

CHAPTER FOUR

Towards a model of research productivity and leadership:

A theoretical framework

This research is located in the family of studies on research productivity. However, the main focus is on research leadership and its influence on research productivity; hence this chapter will look at the development of conceptual models of factors influencing research environments that include the role of leadership as a specific contributing factor. In this case the study aims to provide an exploratory view of leadership through the lens of research productivity. The challenge, however, remains in the fact that leadership is played out in complex, dynamic and changing social systems, and hence “not enough is known about exactly what makes an individual effective as a leader in the higher education context, and what in turn makes them ineffective” (Bryman, 2007:14). Traditional notions of leadership suggest that the impact of leaders on performance is direct, visible and tangible, assuming a linear causal linkage and suggests that a more useful approach to understanding a leader’s influence is to distinguish between direct and indirect impact on organisational performance. He is cognisant of earlier work by Lord and Maher which is still applicable in thinking about leadership and performance viz. “that the range of mechanisms linked to successful outcomes tends to be diffuse, spread over time and more difficult to associate solely with the work of top leaders” (p.333).

The short preface highlights the challenges of enthusiastically linking performance in a changing context to the leadership practices of individual research leaders. This must be borne in mind as the chapter now moves on to outline a number of research efforts undertaken to discover the various factors that stimulate and maintain research productivity. For this study, where both leadership and research productivity are both contested fields (as shown by the previous chapter), the challenge is to understand the relational nature of these two aspects, possibly through a multilevel model of leadership that includes attention to the leaders’ influence on research productivity.

4.1. Factors affecting research productivity

Early researchers suggested that “factors which determine the productivity of scientists are admittedly complex and perhaps not amenable to real scientific analysis” (Babu and Singh, 1998:309). However, the question of how to raise the productivity of individual scientists and groups has persisted for several decades. A number of studies on faculty research productivity identifies sets of facilitating factors and authors in the field (discussed individually below) have clustered these major factors that are seen to have an impact on research productivity. The majority of the early studies to explain research productivity are correlational: their tasks seem to have been to search for as many predictors as possible (Ramsden, 2004). The disparate studies vary widely in their study designs and populations, but generally try to answer the questions we face in our efforts as South African institutions and/or individual researchers: How do we develop productive research environments to build emerging and evolving new faculty and/or new disciplines? How do we maintain productive research environments in the face of constraints and mission redefinition? Although the studies cannot assume a linear causal link between factors, researchers have used these clusters to begin to identify models that may explain faculty research productivity? Some of these studies are outlined below in efforts to understand leadership influence on research productivity.

Most early work in the area of research productivity investigated the personal characteristics of a productive researcher. This body of work showed that leaders of productive research groups were highly research-oriented, internalised mission, kept research emphasis clear to the group and exhibited the behaviours one would expect of a leader with a participative governance style (Bland and Ruffin, 1992).

Given the research on personal characteristics discussed above, Bland and Ruffin (1992) tried to answer the question: ‘What environmental factors stimulate and maintain research productivity?’ They carried out a review of books and articles on research productivity published between the mid-1960s

to 1990. This review revealed that a consistent set of 12 characteristics was found in research-conducive environments:

- (1) Clear goals that serve a coordinating function;
- (2) Research emphasis;
- (3) Distinctive culture;
- (4) Positive group climate;
- (5) Assertive participative governance;
- (6) Decentralised organisation;
- (7) Frequent communication;
- (8) Accessible resources;
- (9) Sufficient size, age and diversity of the research group;
- (10) Appropriate rewards;
- (11) Concentration on recruitment and selection; and
- (12) Leadership with research expertise and skill.

(Bland and Ruffin, 1992:385).

These factors were found to be interdependent and while the differential weights of the 12 individual characteristics were unclear, the authors felt that the role of leadership was clear: “without question, leadership is the most influential organisational variable our literature review uncovered. It is the one variable that affects all of the other organisational characteristics. This, in turn, influences research productivity” (p.392). Their findings indicated that “the leaders of productive research units must be perceived as highly skilled scientists, with the quality of the leader correlating highly with the group climate. The quality of the leader was measured by scientists’ ratings of the leader’s technical competence, knowledge of the field, personality and character, amount of work he/she does and level of support he/she gives to others’ research”(p.393). It is important to note the emphases that although twelve individual factors were identified, they did not function in research groups as isolated characteristics.

Ramsden (1994) carried out a survey of full-time staff working in 18 Australian universities, covering the areas of humanities, commerce, science, health science and engineering. Of particular interest were the joint contributions of individual/personal and structural factors as influences on research productivity. According to his model, research activity at aggregate level is influenced by the nature of the perceived environment. This aggregate activity influences individual output through individual activity. Results showed that the strongest individual correlates are “early interest in research, involvement in research activity and seniority of academic rank” (p.218). The strongest structural predictor of individual output is the academic’s membership of a highly active research department (p.219). Ramsden’s general model is shown in Figure 8 and it implies that an individual’s academic research performance can be explained by a mixture of a relatively small number of personal and structural variables. An academic unit’s average productivity is influenced by the type of institution in which it is situated, its subject area and the degree to which it provides a cooperatively managed environment. An important practical implication of Ramsden’s study is that the unit of analysis is not the institution, but the department and the individual. These factors, however, all interrelate in a complex manner, with environmental factors more amenable to intervention than personal characteristics (p.224).

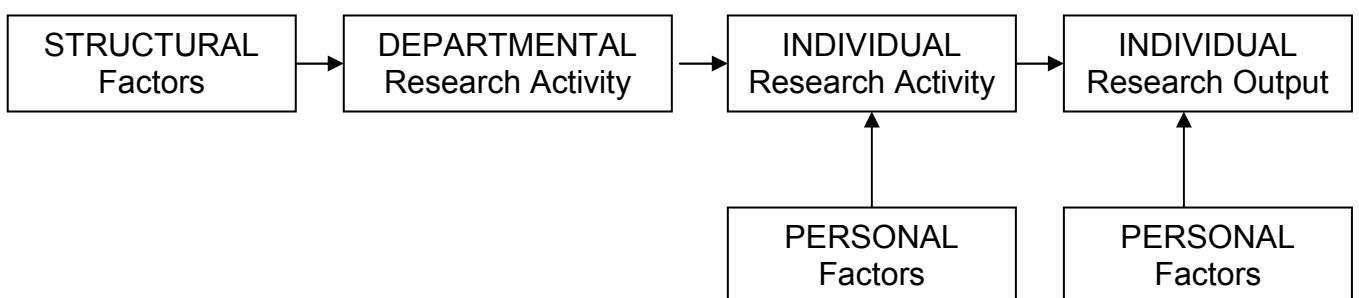


Figure 8: Model of Research Productivity (Ramsden, 1994:221)

The study suggested that “cooperative management structures, participative governance and collaborative leadership may be critical factors in enhancing research productivity across the system” although their research did not determine exactly how these influences operate (p.224).

In order to study the research productivity of scientists, Babu and Singh (1998) studied a cross section of scientists ranging from Fellows of the Indian National Science Academy to young agricultural scientists. Mailed questionnaires and personal interviews were used to collect the data. Their results identified eleven factors that are felt to have an influence on research productivity. These factors fell into two groups, viz. personal factors and organisational factors, with a dominance of personal factors. Factors in the personal group included persistence, initiative, intelligence, creativity, learning capability, concern for advancement and professional commitment. Organisational factors included resource adequacy, access to literature, stimulating leadership and external orientation (p.327). Stimulating and facilitative leadership in the organisation was found to be closely related to the 'urge for excellence'. They found that "those who had prestigious superiors were indeed more likely to be productive" (p.323).

