general trend also means that the production of output by authors under the age of 30 had declined significantly in all fields except for mathematics (Mouton and Gevers, 2009). These are clear indications that

directed purposive efforts at age, race and gender redress need to be accelerated.

2.2.2.5. Research students

The doctorate is usually seen as the central programmatic mechanism to grow the scientific community and therefore the development of the next generation of South Africa's researchers. In 2008 public higher education institutions enrolled 799 490 students in total with 118 622 of these being post-graduate students. The number of international students at South African higher education institutions quadrupled from 12 557 in 1994 to 53 722 in 2006. Sixty nine per cent of all international students came from the SADC region and about a quarter of these were postgraduate students (University World News, 2007). These efforts to encourage international cooperation grew in the research and postgraduate areas of study and helped to support South Africa's growth plans. In 2004 Government announced that the 'youth oriented' higher education system had grown too big and too quickly, with far slower throughput and success rates (Kraak, 2006:149). Despite efforts at massification of higher education and marked shifts in student enrolments and distribution, Kotecha (CHE, 2006:30) points out that in South Africa postgraduate students accounted for 29% of the student population, with only one percent (1%) of these students being at doctoral level.

New knowledge generated via doctoral education is widely acknowledged as an important strategic and economic resource (ASSAF, 2010). South Africa produced 1274 doctoral graduates in 2007, or 26 doctorates per million of the country's total population. Most of the doctoral graduate class of 2007 were white South African males in their 30s (ASSAF, 2010). However, there have been fairly significant shifts in the racial composition with a greater proportion being black and non-South African. Most doctoral graduates are produced in the social sciences.

Table 2: Gender, race, age and nationality of doctoral graduates, 2000 and 2007

Demographics	2000	2001	2002	2003	2004	2005	2006	2007
Gender								
Female	41%	37%	39%	39%	38%	44%	43%	42%
Male	59%	63%	61%	61%	62%	56%	57%	58%
Race								
Black African	19%	22%	23%	23%	27%	29%	30%	32%
Coloured	5%	3%	5%	5%	5%	6%	5%	6%
Indian	6%	6%	7%	9%	9%	7%	8%	8%
White	70%	69%	65%	63%	59%	59%	56%	54%
Age at graduation								
<30	15%	17%	17%	18%	15%	13%	14%	12%
30-39	43%	37%	38%	36%	38%	41%	38%	39%
40-49	29%	31%	30%	30%	30%	29%	30%	30%
50+	13%	16%	15%	16%	18%	17%	18%	19%
Nationality								
South African	84%	81%	80%	78%	78%	74%	72%	71%
Other SADC * countries	4%	4%	4%	4%	6%	8%	8%	9%
Other African countries	2%	3%	7%	7%	7%	9%	9%	9%
Rest of world	4%	6%	7%	9%	8%	8%	8%	9%
Unknown	6%	6%	2%	2%	2%	2%	2%	3%

Source: The PhD Study, Academy of Science of South Africa, (2010)

It is generally felt that the production of doctoral graduates in South Africa is growing too slowly. “At current rates, South Africa will take between six and seven years to increase its current output to about 1500 doctorates per year (Mouton, 2007:1008). This is reiterated through the results of the most recent PhD study of PhD training in South Africa (ASSAF 2010) that states that “working only within existing systems, and talking into account available capacity, there is simply no way that a rapid growth in high-level qualifications at the level of the doctorate will materialise in the foreseeable future” (p.107). Post-doctoral fellowships and early career support for young researchers is

crucial, but many are of the opinion that this level has not reached critical mass because of the fragmented approach to interventions along the different stages of the pipeline (NACI, 2006:80). During the last 10 years, science and engineering graduates grew at a slower rate than business and commerce graduates and arts and humanities have seen a substantial decline in numbers of doctoral graduates. The pictures for health and engineering sciences have remained very much the same over the period 2000 - 2005. Besides the quantities and graduation rates there are numerous matters that raise concern about the quality of doctoral students and their studies. Mouton (2008) lists the following systemic issues that still require attention when it comes to postgraduate education:

- Too many overburdened and inexperienced supervisors;
- Insufficient research preparation for doctoral students;
- Insufficient national and institutional financial support for students;
- Insufficient institutional attention and resources devoted to post-graduate support (p.1090).

