IMPACT OF THE NRF EVALUATION AND RATING SYSTEM:

A REVIEW

REPORT

SUBMITTED TO

THE HESA NRF REVIEW STEERING COMMITTEE

BY

HC MARAIS

(WITH RESEARCH ASSISTANCE BY M SIKAUNDI & S GATHUA)

SEPTEMBER 2007

© 2007 ST&I Network
A report commissioned by the HESA NRF Review Steering Committee

HC Marais
ST&I Network
PO Box 13054
Hatfield 0028
083 448 9390
Marais.stnetwork@gmail.com

© 2007 ST&I Network & NRF
# TABLE OF CONTENTS

| LIST OF TABLES AND FIGURES | v  |
| FOREWORD | vi |
| EXECUTIVE SUMMARY | 1 |
| **CHAPTER 1** BRIEF CONTEXT AND DESIGN | 6 |
| 1 BRIEF AND INTERPRETATION | 6 |
| 1.1 Interpretation of the Brief | 7 |
| 2 OPERATIONALISATION OF THE BRIEF | 8 |
| 2.1 Evaluation questions | 8 |
| 3 DESIGN OF THIS EVALUATION PROJECT | 10 |
| 3.1 Instruments and sources of information | 11 |
| 3.2 Concluding summary | 16 |
| 4 STRUCTURE OF THIS REPORT | 17 |
| **CHAPTER 2** THE NRF RATING SYSTEM | 18 |
| 1 RATIONALE FOR THE RATING SYSTEM | 18 |
| 1.1 Funding systems for research in South Africa | 18 |
| 2 CONTEXTUAL CHANGES | 20 |
| 2.1 Institutional arrangements | 20 |
| 2.2 Programmatic interventions | 21 |
| 2.3 Mandate shifts and evaluation criteria | 21 |
| 3 PROCESS OF EVALUATION AND RATING | 23 |
| 3.1 Summary | 23 |
| 3.2 Administrative and decision-making structures | 24 |
| 3.3 The role of specialist committees in the process | 24 |
| 4 DEFINITION OF RATING CATEGORIES | 25 |
| 5 EFFICIENCY AND ECONOMY OF THE NRF RATING SYSTEM | 26 |
| 6 CONCLUSION: REVIEWS OF THE NRF RATING SYSTEM | 27 |
| **CHAPTER 3** ATTITUDES AND ORIENTATIONS OF RESEARCHERS | 31 |
| 1 QUANTITATIVE INFORMATION | 31 |
| 2 QUALITATIVE INFORMATION | 32 |
| 2.1 Attitudes towards the rating system itself | 33 |
| 2.2 Effects on the individual researcher | 36 |
| 3 CONCLUDING DISCUSSION | 39 |
| **CHAPTER 4** OUTPUT PRODUCTIVITY | 41 |
| 1 PUBLISHED OUTPUTS | 41 |
| 1.1 Rated Researchers listed in SAKB | 41 |
| 1.2 Journal articles | 43 |
| 1.3 International co-authorship | 44 |
| 1.4 Knowledge fields | 46 |
1.5 Overall performance 46
2 OUTCOMES 48
2.1 Patents 48
2.2 Artefacts 49
2.3 Students 49
3 CONCLUSIONS 50

CHAPTER 5 FIELDS OF KNOWLEDGE PRODUCTION 52
1 NATIONAL AND NRF POLICY AND STRATEGY 52
2 DISTRIBUTION OF RATED RESEARCHERS ACROSS DISCIPLINES 53
3 PARTICIPATION IN DIRECTED FUNDING PROGRAMMES 56
4 OUTPUT PERFORMANCE 57
5 THE INFLUENCE OF THE NRF RATING SYSTEM ON DISCIPLINES 57
5.1 Disciplinary and research focus 58
5.2 Intersections of disciplines 58
5.3 Commonalities and uniqueness 59
5.4 Recognition 59
5.5 Promotion of quality 59
6 SPECIAL CASES? 60
7 CONCLUSIONS 61

CHAPTER 6 INSTITUTIONS AND RESEARCH COMMUNITY 62
1 INTERNAL ‘IMPACT’ 62
1.1 Policy, strategies and structures 63
1.2 Financial effects 63
1.3 Knowledge production divide 65
2 EXTERNAL ‘IMPACT’ 67
2.1 Inter-institutional relationships 67
2.2 Networking 67
2.3 Image of the NRF 68
3 RESEARCH COMMUNITY 68
3.1 Discussion 70
4 CONCLUSIONS 70

CHAPTER 7 CONCLUSIONS, RECOMMENDATIONS AND PRINCIPLES 72
1 DESIGN OF THE EVALUATION STUDY 72
2 MAIN FINDINGS 72
2.1 Cross-cutting findings 72
2.2. The researcher as individual 73
2.3 Level of disciplines 75
2.4 Institutions and community 76
2.5 Challenges 76
3 RECOMMENDATIONS 77
4 PRINCIPLES  78