The proposed model of research productivity of Dunbar and Lewis (1998) was based on a study of more than 3 600 research-doctoral programmes in the United States. The model is primarily associated with two categories of factors, viz. individual attributes (innate abilities and personal environmental factors) and institutional and departmental attributes (leadership, structure, culture and working conditions) (p.614). They found that factors which influenced productivity included programme and department size, being a private rather than public institution, the number of full professors and increased financial support.

The research literature in the medical field shows an increasing emphasis on developing and stimulating research activity. According to Holttrum and Goble (2006), an examination of low research activity in some medical disciplines suggests that this phenomenon is influenced by both the research training delivered on courses and the lack of infrastructure for research in practitioner settings (p.340). When the transfer of nursing education from hospital based to university-based education occurred, the nursing field found itself facing the challenge of insufficient numbers of aspiring research leaders and thus embarked on many programmes to build research competence with the

requirement to publish being inherent in the job description. (Green and Ridenour, 2004; Segrott, McIvor, and Green, 2006; McCarthy and Fitzpatrick, 2008). McCrathy and Frederick (2008) report that three key areas that they remain focused on in future nursing research development are: strong and visible leadership, developing research expertise and increasing the capacity of individuals. Programmes in fields like psychology have been characterised by the 'scientist-practitioner' model for the training of clinical psychologists. However, a growing concern has been the relative lack of research participation by the majority of trained doctoral clinical psychologists in the USA. Holttrum and Goble (2006) have suggested a more complete model of factors influencing clinical psychologists' research activity. The model has been strongly influenced by the theory of planned behaviour. Factors include vocational preferences, research training experience, practice context, research values, perceived norms in relation to doing research, research self-efficacy, professional identity and sex-role identity. The model suggests relationships between the various factors, but there is still a need to test these relationships.

The various studies in research productivity have not been able to assess the combined impact of features by studying all the features at one time in one institution. Nevertheless, it would appear that many of the diverse research studies discussed thus far support the conclusions of earlier work, that suggests that a successful research unit requires a particular set of personal characteristics in each of its researchers, a supportive set of organisational features, and leaders who are research-oriented and skilled in participatory governance (Bland and Ruffin, 1992: 395).

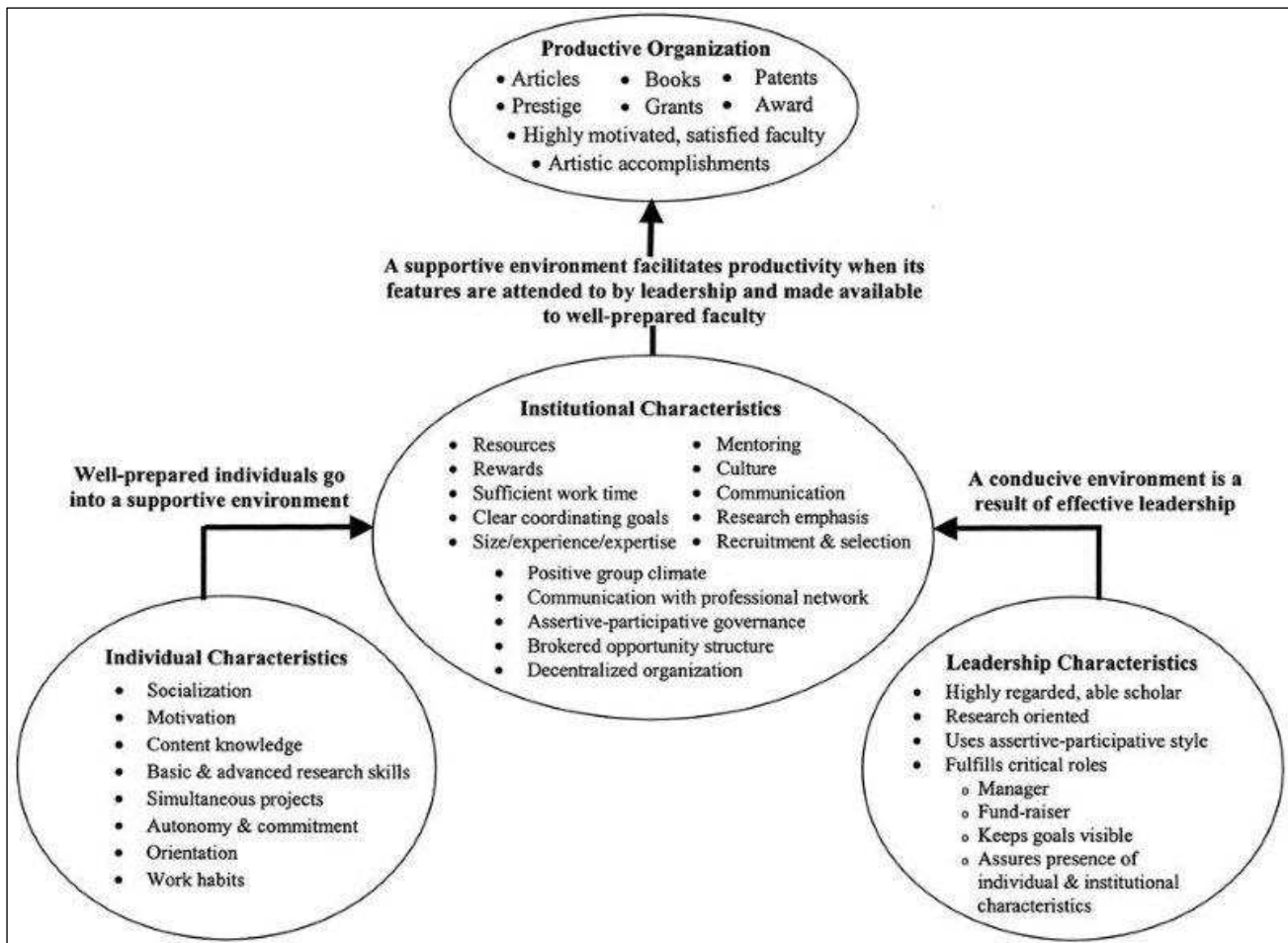
4.2. A Conceptual Framework

Bland, Wersal, Van Loy and Jaccot (2002) devised a model that built on the prior work of numerous studies in research productivity, such as those listed above and their own work, discussed earlier. They investigated "how the multiple characteristics thought to facilitate faculty research productivity

actually simultaneously affect faculty productivity” (p226). The Bland et al. model asserts that high research productivity is strongly associated with eight individual characteristics, fifteen institutional characteristics and four leadership characteristics (Bland, Center, Finstad, Risbey and Staples, 2005:227). They assessed the validity of this model in the context of a large US medical school through a survey of its 615 full time faculty members and confirmed the three broad groupings of individual, institutional and leadership as necessary for high levels of research productivity. For optimal productivity, *all* features in each component must be present and accessible. The model is displayed in Figure 9 below.

The model clearly identifies leadership as an important factor for research productivity. While it could be said that research could be undertaken without leadership, the underlying stance in this research study is that effective research leadership can improve research productivity. Similar views are also taken by Ball (2007) and Bushaway (2003). The argument that leadership contributes to research performance is even stronger today, given the climate of output-driven systems, precious financial resources, heightened competition and the continued serious skills shortage in the South African context.

Figure 9: Components of a productive research environment: the individual, environmental and leadership characteristics.