Hence early analysis clearly shows that it has been much more difficult to address the deeply entrenched legacies of the past with regard to the research context. The supportive and directly driven policy context, the increases in accountability and the injections of funding are recognised as outcomes of the transitional state. As outlined in this chapter, many universities have adopted research policies to encourage research performance through increased publications in ISI-indexed journals. They also encourage staff to become rated in the NRF system and to build international networks. However, despite massive injections of funding and research capacity-building interventions, the scales have not been tipped in favour of significantly increased research productivity or the racial or gendered character of research activity and output have not been adequately changed (Jansen, 2003; Badat, 2009; ASSAF, 2010). This has far-reaching implications for a higher education system that needs to address high quality

human capacity development and new knowledge needs in order to compete successfully in the global research arena.

Thus far the chapter has traced the essential facts of the South African research context. The focus will now turn to what Jansen terms the ‘tangible changes in the soft architecture of our institutions’ i.e. academic and research leadership.

2.3. South African Research Leadership Context

Research leadership in this study is identified by the hallmarks of excellence in scholarly publication at the cutting edge of the discipline, extensive quality national and international research networks, personal scholarly recognition and prestige among peers, leadership of quality Master’s and doctoral programmes, early researcher mentorship and the ability to garner research funding. These indicators collectively speak to the credibility of personal scholarship, the capacity for people management and the consciousness of the global knowledge economy. The post 1994 policy framework has been noticeably silent on issues of leadership or more specifically academic leadership that is needed to address the challenging research scenario sketched previously.

Leadership is closely associated with change and leaders are often viewed as being necessary for responses to change in the environment and the agents of change among colleagues or subordinates. Though limited in volume, much of the documented South African higher education leadership information and research pertains to institutional leadership and administration and most often at the level of the vice-chancellor. In this changing context, the leaders of higher education institutions have largely been confronted with the following challenges in the context of the transformation imperatives:

- ✚ Legislative demands to promote equity in access and employment;

- ✚ Pressures to address development of higher level human resources;
- ✚ Funding constraints that create pressures to diversify income sources;
- ✚ Increased competition through the marketing of higher education and an increase in private higher education institutions;
- ✚ Centralised and strategic planning with increased emphasis on the ‘three-year rolling plans’ and institutional performance against planned outputs (Cloete, Kulati, and Phala, 2000).

Ladlindle’s investigations (2007) found that a very limited number of South African researchers have described the complexity of leading higher education institutions, but found that their works do not indicate how the understanding of leadership by leaders affects their practice. His research covered senior South African higher education leaders and focused on an exploration of leadership practice by eleven leaders from their own point of view. The data indicated that there are several influences on the leadership development process and that practice is a product of the values and context determinants of leaders (p.465).

Another level of academic leadership that has received some attention in the research literature is that of the Dean. As in many developing country contexts, new Deans in South African higher education are often appointed with the requirement to build and sustain strong research cultures in inherited faculties with a low research performance record and a low-level of research-qualified staff. Koen (2006) reports that in 2003 only 6.9% of technikon staff had PhDs as compared with 37.5% of staff at universities. This is an exceptionally low percentage of staff available for research. Winberg (2005) describes an absence of scholarly identity where “a research culture is not established in an institution, and lecturers do not have higher degrees themselves, or significant academic publications and where strong disciplinary affiliations are not common” (Winberg, 2005:194). The merger of institutions heralded strong challenges for research leadership and development of research capacity. Looking at research capacity development at a merged institution, Balfour and Lenta (2009) illustrate how a merger of three institutions resulted in a new school that started with the qualifications of

most new members of staff inadequate in terms of research capacity and experience. "...only two out of ten had doctorates, six had Master's degrees and two had only honours degrees. Hence most were unqualified for the supervision of higher degrees, at least as far as doctoral level, and were inexperienced in any kind of supervision. Few colleagues had encountered the obligation to publish research in academic journals" (p.10-11). The obligation to address race and gender imbalances among staff coexisted with the requirement to build research capacity.