SELECTED REFERENCES  79
LIST OF ACRONYMS  82
APPENDIX: DEFINITION OF RATING CATEGORIES  83
LIST OF TABLES AND FIGURES

TABLE

2.1  Funding streams in 1984 .......................... 20
2.2  Outline of the evaluation and rating process .............. 23
3.1  Lapsed ratings: Institutions and disciplines ................. 37
4.1  Article outputs of rated versus non-rated researchers .......... 42
4.2  Other (than journal article) publication outputs .......... 43
4.3  Relative publication performance of rated researchers .......... 46
4.4  Patents in the THRIP and IF databases .................. 48
4.5  Students involved in projects of rated researchers .......... 49
6.1  NRF funds allocated to rated researchers .................. 64
6.2  Rank-order of universities (number of rated researchers:total staff) 66

FIGURE

1.1  The evaluation design .................................. 10
1.2  Interview and group discussion framework ................. 13
4.1  Rating mobility x output ................................ 44
4.2  ISI versus South African journals ....................... 44
4.3  Rated versus non-rated researchers: International co-authorship 45
4.4  Category of rating: International co-authorship ............ 45
4.5  Rating mobility x international co-authorship .............. 45
5.1  Rated researchers x ratings x disciplines x R&D expenditure 55
5.2  Funding sources of rated and non-rated researchers .......... 56
6.1  Relationship between number of rated researchers and NRF funding (2004) 65
6.2  Age distribution of rated researchers ..................... 69
FOREWORD

This investigation was conducted in a spirit of excitement. It is always a privilege to be part of a project of the scope and complexity of this nature. I am indebted to the HESA NRF Review Steering Committee for affording me and my team the opportunity to participate in this endeavour. We were entrusted with a topic that is of critical importance to the development of high-quality human resources and research in the South African society. Our approach was that of trying to do justice to this serious challenge.

My expressed appreciation goes to all researchers and officials that participated in individual or group discussions and who set aside the time to share their views on and experiences of the NRF Rating System with passion and precision.

Any commission of this kind is dependent on collegial collaboration, and I am grateful that I could rely on valued colleagues for their inputs, assistance, insights and access to databases in conducting the investigation. My appreciation also goes to colleagues who assisted with editing various phases of the project.

I would like to thank Maria Sikaundi and Simon Gathua, two postgraduate students that participated as research collaborators in the project. I trust that you benefited from the experience.

A special word of appreciation goes to the official and unofficial critical readers of earlier versions of the report. You have added value to the contents and at the same time added stimulating perspectives to the debate on this important subject.

I wish to acknowledge the prompt and invaluable assistance I received from the NRF Evaluation Centre. The staff members of the NRF were most helpful in ensuring that information that was not readily available was provided at short notice. Many of these individuals will remain anonymous, but their support and time are enormously appreciated.

It is my wish that this report should comply with the expectations of the HESA NRF Review Steering Committee and that these inputs will contribute to strengthening the relatively young South African research system.

Dr HC Marais
September 2007
THE IMPACT OF THE NRF EVALUATION AND RATING SYSTEM:
A REVIEW

EXECUTIVE SUMMARY

The NRF Institutional Review of 2004, after expressing strong reservations about the rating system, recommended that: “A sector-driven task group should reconsider the rating system, in terms of its fundamental purpose and utility; and that the higher education sector should convene this task group, invite input from all stakeholders and report to the NRF.” Early in 2007, a HESA NRF task group therefore called for proposals to review a range of aspects of the NRF Rating System. This report is the outcome of the review of one of those aspects, namely, the impact of the system on researchers and disciplines.

The mediated known sources review, consisting of both quantitative approaches (by analysing survey, bibliometric and NRF research management data) and qualitative approaches (by collecting data through interviews with key role payers and group discussions with researchers and executive managers/directors of research offices at universities), addressed the impact of the rating system at each of the following five levels: attitudes and orientation of researchers as individuals; output and outcome productivity of researchers; fields of knowledge production; institutions; and the research community. It was emphasised that the concept of ‘impact’ should be approached with circumspection, since proving the impact of a systemic intervention such as a research support programme on a socio-economic sector such as the research community was almost impossible. Impact was consequently variously interpreted as ‘effect’, ‘association’ and ‘influence’.

FINDINGS AND CONCLUSIONS

The study yielded the following high level findings and conclusions.