Source: (Bland et al. 2005: 227)

The model highlights that the core features never function in isolation, so a study of leadership will indirectly bring to the fore features that are both institutional and individual in nature. For optimal productivity, all features in each component must be present and accessible. The model also suggests a hierarchical order to these three sets of qualities. That is, the individual characteristics are essential, but their degree of influence is dependent upon how research conducive the faculty member's institution is. This confirms that an individual's research productivity is influenced by a combination of individual characteristics and institutional characteristics. The impact of the institution is mediated by the qualities and style of the leader. This also confirms the importance of research-oriented leaders. "The department head

keeps the core missions in front of faculty, makes the generation of dollars through research a high expectation and assures communication” (Bland et al., 2005:232). The leadership features in the model are highly correlated with the institutional features and according to the research around this model, “institutions that want most of their faculty, instead of a few stars, to be highly research productive, should emphasise institutional and leadership characteristics such as clear co-ordinating goals, research emphasis, communication and assertive, participative governance” (p233).

The leadership characteristics of the model are further detailed as follows:

1. **Scholar:** Highly regarded as a scholar; serves as a sponsor, mentor and peer model for other group members;
2. **Research-oriented:** Possesses a ‘research orientation’ – has internalised the group’s research centred missions;
3. **Capably fulfils all critical leadership roles such as:**
 - ✚ Manager of people and resources;
 - ✚ Fund raiser;
 - ✚ Group advocate;
 - ✚ Keeps the group’s mission and shared goals viable to all members;
 - ✚ Assures the presence of individual and institutional features that facilitate productivity.
4. **Participative leader:**
 - ✚ Uses an assertive, participative style of leadership;
 - ✚ Holds frequent meetings with clear objectives;
 - ✚ Creates formal mechanisms and sets expectations for all members to contribute to decision making;
 - ✚ Makes high quality information readily available to the group;
 - ✚ Vests ownership of projects with mentees and values their ideas.

“Taken together, the separate analyses of this study reinforce the perception that a highly research productive organisation is indeed a function of the integration and interplay of the individual and institutional features. The

successful synthesis of these features is highly dependent on effective leaders” (Bland et al., 2005:237).

The Bland et al. model described above is a model that can be a useful starting point for this study. It does provide a link between the two main indices of research leadership and research performance. However, some challenges remain for the use of such models and more especially in relation to the proposed research study. Traditional notions of leadership assume a linear causal link between leaders and performance. As pointed out by Middlehurst (2008), a major difficulty in many research studies in the leadership field however, has been isolating leadership from other variables, including size of organisation, individual leadership versus collective leadership, and leadership independent of other systems (such as human relations practices). In addition, as highlighted earlier in the literature review, leadership is ‘relational’ between leaders, followers, situation and context, and indeed between governance, management and administration. “There remains a need for those in leadership positions to discuss, negotiate and learn about the leadership that needs to be exercised in specific settings and circumstances” (Middlehurst, 2008:333). In many cases the models are developed outside the context of the research and hence care must be taken in ‘importing’ models directly for use into new contexts. The models represented in this chapter are international (mostly UK and USA) in both source and validation studies to date. To date there are no published South African or African models of research leadership and links to research performance against which to benchmark the international work. This research, rather than an exercise in strict verification of proposed models, seeks to more fully understand the leader and leadership in relation to research productivity and seeks an inductive, comprehensive approach for studying this relationship. In this aspect the research is generative as it is expected to produce new conceptions about research leadership in the South African context.

4.3. Concluding Remarks

This chapter outlined studies that have looked at the multiple factors affecting research productivity in academic environments. Leadership (as collaborative or participative governance) was found to be a critical factor in research productive environments, although few studies were able to say just how the influence was achieved. Bland et al. (2002) devised a model that illustrated that three broad groupings of characteristics are necessary for high levels of research productivity i.e. individual, institutional and leadership. The model suggests that all features in each component must be present and accessible and that there is a hierarchical order to these three sets of qualities. The model will be used as a starting point for the conceptual framework of this study, leaving space for the adaptation of the model to a South African context, should the research prove this necessary.

CHAPTER FIVE

Research Design and Methodology

The focus of this study is on research leadership and its influence on research performance in the context of the South African research enterprise. The aim is to understand successfully performing research leaders and how they influence the research performance of their units, teams or faculties. This involves an understanding of who these leaders are, what their own research development trajectories are, and what their research leadership views, values, assumptions and roles are in driving increased research performance. The research studies and resultant models discussed in the literature review point to the importance of research leadership in improving research productivity. However, as highlighted in the models discussed earlier, both research production and leadership are best thought of as contextual, with interaction between complex phenomena, so that simple cause and effect analysis is inappropriate for addressing the research questions. As such, a qualitative research study was selected as the most suitable research design. In this instance the research is informed by the use of a grounded theory approach with a case study design.

5.1 Grounded theory research

The goal in grounded theory research is to produce theories from data rather than from some apriori standpoint. The literature review above has shown that there are models that exist to link research productivity, leadership and other variables, for example institutional culture, in connected patterns that can explain possible influences in research productivity. Although these models are available, the choice of grounded theory for this research rests on a number of factors:

a) the models are incomplete since they do not address all leadership variables of interest to this research;

- b) the models and samples were developed mainly on Western populations (mainly United States and United Kingdom) that did not necessarily consider the context of change imperatives and transformation in the research enterprise; and
- c) a grounded theory approach can be used to explain research leadership from the point of view of the leaders in the South African context. We may then be able to compare with models from other countries and stimulate new dialogue through the data.

The term 'grounded theory' refers both to a method of inquiry as well as to the product of the inquiry. For the purposes of this research grounded theory is understood as a qualitative research design in which the inquirer generates a general explanation (theory) of a process, action or interaction, shaped by the views of a number of participants (Creswell, 2007). The grounded theory approach will be more strongly located in the constructivist views of Charmaz (2006) who challenges the positivist traditions of early analysis in grounded theory, and places more emphasis on the views, values, beliefs, feelings, assumptions and ideologies of individuals. It is also thought to uncover experiences with embedded, hidden networks, situations and relationships, and makes visible hierarchies of power, communication and opportunity (Creswell, 2007). This approach provides a flexible framework in which to investigate research leadership and its relationship to research performance. It will allow the investigation of how leaders interpret and enact their role in the production of research. The data will look to provide details of a qualitative nature such as discovering what occurs, the implications of what occurs and the relationships linking occurrences. According to Chamaaz, "grounded theory methods hold untapped potential for innovative studies at the organisational, societal and global levels of analysis" (p.514). The grounded theory analysis procedure is used in a multiple case study design.

5.2. Case study design

Since the focus is on broadening our understanding of the nature of research leadership and the range of leadership factors contributing to research performance in the research enterprise, the case study method is selected as an appropriate tool for this exploratory project. As Yin (2003) comments “you would use the case study approach because you deliberately wanted to cover the contextual conditions – believing that they might be highly pertinent to your phenomenon of study” (p.13). The position adopted in this research is that context has been crucial to leadership of the research enterprise, either in the university or in other research-performing organisations, and hence it is likely to shape the leadership of academics and influence their research productivity and shape the research experiences of their mentees. The case selection is crucial, since achieving the greatest understanding of the critical phenomena depends on choosing the case well.

All research leaders and post-graduate students who participated in the present research study in their bounded research context can be considered a case. Case studies were developed of ten effective research leaders from three higher education institutions in the South African research system. One case would be sufficient to provide an in-depth analysis of an individual leader, yet I decided to include 10 cases (study of 10 leaders and their identified mentees) to gather sufficient information to present a comprehensive picture through detailed descriptions. The richness of the data is enhanced by the diversity of research leadership across scientific disciplines, institutions or different types of institutions being addressed and by race and gender being considered.