Naidoo (2009), on interviewing a sample of Deans in merged higher education institutions, found that in some cases there is relatively little reference to research during the interviews. Of the five Deans interviewed, two showed a strong inclination towards research while another stated the frustration of not being able to make research a priority. It may be significant that the two Deans that did not focus on their own contribution to research are about to retire. "It is reasonable to assume that, as deans, they were not personally foregrounding the need for research in their faculties" (Naidoo, 2009:131). The research ethos has not been easy to develop across all institutions in the inherited system and one of the strongest challenges has been the fact that many of the senior academics (Deans, Heads of Department, management) have been such poor researchers themselves that they have not been able to make the kinds of demands on new researchers in their faculty for sheer lack of credibility (Jansen, 2002). Lack of leadership at the supervision level also affects quality research. A case study at a higher education institution during the transition period revealed that many supervisors have no training in post-graduate supervision, are supervising students over a wide range of topics and are using methodologies they have not practised themselves (Chetty, 2003). Latest research results (ASSAF, 2010) point out that supervisory capacity remains a very real constraint to increasing the number of doctoral graduates in South Africa "...there are simply not enough supervisors, even assuming all those available were qualified and that the supervisor/student ratio was evenly spread" (p.107).

Specific interventions have been identified as priority resources to address the research leadership gaps and build world-class research capacity in the country. The South African Research Chairs (SARC) programme is a national strategic intervention established in 2006 and is aimed at strengthening research leadership and capacity in South African Higher Education institutions. The programme was instituted in an effort to address the spiralling brain drain in South Africa that has impacted directly on the quality and quantity of postgraduate student training and outputs. Through the establishment of research chairs the programme seeks to retain world class researchers in higher education institutions and attract similar individuals from industry and from abroad. The objectives of the Research Chairs Initiative relate directly to the issues of leadership and capacity and are elaborated below in the context of the research study that has studied related aspects of research leaders and their post-graduate students:

- To increase the number of world-class researchers in South Africa;
- To retain and/or attract qualified research scientists to the Higher Education sector;
- To stimulate strategic research across the knowledge spectrum and thereby increase the level of excellence in research areas of national and international importance;
- To create research career paths for highly skilled, high quality, young and mid-career researchers that effectively address historical racial, gender and age imbalances;
- To improve and accelerate the training of highly qualified personnel through research (NRF, 2010).

The programme consists of two sub-programmes:

- (a) The South African Research Chairs Initiative
- (b) Research and Development Chairs; their progress is highlighted through the statistics below.

Table 3: DST/NRF Awarded Chairs as at March 2010

Total number of Chairs awarded	82
Total number of operational Chairs	79
Total number of SARCHI Chairs awarded	80
Total number of Research and Development Chairs awarded	2
Number of participating universities	16

Source: National Research Foundation (2010)