Cross-cutting findings

Firstly, the NRF Rating System was developed during the period when Mode 1 knowledge production (e.g. discipline oriented) was predominant and has not been synchronised with the post-Mode 2 (e.g. problem and multidisciplinary oriented) research environment in which it currently has to function. Secondly, a duality of opinions exists about the NRF Rating System, characterised by public statements and private beliefs.
The *NRF Rating System*

From an overview of the rating system, it was concluded that the system has seen two or three major policy changes over the past 24 years, producing a robust, yet fairly flexible, system that relies almost entirely on external peer review of applications, including extensive use of international reviewers. The elaborate system appears to be less efficient than its context may ideally require, yet it represents a reliable management system for the international benchmarking of researchers.

**The ‘impact’ of the rating system on the attitudes of researchers**

The process of rating ‘impacts’ relatively positively on the attitudes of individual rated researchers. The process has promoted growth in understanding of the requirements for participation in the international research arena, has enhanced self-insight among researchers and contributed to motivating them. A substantial number of researchers at institutions do not support the system, however. The research sector is not as intensely opposed to the *NRF Rating System* as the NRF Institutional Review suggests, although innovative strategic thinking will be required to retain the best aspects of the rating system in the current stage of South Africa’s development so as to respond effectively to the challenges facing the research system. The single most important driver of dissatisfaction – even disillusionment – has been the delinking of the rating from the award of research funding. Relinking these aspects has become a necessary precondition for regenerating the *NRF Rating System*.

**The ‘impact’ of the rating system on the output productivity of researchers**

The rating system has been found to be closely associated with output productivity in the form of publication outputs, human resource development, as well as embodied knowledge such as patents and artefacts. Rated researchers in both the Natural Sciences and the Social Sciences and Humanities are significantly more productive than unrated researchers. Furthermore, the level of rating is positively associated with output indicators. The prominence of rated researchers in knowledge production was sharply underlined by the finding that they feature prominently among the most productive 100 authors: NRF-rated researchers accounted for 26% of the top authors in the Health Sciences, 43% in the Social Sciences, 76% in Engineering, and 82% in the Natural Sciences. However, over time, there has been a decline in the productivity of individual researchers in these four knowledge fields, the dynamics of which are not immediately clear.

It was concluded that the rating system has contributed to the productivity of rated researchers, notwithstanding methodological problems in interpreting the results.
The ‘impact’ of the rating system on fields of knowledge production

The results show that the NRF Rating System impacts positively on sharpening the boundaries between disciplines and promoting focus and research specialisation. Conversely, the rating system does not appear to be sufficiently flexible to win the confidence of researchers at the cross-sections of disciplines, generalists or prominent ‘interdisciplinarians’.

Overall, the NRF Rating System promotes the visibility of disciplines and research fields. The system has promoted, raised and maintained the quality of research through a stringent evaluation regime. However, this positive impact can continue only with adequate quality assurance.

The ‘impact’ of the rating system on institutions

There was considerable consensus on the way in which the rating system has influenced research management processes and structures at universities. In general, the system was welcomed as value-adding. It was acknowledged that the quality criteria and markers, the ways of attaining high levels of research quality, and the techniques for evaluating such success have, over time, been adopted in one way or another by most, if not all, higher education institutions, influencing their human resource function in that the criteria of the NRF Rating System have been integrated into various facets of, for instance, performance evaluation. Furthermore, the outcomes of the rating system have been incorporated into the marketing messages of universities, which has given rise to dissonance among some rated researchers.

The ‘impact’ of the rating system on the research community

The NRF Rating System reinforces the demographic shape of the research system by reinforcing the prominent position of white males at the upper end of the age spectrum. Official statistics on the low percentages of NRF-rated black researchers (12%) and women researchers (24%) and the 56% of rated researchers in the age category 50+ may reflect historical and international trends, but are not aligned with the official commitment to redress in South Africa. It was stressed that care should be taken to avoid using an instrument developed to promote research excellence to pursue other objectives, which might require different approaches.

CONCLUSIONS, RECOMMENDATIONS AND PRINCIPLES

Summary conclusions

The point was made that it would not be methodologically correct to interpret the evidence presented in this report as proof of the ‘impact’ of the system on various layers of the research
system. However, the evidence presented in this report on the influence of the *NRF Rating System* on the attitudes and orientation of researchers, the focus of disciplines, the research promotion systems of institutions and the demographics of the research community indicate varying degrees of association, covariance and influence. A meaningful portion of the research community believes that the rating system, as one of a range of structures and processes designed to promote research, has left its mark, as it were.

It is generally acknowledged that the rating system has played a major role in institutionalising quality research and international benchmarking. It is also acknowledged that it still performs this role and that the NRF has established itself as the appropriate executive agency for this function.