In the multiple case design, it becomes necessary to undertake an in-case analysis, followed by a thematic analysis across the cases. Cross-case analysis enhances the generalisability of the findings to other similar settings and deepens the understanding and explanation. Even though cross-case analysis was undertaken, this was not intended to be a comparative study,

but the intention was rather to build from the individual portfolios and then to provide a broader understanding of research leadership in different contexts. Stake (in Denzin and Lincoln, 2005) raises a point that needs to be borne in mind for this research. He stresses that damage occurs when the commitment to generalise or to theorise runs so strong that a researcher's attention is drawn away from features that are important to understanding the case itself. There is thus tension between the reconciliation of the individual uniqueness of each case and the need for more general understanding of generic processes that occur across cases.

5.3. The sample

When qualitative fieldwork is carried out a purposive sample is drawn, variety is built in and opportunities for intensive study are acknowledged (Stake, 2005). This research study intentionally targeted and selected participants who could be identified as effective research leaders and could thus contribute to the development of a theory. The definition of research leadership used in this research study was the main criterion used in deciding whether a researcher was 'effective'. This type of non-probability sampling allowed for cases to be chosen that could purposefully inform an understanding of the research problem and central phenomenon in the study (Merriam, 2003; Creswell, 2007). A criticism of much leadership research is an "acknowledged weakness (and methodological challenge) that it is often a trawl of the views of the leaders not the led" (Smith and Adams, 2008:342). The sample of 'the led' in this research study was gradually informed by the final sample of research leaders. This is in keeping with the grounded theory approach where, theoretically, a researcher continues to select the sample as she/he develops the theory (Neuman, 2001).

5.3.1. Case selection

In this study research leadership is identified by the hallmarks of excellence in scholarly publication at the cutting edge of the discipline, extensive national and international research networks of high quality, personal scholarly

recognition and prestige among peers, leadership of quality Master's and doctoral programmes, early research mentorship, and the ability to garner research funding. Excellence shown in scholarly production was regarded as a major criterion. The criteria for the selection of effective research leaders for the study were formulated as follows:

5.3.1.1. Possession of an NRF rating

“Rating and rewarding individual researchers is an approach used internationally (e.g. in Mexico, Taiwan and New Zealand) in order to promote excellence, retain skills in the research environment and prevent brain drain” (Pouris, 2007:54). In South Africa, the National Research Foundation (NRF) is a government research funding agency. In its efforts to promote and safeguard research excellence, the NRF operates a rather unique, voluntary, researcher evaluation and rating system. It uses the system to nurture scholarship and grow the country's research capacity. According to the *NRF Facts and Figures* (2010) the evaluation and rating system reinforces the importance of internationally competitive research and stimulates healthy competition between researchers and research institutions: “It is a valuable tool for benchmarking the quality of our researchers and our entire research system against the best in the world” (p.2).

The evaluation and rating of researchers in the natural sciences and engineering was introduced in 1984. The objective of the system was to support self-initiated research and to encourage the development of a new generation of researchers. In the first year of evaluation and rating there were only 508 rated researchers, all of whom were from the natural sciences and engineering. The NRF rating system was extended to researchers in the social sciences and humanities in 2002 after which the number of rated researchers increased to 1267. In 2010, 2144 researchers of approximately 16000 staff members in academic and related positions in higher education institutions in South Africa held valid NRF ratings. Across all categories, most rated scholars were in health sciences, followed by animal and veterinary sciences, engineering, mathematics and physics, with two thirds of all these

rated researchers concentrated in five South African Universities – Cape Town, Stellenbosch, Pretoria, the Witwatersrand and KwaZulu- Natal (NRF, 2010)

The NRF rating system is a benchmarking mechanism based on peer review of recent research outputs and the impact of the work of individual researchers. The system rates researchers across 22 subject fields. Peer reviewers appraise applicants on two criteria:

- ✚ The quality of the research-based outputs over the previous seven years as well as the impact of the applicant's work in his/her field and how it has impacted on adjacent fields.
- ✚ An estimation of the applicant's standing as a researcher in the field in terms of both a South African and international perspective.

The rating system provides for **A** (leading international scholars), **B** (considerable international recognition) and **C** (established with sustained research records) categories and sub-categories. Young research stars (**P** category) who demonstrated exceptional potential in their published doctoral or research work and are considered likely to become future leaders in their fields are also recognised. An additional category was created for those who had entered the research system late and who were deemed capable of establishing themselves within a 5 year period (**L** category). In 2009 the elite "A" category comprised just 81 researchers from among the 2144 NRF-rated researchers. The majority of the A rated researchers are from three universities – Cape Town, Stellenbosch and Witwatersrand, with the highest number of A-rated academics working in animal and veterinary sciences. In the social sciences and humanities, the highest number of A-rated academics came from law and literary studies, language and linguistics. More than 50% of all rated researchers were in the C rating category (defined as established researchers). Black researchers comprised 17% of the total pool of rated researchers, and by 2009 nearly one third of all rated researchers in South African higher education institutions were women. Despite these increases,

the NRF acknowledges that the process of transforming the community of rated researchers is frustratingly slow (NRF, 2010).

The rating system has endured since its introduction but there has been divergence from the original conception, especially in relation to the link between rating category and funding levels. The ‘liberty’ allowed academic researchers before 2000 was best epitomised by the original philosophy of the rating system: provide funds with the minimum conditions and the good researcher would produce quality research. “Despite the fact that baseline incentive funding to all rated researchers accounts for only 10% of the NRF’s total annual research investment (around R100million a year), rated researchers produce some 70% of the research students funded by the NRF, as well as 70% of the ISI research outputs generated via NRF funding” (NRF, 2010:2).

However, it is acknowledged that the NRF rating system has been the subject of much debate, discussion and criticism over the years. Many of these criticisms relate to its current ineffective link to funding levels, the perceived subjective nature of terms used in the rating categories, challenges with regard to the review of multidisciplinary work, the administrative burden, and its ‘unofficial’ use as a performance management tool by many higher education institutions (Cherry, 2008; Lombard, 2007). In addition to the above factors, the 2007 review of the NRF rating and evaluation system by Higher Education South Africa (HESA) also highlighted the following key recommendations:

- The focus on excellence must be sharpened;
- Accurate information about the rating system must be more widely disseminated;
- Administrative issues such as the complexity of the application process and the lack of transparency and format in which feedback is given to applicants must be addressed.

Despite the criticisms above and the acknowledgement that the majority of researchers in higher education are not rated, its choice as one of the criteria for this research study that focuses on research leadership of individual researchers in the South African system is justified because it is based on a number of considerations, some of which have emerged from the review of the NRF system of evaluation and rating (NRF, 2008). These considerations include the following:

- a) It is an available peer reviewed assessment of individual scholarly production in the South African context;
- b) The rating system has a degree of credibility despite some criticism, scepticism and varied perceptions;
- c) Substantiated data indicate a positive relationship between rating and research productivity;
- d) Evidence suggests that the number of rated researchers at universities has become one of the indicators of research excellence of universities;
- e) Evidence suggests that the rating system has had a positive effect on the careers of individual researchers in institutions that use it.
- f) In terms of data collection, the database of rated researchers is available from the NRF (www.nrf.ac.za.)

5.3.1.2. 'Expert' advice or judgemental sampling

In 2009 there were approximately 2144 rated researchers (of approximately 16 000 staff members in academic and related positions in South African higher education institutions) on the NRF database (NRF, 2010:6). Hence it can be seen that the sample selected for the present research, although a small percentage overall, is still too large to be refined in accordance with the definition used in this research. Hence, further sampling (beyond the NRF rating) made use of 'judgement experts' in selecting research leaders from the initial database of rated researchers. Institutional academic leaders at the level of Deputy Vice Chancellor (DVC) Research (or equivalent in other research enterprises) were contacted by email with a formal request for permission to undertake the research study with researchers from their

institutions and a request for their offices to identify the six most 'effective research leaders' (rated researchers only) of the institution. They were asked to make their recommendations taking the following items into consideration:

- The definition of research leadership used in the research study;
- Individuals had to be NRF-rated staff members of the institution;
- Individuals could be selected from natural sciences, social sciences and humanities.