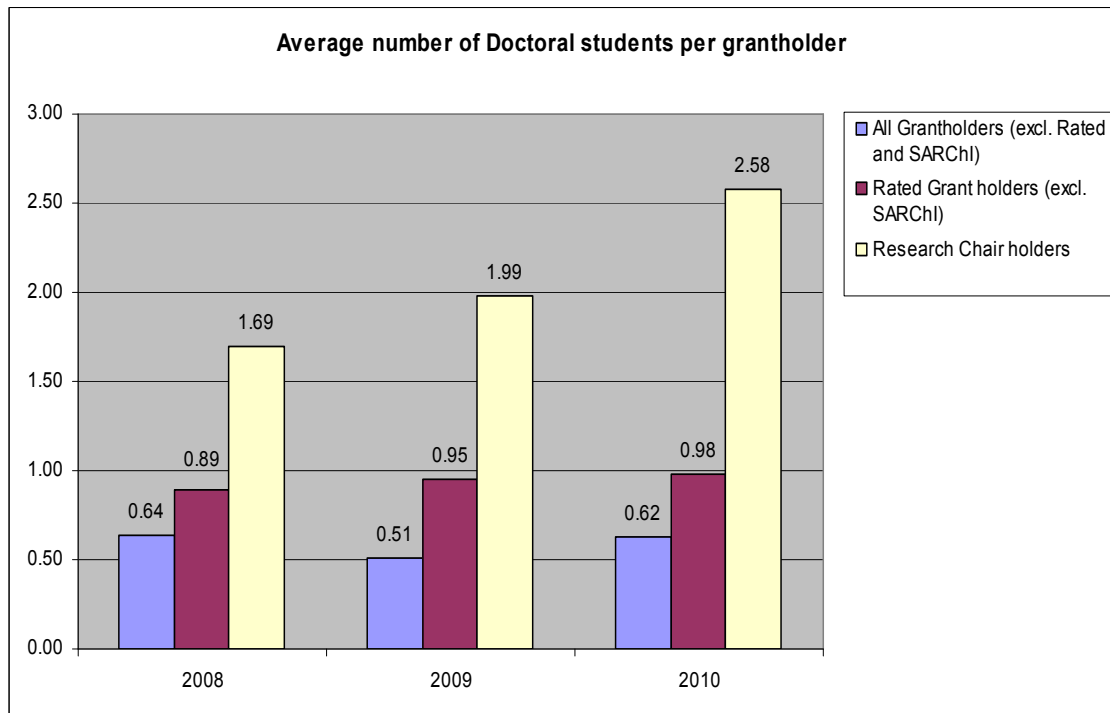
An analysis of key indicators of research output by the SARCHI is included in table 4 and figure 4 below to give an indication of research productivity in line with the original objective. It appears that the research leaders and their teams in these Chairs are producing significant output as well as an increased numbers of doctoral students overall.

Table 4: South African Research Chairs Initiative (SARChI) Performance [ISI Outputs]

Source: National Research Foundation 2010			
	2008	2009	2010
Publications by SA Authors*	8707	9264	9326
Publications by SARChI Authors	368	404	416
	4.23%	4.36%	4.46%
Number of SA Authors*	4682	4838	5028
Number of Research Chairs	68	70	78
	1.45%	1.45%	1.55%

- Includes SARChI due to co-authoring of papers

Figure 4: Doctoral students per National Research Foundation (NRF) Grantholder



Source: National Research Foundation 2011 (Annual Performance Plan)

Women's participation in science has become a central concern, featuring in most of the recent discussions and debates on science and technology in South Africa, and the question of gender and leadership has been a focus of education researchers. Historically, the statistics on the gender profile of academics in South African universities reveal that women have been generally concentrated at the lower levels of the career ladder, with very few women at the uppermost level of professorship. De la Rey (1999) undertook a study of 25 women professors from a diversity of South African universities, academic disciplines, race and age groups whose career paths were shaped largely by the higher education system of the 1990's and earlier. At the time that the study was undertaken, women comprised only eight percent of the total number of professors in South Africa. "The unfolding of the narratives of the 25 women professors illuminated complex articulations between the legacy of apartheid and processes of gender organisation both inside and outside the academy. Both gender and race were pointed to as salient factors

in the subjective representations of academia” (De la Rey, 1999; Thesis abstract).

Although the number of women in top administrative positions improved between 2000 and 2002, women are still under-represented in senior academic positions such as Deans, Vice-Chancellors, Registrars and management of other major divisions in the university. When looking at gender representation across senior management in the various public higher education institutions, women in the universities make up 40% of the senior management at the universities while they make up 24% of senior management in the Universities of Technology. Only four of the 23 public institutions have women Vice-Chancellors (CHE, 2009). Of the few women Deans, many of them are in the fields of nursing and health sciences, education and very recently, law (Zulu, 2003:101-102). The current status of women in leadership in South African higher education is reflected in Figure 5 shows that the situation is improving, with the proportion of women in senior management increasing from 18% in 2004 to 36% in 2007.