In addition to the above generic items, the judgement experts were supplied with a list of additional indicators that would be useful in guiding their recommendations. The research and leadership indicators they were asked to consider included the following:

- a) excellence in scholarly production at the cutting edge of the field;
- b) personal scholarly recognition and prestige among peers;
- c) leadership and/or teaching of quality postgraduate programmes;
- d) mentorship of early career researchers
- e) research or scholarly awards;
- f) fund raising;
- g) contribution to management in support of research excellence;
- h) innovation in research performance;
- i) appointment to position of research chair or centre of excellence;
- j) selection to academy of sciences;
- k) any other indicators deemed relevant to research leadership and performance.

Unfortunately this selection process by the judgement experts did not prove to be as simple as outlined above and face-to face-meetings were subsequently held at each institution with either the DVC Research or her/his designated substitute. In order to contextualise the sampling process, the issues that arose for discussion and/or consideration during this phase are highlighted below:

Ethical considerations:

Institutions were concerned about the ethical procedures and the protection of their researchers, especially as regards voluntary participation and confidentiality. They were assured that the study had received ethical clearance from the University of Pretoria. Two institutions first consulted their own ethics committees before granting permission (this caused some delays in finalising samples); two institutions gave permission without further consultation in their own ethics committees and one institution requested the submission of a detailed application to their own ethics committee before they would consider granting permission. In light of the time constraints in finalising a sample, the research supervisor wrote directly to the latter institution with the assurance that the institutional ethics procedure that had been followed was efficacious and reliable, and requested the new ethics submission to be waived. However, the institution was not willing to consider this request. In the interests of time and the completion of the study the researcher chose to withdraw this institution from the initial list of five institutions in Gauteng and proceeded with the remaining four institutions. These four institutions included three universities and one research performing science council. The *National R&D Survey (2006/7)* shows that science councils accounted for 17.3% of total national expenditure on R&D and employed 23% of the total full time equivalent (FTE) R&D workforce (Mouton and Gevers, 2009). In 2008 there were three A-rated researches in science councils, thus science councils were included as part of the sampling institutions.

Use of NRF-rated researchers:

It was clear from the discussions that opinions about the NRF rating system differed across institutions, and were similar to some of the criticisms highlighted earlier. In the science council, the sample was very small simply because the majority of researchers in that council were not rated. A senior member of one research office in the higher education institution cluster was taken aback by the 'limitation' (his choice of word) of using only rated researchers. Although the reasons for that criterion for this research study were discussed, the final list submitted contained names of researchers who were not rated. These recommended researchers could not be considered for

the sample that meant that there was much negotiation until a list of recommended rated researchers could be obtained from the institution.

Recommended researchers - 'system reflections'.

The first draft lists of institutionally recommended research leaders submitted by the four institutions did not include any black females and only a few black male rated researchers. In 2010 black rated researchers made up 17% of the total number of rated researchers and rated female researchers made up approximately 33% of the total number of rated researchers (NRF, 2010). Each of the institutions was contacted again and further recommendations were obtained. It is interesting to note that those names were not the first recommendations. This indicates that using rating as a selection criterion was especially limiting. However, it also points to the broader issues of gender and equity that still plague the South African research system, even though the stringent peer review system of the NRF rating process is intended to nurture scholarship and grow the country's research capacity.

5.3.1.3. Supporting research data

It must be noted that the definition of research leadership used in this research is more than an assessment of individual scholarly production. The rating system does not reveal data about other factors that are considered important within the definition. These include postgraduate training and mentorship, individuals' management of teams, innovation, multi-disciplinary work, management capabilities, research funding obtained, and so on. Data on postgraduate training, teamwork and research funding was obtained from relevant databases of the NRF and the central research offices at all research enterprises. This data was mapped against short-listed candidates identified by institutions. A final sample that informed the study was selected by the researcher. Considerations included the richness of the diversity of the sample as well as practical concerns such as reasonable accessibility (geographical, financial) for the researcher.

5.3.1.4. Geographic location

At the time of conducting this research the researcher was based in Pretoria, Gauteng and accessibility to the research participants was a major consideration. Hence the decision was taken to limit selection to research institutions and or research enterprises in Gauteng. Given the fact that the target sample consisted of rated researches, the original participants were selected from a total of five Gauteng institutions, viz. four higher education institutions and at least one research-performing science council. The sample of higher education institutions excluded all universities of technology since they were considered to be working towards becoming fully research-led institutions. All institutions selected had a clearly-stated research mission with two of the universities being part of the established 'Big Five' research universities of South Africa. One university was a distance learning institution and the remaining university was a merged institution (a university merged with a technikon). This sample of five public funded institutions provided a diverse institutional mix from which the research leaders were selected.

5.4. Participants in the study

Researcher

The researcher is a senior management employee of the National Research Foundation, but not currently directly involved in the evaluation and rating of researchers or linked in any way to the grant funding of research programmes. There is contact with some researchers in the current portfolio but mostly through programmes or projects of science communication rather than research funding. The researcher previously managed a research focus area and worked with many different researchers. Thus she is familiar with the institutions used in the sample, as well as many of the aspects of research management in higher education such as research programmes, assessment of research proposals, student support and development, capacity building interventions and grant funding.

This experience and understanding of the research community supported the primary interview activity with research leaders. The researchers were aware

that the researcher worked for the NRF and since many of them had received research or student grants at some stage, there was some acceptance of and familiarity with the dynamics of the research funding environment. This facilitated both the securing of the interviews and the discussions that followed. In one or two instances problems experienced with the NRF were raised in the discussions (mostly with the rating system), but these were quickly followed by a wry smile and a comment that 'you are probably not the one I should be saying this too'.

At one level the researcher was a representative of NRF senior management, and at another level she was a doctoral student collecting data. There was self-awareness of how these two roles juxtaposed throughout the interview process, but there did not seem to be any sense of mistrust of the researcher or her position in the NRF that impeded the research interviews in any way. Positive email follow-up communication was received from all except one research leader who did not offer any feedback at all.

Research leaders

Each of the final four participating institutions submitted a list of recommended rated research leaders. The number of potential respondents across institutions varied as the number of rated researchers across disciplines varied in each institution. In three cases, the submitted list far exceeded the initial request for at least six. This was helpful, as these lists were used to finalise a sample that included considerations of institution, discipline, as well as race and gender. The original list consisted of 12 selected research leaders and allowed for possible non-availability or drop out along the way. Each listed researcher from this group of 12 was sent a formal invitation to participate, providing them with the background information on the research study and informing them that their institutions had recommended them. Two research leaders declined the invitation to participate due to work commitments. The remaining ten research leaders agreed to participate in the interviews. Much time was spent negotiating times for the interviews to take place in their busy schedules. Eventually it took nearly four months, from August to November 2009, to complete most of the

interviews. The last interview was held in February 2010 when the participant returned from an overseas sabbatical.

The summary of biographical data presented in the tables below (Tables 7.1 to 7.4) indicates the composition of the final sample of research leaders while being mindful of confidentiality. The extensive combined research leadership inspired confidence in the kind of information that would be obtained from this grouping.

Summary of Research Leader Information collected at time of research.