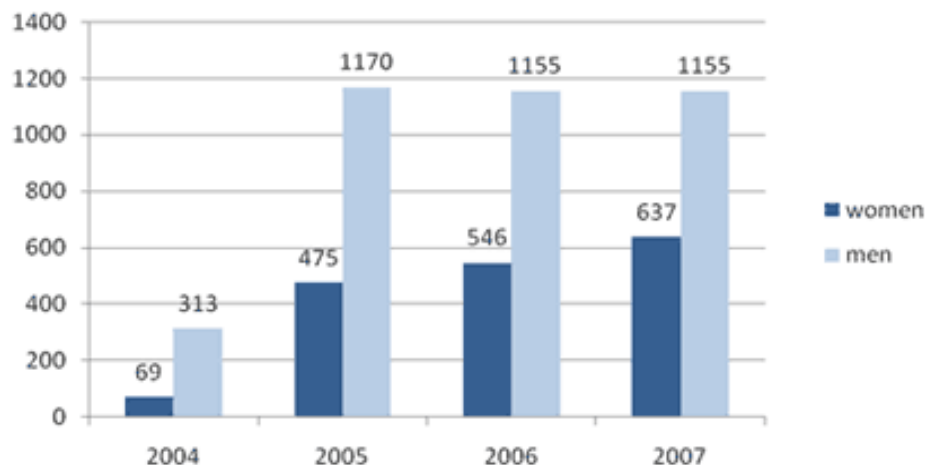


Figure 5: Growing numbers of women in senior management, 2004 – 2007.
(Source: HEMIS)

The term leadership metaphorically embodies a gendered hierarchy of labour (Isaac et al., 2009). In the South African research context, as in countries like the USA, the authorial voice of leadership has been largely male and the tenets of good leadership practice taken as that of male administrators. The statistics provided indicate a slow move in a positive direction. Legislation through policy has been improved and regulation through benchmarks, targets and monitoring has been set in place. It would thus seem that the actual *practice* of gender equity in higher education remains the main challenge.

2.4. Concluding remarks

This chapter sketches a broad outline and a summary of key aspects of the South African higher education system. The main focus was on the research context, since this study is based on a view that leadership research is clearly associated with its context. Cloete et.al (2002) concluded, and Badat (2009:464) agrees, that in South African higher education, “most changes occurred not as a result of centrally driven higher education policies, but through complex interactions among policy, societal and market forces and, above all, through a wide range of unexpected institutional processes”. Given the preceding outline of the changing research policy environment as well as the main research indicators and research leadership context, it is clear that institutional change in South Africa has been “characterised by stasis in certain areas and great fluidity in others, as well as continuities with the past in some areas and discontinuities in others” (Badat, 2009:465). The indicators highlighted show that significant progress had been made in terms of an extensive policy drive for research development, increasing investment in research and increasing support for strategic research. South Africa’s research output in ISI journals is still dominated by the natural and agricultural sciences. However, the publication output seems to have reached its peak by about 2006, and the rate of increase has not kept pace with international growth. As a system, South Africa does not produce sufficient doctoral graduates to meet the needs of a globally competitive economy. The research system continues to struggle to nurture a new generation of academics and

research leaders that are increasingly black and female and with creating a diverse, supportive and productive research culture that is driven by the principles of academic excellence.

The merger of higher education institutions posed challenges for research leadership and research capacity development. Only 40% of staff at South African universities have doctorates. Limited supervisory capacity is one of the main barriers to increasing the number of doctoral graduates in the system. The chapter also outlined a number of specific government financed interventions to increase the quality of research outputs and build a cadre of new world-class researchers. According to Mouton and Gevers (2009) the promise of better mobilisation of talent probably presents the best opportunity for gains in productivity of the science and technology system in the immediate future (p.67). The role of research leadership in stimulating research productivity and preparing the next generation of researchers is thus of utmost importance. In order to investigate this further, Chapter 3 discusses these two key indices viz. research leadership and research performance, in greater detail.