Table 7.1: Age, Race and Gender

30-40 YRS	41-50YRS	51-60YRS	61+ YRS
1	3	5	1
male	2 females 1 male	2 females 3 males	female
black	black female white male, white female,	2 white females 2 black males 1white male	black

Table 7.2: NRF rating categories

A category	B category	C category	TOTAL
4	4	2	<u>10</u>
2 males (1B) 2 females(W)	2 males (1B) 2 female (1B)	1 male (B) 1 female(B)	3 B males 2 W males 3 W females 2 B females

Table 7.3: Disciplinary Base (s) and primary research areas

<u>NATURAL SCIENCE AND ENGINEERING</u>		
	Engineering	2
	Biological sciences	3
TOTAL		5
<u>SOCIAL SCIENCES AND HUMANITIES</u>		
	Health	1
	Business Administration and management	1
	Economics	1
	Education	1
	Law	1
<u>TOTAL</u>		5

Table 7.4: Institutional positions (Highest)

POSITION		RATINGS	NOTES
Professor in a department	2	A, C	A -rated participant in this group had previously been a Head of Department for 8yrs and had recently moved institutions
Professor and Director of Research Centre/Research Chair/ Centre of Excellence	5	2A, 3B	
Professor and Research Director	1	A	Previous Head of Department

Professor and Executive Dean	1	C	Previous Head of Research Chair
---------------------------------	---	---	------------------------------------

Research ‘followers’ or mentees

This group of participants was selected as the study progressed. They were identified in order to provide the perspective of those that had been “led” by the identified research leaders. Their role is important to ensure that the research data are not just self-reported leadership stories, but that they should be substantiated or contested by the views of those who have experienced the leadership, especially its influence on their own research productivity and development. A snowball selection process was used to select participants who had been led by the research leaders but who occupied their own ‘positions of influence’ in the sector. After each interview the participant was requested to provide a list of post-graduate students who could be contacted for inclusion in the research study. The request was for names of doctoral and post doctoral students, but Table 8 below illustrates that a cross section of supervised degrees was submitted. In eight cases the participants sent lists of names per email the next day, while in the other two cases they provided the researcher with a list of students from an available list on the day of the interview.

Thirty completed mentee questionnaires were finally analysed. This group comprised 14 male and 16 female respondents, 20 of whom were South African and ten were foreign students from Africa, the USA and Germany. All the degrees had been supervised by the leaders and completed during the period 2000–2009, with at least four respondents involved in ongoing doctoral studies in 2010. An analysis of completed questionnaires with regard to degrees supervised and ‘follow-on’ career paths is summarised in the table below.

Table 8: Follow-on career paths of mentees

Mentee Degrees supervised by leaders	Current positions of mentee respondents				
	Ongoing PhD	Post Docs	Research positions (HEI)	Private Practice/ Industry	Government
4 x Masters Degrees	4				
1xPost doctoral degree			1		
25 x PhD		1	16	6	2

In this sample it is noted that 83% of those that had completed doctoral degrees with the research leaders progressed to positions in the research sector, mostly universities. Those in government positions were assigned to research or legal (law candidates) positions in their units. Those in private practice or the industry category included engineers, health professionals and business management professionals. This contextualisation refers to building research capacity and transforming the research profile of the national system of innovation in South Africa and is further discussed in the analysis of the results

5.5. Data Collection strategies and instruments

Typically in grounded theory research, where the aim is to generate a theory using constant comparative analysis throughout the research process, interviews are primarily the main data collection activity (Creswell, 2007). In case study research, interviews are supported further by relevant documents and records. The main data collection methods for the present study were interviews, questionnaires and document analysis.

Interviews

Face-to-face, semi-structured interviews were conducted with each of the research leaders. This included a minimum of at least one interview each, with interview time ranging between one and a half and three hours each. One of the most challenging aspects of the data collection process was the delay in setting up the interviews in the busy schedules of the participants. Despite this, the fact that interviews were secured with ten consenting research leaders was considered to be a major accomplishment given the context of their daily commitments. One respondent was overseas at the time most of the interviews were conducted and agreed to grant an interview when he returned to South Africa six months later. Because participation was important the researcher agreed to this request since it allowed her the opportunity to continue with parallel processes in the interim. In other cases, interview appointments had to be rescheduled several times owing to unplanned occurrences such as emergency calls to meetings and illness. The fact that all the interviews were held at the research leaders' institutions, was helpful in creating a context and observing the hectic nature of many of their schedules as the interviews were often interrupted by knocks on the door from staff and or students, or telephone calls that had to be attended to (with apologies).

All interviews were audio recorded and later transcribed. The discussions were aided by an interview schedule containing a list of themes and broad questions that sought to understand the development of the participant's research career. Previous studies of leadership development have used retrospective accounts of leaders' lives in written biographies or oral interviews in order to discover events and experiences that had contributed to their development (Shamir Dayan-Horesch, and Adler, 2005 p.16). The focus of the discussion with the research leaders in this study was on tracing the development of research leadership according to the criteria used in this study. Initial broad themes included:

a) background details related to research experience or research career trajectory;

- b) views about research and their involvement in research;
- c) opinions and experiences of research leadership;
- d) mentoring, building capacity and research productivity.

The interview protocol was piloted with an executive colleague who had previously been an Acting Deputy Vice Chancellor (Academic) with experience in research publication, doctoral student supervision and roles in academic journal publication. Although not rated, this colleagues' academic experience, administrative and strategic involvement in the NRF rating system, willingness to be interviewed and accessibility provided a sound platform for the pilot. The introductory email, invitation to participate, letter of consent, as well as interview questions were piloted during this first interview. The pilot interview lasted for one hour and forty five and was audio recorded while the researcher made extensive hand written notes. The questions were found to be appropriate, but the researcher felt that she had rushed through them in an effort to make sure that all questions were covered during the interview. This made the interview a limited question-and-answer session and the researcher realised that the answers to some questions over-lapped. Thus the researcher was able to reconsider her approach and decided to concentrate on important general questions and thus introduce flexibility to the sequencing of questions. This allowed for a better flow of conversation and the opportunity to probe for more information.

At first, many of the participants were not comfortable discussing themselves or had not considered their research trajectories in a structured manner. The role modelling function of leadership is very important and "is performed not only by leaders exhibiting certain behaviours in front of followers, but also, sometimes even primarily, by the traits and behaviours reflected in the stories leaders tell about themselves"(Shamir et al., 2005:15). The discussions often veered towards opinions about broader institutional or system issues and the researcher had to redirect the conversation with questions such as 'but what about you, Professor, what about your role, or position, or influence?'. This was especially evident in some statements made after the interviews, for example: 'I haven't seriously stood back and thought about all this stuff

before’ and ‘I hope you found something useful in all of that. I feel like I’ve been sharing my history with a friend’. The biographical data consulted as part of the purposeful sampling revealed that many awards and research recognitions had been bestowed on the participants, and yet unless specific questions about this aspect were asked, very few offered the information. In some cases they seemed almost embarrassed to be reminded of these things. Nevertheless, generally speaking, the researcher found that the telling of the research stories was similar to what Reddy (2000) found when investigating the life histories of black South African scientists. According to Reddy, each of the participants recounted their stories differently. Throughout the story telling, they all had different points of emphases, different ways of telling, and different amounts of reflection.

When the findings were interrogated it was evident that the initial interview questions did not address the issue of research leadership as an agent of and for the transformation of higher education sufficiently. The data collected from the interviews addressed many issues of transformation, and while some aspects could be surmised from their discussions, it was felt that the participants needed to be given another opportunity to answer further questions. As a result, each participant was contacted via email and requested to answer two additional questions with regard to their research development in an apartheid context as well as their personal leadership contributions to transformation in a post-apartheid South Africa. Five of the ten participants provided email responses to the two questions posed. In some cases their responses verified earlier interview data, while in others new information allowed for more informed interpretations of the earlier findings.

Questionnaires

The original research proposal suggested that focus group interviews would be held with identified past doctoral or postdoctoral students who had been led by the participants. The aim was to create focus groups of two members each (per research leader), with each interview lasting approximately one and a half hours. The discussions would be structured to provide information

about the student-participants' views and experience of the research leadership provided by the identified research leaders. However, after the first interview with a research leader, the researcher realised that this would prove practically impossible since the list of past doctoral students indicated that many were scattered at institutions throughout the country and some were even at institutions abroad. Consequently, after discussion with the supervisor, the researcher decided to compile an electronic questionnaire that could be distributed by email.

At each interview the research leader was asked to provide the names of three to five doctoral and or post-doctoral students who had experienced their supervision and mentorship and who had moved on to fill niche areas of their own. Each identified mentee was sent an electronic letter of invitation to participate in the study, explaining that their participation was based on their research experiences when working with the supervisors. Each mentee who had indicated a willingness to participate in the study was sent an electronic questionnaire for completion and return. All sent and returned dates were tracked with the use of a spreadsheet. The tracking process required frequent follow-up email requests with what came to be termed as 'gentle nagging' in ongoing correspondence with the mentees over many months. For the most part, those who returned completed questionnaires did so in a very positive spirit. The response rate for returned questionnaires was 64%. An analysis of all questionnaires sent and returned is summarised in Table 9 below.

Table 9: Mentee questionnaire information

Total No of mentees contacted by email	NIL response	Number who responded, but DECLINED to participate	Number who indicated that they were willing to participate but did not return questionnaires	Number who returned completed questionnaires
47	7	2	8	30

Document collection

The research leaders were asked to provide a copy of their most current curriculum vitae. This was used to substantiate some details of the personal stories and research trajectories that formed part of the interview protocol. Copies of the research records were obtained (with permission) from the NRF database, as well as information about grant funding and student support. Any research data not captured through NRF support was requested directly from the participant or institutional research office. Where applicable personal web pages, institutional web sites, annual research reports, special research or institutional commendations or awards as well as any reports in print media were sourced and examined.

5.6. Data Analysis

The method used to analyse the data consisted of simultaneous data collection and analysis, with each focussing and informing the other throughout the process. Each interview was recorded using a suitable MP3 recording device. Each audio interview was downloaded onto the researcher's computer and transcribed as a hand written verbatim version. While this process was slow it provided the opportunity to listen very carefully to the interview.

The researcher transferred the hand-written versions to a typed format from where she organised the verbatim data to correspond with the questions. For instance there were times where the conversations had digressed from the main issue. This repeated interaction with the data was very helpful in developing a sense of emerging issues or even ideas before starting any detailed content analysis. The final transcribed copy was sent to each of the participants for comment. Those who responded to the request made minor corrections of formatting, names, spelling and so on. None of them disputed the transcription as provided. One participant was concerned about anonymity since it was felt that some of the opinions expressed in the interview had the potential to be viewed in a negative light by either the home institution or the NRF. It was agreed that the said comments would not be deleted since they were an honest reflection of the situation at the time, but

that anonymity would be assured as far as possible through the use of pseudonyms. In light of the fact that the South African research community is comparatively small, some disciplinary views may allow searches and endeavours to identify participants. However, the researcher did not regard this as a means for possible malicious targeting.

Since this research study is a multiple case study of different research leaders, both in-case analysis and cross-case analysis were carried out to build a rich portrait of each individual research leader and to make abstractions across cases. Grounded theory is a comparative method in which a researcher compares data with data, data with categories and category with category (Chamaz, 2005). A researcher attempts to see processes and outcomes that occur across cases to understand how they were qualified by local conditions and this develops more sophisticated descriptions and powerful explanations (Miles and Huberman, 1994;172). In this research semi-structured questions were used in the interviews while most of the questions in the mentee questionnaires were open-ended. Because of this, the data was initially interrogated through thematic analysis, a technique in which themes and patterns are identified from the responses reflecting the participant's experiences.

5.6.1. Computer Aided Qualitative Data Analysis

Having transcribed the ten interviews and typed them herself, the researcher had ample opportunity to listen to the interviews several times and read the typed transcripts. This allowed for deep immersion in the data, so that a sense of emerging themes across the interviews gradually developed. As Stake advises (in Denzin and Lincoln, 2005), "Place your best intellect into the thick of what is going on. The brain is ostensibly observational, but more critically, it is reflective" (p.449). When data gained from casework is considered, sometimes it is pre-coded and continuously interpreted. The early stage of the present research used a primary form of inductive logic where the researcher worked from the text and recognised the emergence of some common themes. As this provided a superficial sense of data emerging, the researcher proceeded to the use of a software package to aid code-based

analysis. The analysis was aimed at organising, describing and interpreting the data by identifying patterns or themes and constructing a framework through which this essence could be communicated meaningfully.

Atlas.ti was used for the analysis of both the interviews and the mentee questionnaires. Atlas.ti allows for the analysis of textual, graphical and audio data (Scientific Software Development, 2004). This software tool allows one to organise data in terms of three levels of coding suggested for grounded theory research. These include open coding (developing categories of information), axial coding (interconnecting the categories) and selective coding (building a story that connects the categories) (Creswell, 2007).

Each interview was assigned codes as they emerged throughout the document. The line-by-line coding enabled the researcher to be involved in a close study of the data and to lay the foundation for its synthesis. The same process of assigning codes was applied to the mentee questionnaires and new sets of codes emerged in this data set. Codes were thus generated through an inductive process and allocated to each unit of text. The inductive approach works well when the terrain is unfamiliar and/or complex and the intent is exploratory or descriptive. The codes match fairly well to the clusters of questions that were answered in the interviews and in the responses to the questionnaires. Sometimes a new code was developed during analysis of one of the later interviews, and the researcher was able to go back and take a fresh look at earlier interviews. This is in line with Chamaz's work where she reminds us that "in working with grounded theory the researcher can give data multiple readings and renderings" (p.517).

Once coding was completed, codes were clustered together in meaningful groups to generate families or themes. The groups were collapsed in some cases where the overlap became evident as the units were analysed in greater depth. The software package allowed numerous iterations of organising the data, including all codes for participant interviews or mentee data, as well as linking mentee data to each of the relevant participant research leaders. Atlas.ti was thus able to provide an easily accessible audit

trail (See Appendix H). The detailed output documents generated for each selected data combination were then used to guide the in-depth analysis that follows in the next chapter.

5.7. Towards validity and reliability

Even though it is acknowledged that no observations or interpretations are repeatable, one still needs to clarify meaning by identifying the different ways in which a case is seen and to present a holistic interpretation of what is happening (Stake, 2005; Merriam, 1998). This allows one to lay bare any researcher bias that might mean that the researcher brings her own assumptions and worldview to the research and its analysis. Earlier in this chapter the role of the researcher is outlined and the awareness highlighted of how her roles as a senior member of a research funding agency (NRF) and a doctoral student were juxtaposed throughout the interview process. Her experience of the research funding environment and the institutions in which the participants were situated, as well as her proximity to one of the major government departments involved in research, all had the potential to encroach on the research process and on her interpretations of the data. She was acutely aware of her own potential biases and she kept this awareness in the forefront especially during the interview process and when she was engaged in repeated data ‘renderings’ in pursuit of validity.

The focus of qualitative research is inherently on multi-methods and objective reality cannot be captured (Denzin and Lincoln, 2005). The combination of multiple methodological practices, empirical materials, perspectives and observers in a single study is then best understood as a strategy that adds rigour, breadth, complexity, richness and depth to any inquiry. In this research study the researcher specifically set out to counter the self-report data of interviews by combining them with mentee reflections of their experiences of research leadership. This was also supported by empirical research data such as research funding, publications, student training and a range of diverse indicators. In this case the leadership experience is viewed from different points of view. This supports the view of triangulation as the

simultaneous display of multiple-refracted realities where readers and audiences are invited to explore competing visions of the context (Denzin and Lincoln, 2005).

With regard to internal validity, the multi-staged process of selection of the research leaders is reiterated. Given the comprehensive indicators used for research leaders, there is a level of confidence that their combined research experience and current research leadership, as outlined, enabled them to comment accurately and with authority on their research experiences within the wider system of research and innovation in South Africa and abroad. This confidence in case selection contributes towards the 'trustworthiness' of the data that has emerged.

Ensuring that data are accurate is a key principle of qualitative research studies. In this study all data transcribed from interviews was sent to all the research leaders for consideration and to identify any technical errors in the reporting of the conversations, as well for verification of the accuracy of their perceptions and or attitudes expressed in the interviews. A similar process of data checking or evaluation was used to include peer evaluation in the study. The researcher works in an environment with easy access to colleagues experienced in higher education management and research management. This enabled her to ask colleagues to comment on tools used (interview protocols and software) as well as on the findings as they emerged (Merriam, 1998).

5.8. Limitations of the Study

If we begin from the worldview of qualitative enquiry as discussed by Stake (2005), where "there are multiple constructions of reality, where the researcher is the primary instrument of data collection and analysis and where understanding and meaning are of paramount importance", then questions will always be raised of both the researcher and for those being studied. Thus it is important to be mindful of the limitations that the research study faces and these are identified as follows:

1. Case studies based on a sample of 10 research leaders, can at best be considered as a snapshot of personal responses from the research participants involved in the study.
2. Qualitative research is a situated activity and the case to be studied is a complex entity located in a milieu or situation embedded in a number of contexts or backgrounds.

In this research study the identified research leaders' experiences were located in a changing and transforming research context of higher education over a period of time and hence the results will not be able to be generalised to other researchers, institutions and or across scientific disciplines.

There are two main limitations that relate to the sample selection in this study. Firstly, the decision to use only rated researchers to identify the first phase sample of research leaders can be viewed as a limitation since this criterion then excludes the majority of researchers in South African higher education institutions who are not rated. The reasons for this particular choice were discussed in the methodology section and relate mostly to choices of criteria to identify a pool of acknowledged researches where that independent acknowledgement relates strongly to research scholarship and performance. The use of rated researchers for this sample does not in any way imply that non-rated researchers are not research leaders as per the definition used in this research study.

Secondly, the final sample of institutions selected was influenced by decisions of available time and resources as well as accessibility of participants to the researcher who is in full time employment in Pretoria/Tshwane, Gauteng. In the final sample all 10, participants were employed across only three higher education institutions in a single province in South Africa i.e. Gauteng. All Universities of Technology, even if in Gauteng, were excluded from the sample of institutions as they were felt to be developing research institutions.

The study is centred chiefly on interviews with the research leaders. This data can be considered as largely self-report data, as the research does not include observations of the leaders in their professional environments over a prolonged period of time. The literature has acknowledged this weakness of leadership research and thus questionnaire survey responses from mentees who had studied or worked under the guidance of the identified leaders are included to provide a 'mirror' to the self-report data.

Kvale (2006) states that the interview is actually a hierarchical relationship with an asymmetrical power distribution between the interviewer and interviewee. His reference is mostly to the interviewer as being in the 'power position' that rules the interview. However, there is a possibility that this power dynamic may have existed in this research context, but was assigned differently between interviewee and interviewer. Unequal power dynamics may interfere with the context where a PhD student without a research record interviews research leaders about issues of research productivity, where research productivity is itself still a contested field (see section 5.3.1. p. 33). The researcher would need to establish a rapport with the participants so that they would be encouraged to respond openly and honestly within the limits of the research study. The researcher feels that this rapport was created and that the interviews were conducted in as open an environment as possible for the context. Some researchers provided feedback about the 'conversational tone' and ease of talking once they 'got started'. An additional factor that must be reported is that of the role of the researcher as a member of staff of the funding agency from which many of the participants had received research grants. It was known that she was an employee of the NRF, and this was acknowledged in various parts of some discussions as illustrated in earlier parts of this chapter. These were senior academics who felt comfortable with this fact and the researcher found that her association with the NRF did not preclude or prevent them from offering strong opinions about issues related to the NRF e.g. rating, funding levels and policy issues. These are captured in the coding category of the data analysis and hence my opinion that this factor of being an NRF employee did not hinder the interview process.

5.9. Ethical considerations

Qualitative researchers usually face many ethical issues that surface during data collection in the field and in the analysis and dissemination of information. In this study ten research leaders were interviewed and the interview included sharing of personal and professional views and circumstances. These participants were all employed in public institutions and although not named or directly linked to an institution, one is mindful of the fact that those whose lives and expressions are portrayed, are placed at some considerable risk of exposure. Hence in the words of Stake (2005) the researcher was “a guest in the private spaces of the world” of the research participants and that necessitated a “disclosing and protective covenant, usually informal but best not silent, a moral obligation” (p. 459).

Before the research began, permission was obtained to undertake the research in each institution (Institutional Ethical Clearance Protocol). This was provided by the various institutions as explained earlier in this chapter. One institution was withdrawn from the original sample because of the additional processes that were required to be followed for ethical clearance. Permission was also obtained from the NRF to extract data from their databases that are protected, namely, curriculum vitae and rating information and grant funding applications. After a clear explanation of the research study and its possible benefits over risks, identified research leaders were invited to participate voluntarily. Each research leader interviewed signed a letter of consent that gave permission to use some of their NRF records for secondary data collection as required but also indicating that the researcher would also have to provide participants with a right to privacy of their information and anonymity so that they are not necessarily easily identified through the study. To achieve this, pseudonyms have been used for researchers and as far as possible direct institutional affiliation is avoided in the text.

As pointed out earlier, a participant raised some concerns about possible personal negative repercussions if the transcribed interview became more widely available or certain parts of the interview were quoted verbatim. One

mentee requested that the completed questionnaire should not be shared with the research leader as it was not clear whether he or she was aware of the mentee's 'less than positive' experiences in some areas of leadership. These concerns were addressed individually with the participants and the mentees concerned and the issues of anonymity were reinforced after the data collection process as well. Where information that was supplied was deemed to be critical of the institution or the research sector, the participant is not named if that text is used. Instead, in these instances the text refers to 'one of the leaders said' in efforts to protect the participants. Although confidentiality has to be assured as the primary safeguard against unwanted exposure, watertight confidentiality is, however, difficult to achieve; this is especially so within a research community that is relatively small, where each of the participants came from different disciplines that are clearly stated and where the NRF list of rated researchers is publicly available information from both the NRF and various higher education institutions themselves.

5.10. Significance of the Study

As highlighted earlier, this study focuses on the leadership of the academic work of the research enterprise, in particular research with special attention to how this influences research performance. It explores the dynamics of leadership and influence in the research enterprise. In particular, it aims to understand the nature of quality research leadership and to identify a range of leadership factors or indicators contributing towards research productivity and, in doing so, highlight likely areas of difficulty as well as opportunities for improvement. This exploratory, generative research is of significance since the literature shows that there is a dearth of academic leadership studies in the South African context. Our own policies have not addressed the importance of research leadership or focused on its development. Certain leadership development courses have been introduced at institutional level (e.g. University of KwaZulu-Natal, University of Cape Town) or more broadly by organisations such as Higher Education South Africa (HESA). However, none of the available interventions directly addresses the broader research

context of understanding what makes quality research leadership work in the SA research environment. This research can thus help to inform the development and support of research support interventions by institutions and funding agencies.