However, the rating system is currently causing increasing frustration among a section of the research community. The frustrations range from doubts about the value of the system to overt dissociation by allowing ratings to lapse and discouraging colleagues from applying for ratings. Many reasons have been offered for the negative attitudes among a number of researchers, but the following four are the primary ones: the delinking of ratings from direct research funding; the extensive and time-consuming application and renewal procedures; the reliability and application of the evaluation criteria and procedures; and the availability of research funding from other quarters, especially business and international donors.

**Recommendations**

The report recommends that:

1. The *NRF Rating System* should remain in place, with the following revisions:
   1.1.1. Relinking the rating to direct funding
   1.1.2. Linking ratings to the approval of a satisfactory research plan
   1.1.3. Revalidation of evaluation criteria, rationalisation of application procedures and reconsideration of the procedures rating renewals.

2. The NRF should in principle retain the management of the rating system, albeit in a revised form, but should implement the revised system only after consultation with its stakeholders.

3. An implementation monitoring plan and instruments (including indicators) should accompany the approval of the revised strategy.

4. The NRF should make conceptual and operational distinctions between the various appropriate initiatives and incentives required to address the full range of the NRF mandate.
5. The NRF should ensure sufficient congruence among its own initiatives as well as with other national research and human capital development schemes.

6. The NRF should establish a corporate objective to ensure the systematic and accessible storage of relevant information sets for strategic management.

**PRINCIPLES**

The following principles could be applied in charting the road ahead in the strategic development of a research promotion and support strategy:

1. Research project evaluation should always consider the researcher’s track record and the research plan/project.

2. The researcher and the research should form the central focus of funding programmes, and other elements should be considered as secondary factors.

3. Striving for excellence presupposes professionalism in all dimensions of the adjudication process.

4. Any evaluation approach should comply with the principles of clarity of and fitness for purpose.

5. A system of research evaluation should comply with the principles of consistency and integrity.

6. Economy and efficiency should serve as criteria for the development of all evaluation procedures.
THE IMPACT OF THE NRF RATING SYSTEM

CHAPTER 1

BRIEF, CONTEXT AND DESIGN

In February 2005, the Institutional Review of the National Research Foundation (NRF) recommended to the board of the NRF that a sector-driven task group should reconsider the rating system in terms of its fundamental purpose and utility. The present report is one of the outcomes of that recommendation.

There is growing interest in, and even concern about, the value of current *ex post facto* and *ex ante* evaluation approaches to publicly funded research and development. This is clearly illustrated by the fact that the Committee for Science and Technology Policy Assessment of the Organisation for Economic Cooperation and Development (OECD) recently launched a programme to assess and develop more powerful approaches to research evaluation (cf. Seoul workshop, 2006; also see Barker 2007). The current process of evaluating the rating system of the National Research Foundation (NRF) is clearly aligned with this international trend.

1 BRIEF AND INTERPRETATION

The HESA NRF brief for this project stated that “(t)he purpose of the review will be to reconsider the NRF evaluation and rating system of individual researchers in terms of its fundamental purpose and utility”, and that the scope covered “the NRF evaluation and rating system since its inception by the Foundation for Research Development (FRD) in 1984, with the emphasis on the system currently in use by the NRF”.

The HESA NRF brief was disaggregated into the following dimensions as a series of separate projects:

- Historical dimension, which comprised a document-based analysis of the rating system
- Institutional dimension, which focused on the use made by institutions of the rating system
- Individual and disciplinary dimension, which concerned the effects of the rating system on individual researchers and disciplines
• Comparative dimension, which was a cross-national comparative study of individual rating systems

• Review of the processes involved in the system that the NRF currently uses to rate individual researchers.

The individual and disciplinary dimensions, which formed the subject of this report, were described as follows in the project brief:

“The impact of the rating system within specific disciplines or fields of scholarship on the scholarly productivity of South African academics. In other words, the study should address the social impact of the rating system (i.e. how the introduction of the rating system changed researchers’ attitudes to research and their focus within fields of research). The review panel would be interested in an analysis of the effect of the rating system on attitudes to undertaking research by staff of universities and the transformation of universities into research-intensive institutions. (...) The service provider will be expected to identify indicators such as quantity and quality of research outputs, internationalisation of research findings, networking, student training, etc., that will be useful for providing evidence of the impact of the introduction of the rating system” (HESA NRF 2007).

1.1 Interpretation of the brief

The point of departure in this study was that “(i)mport assessments are undertaken to estimate whether or not interventions produced their intended effects. Such estimates cannot be made with certainty but only with varying degrees of plausibility” (Rossi and Freeman 1993: 215). To raise those estimates, a multi-methodological approach was followed, as described below.

The following three dimensions formed the nexus in the conversion of the brief into an empirical evaluation.

Firstly, the concept of ‘impact’ required explication. It is generally accepted that this concept is methodologically problematic, since it is normally understood to imply causal relationships. Proving such cause-effect relationships, however, is rather difficult in view of variables such as time-lag and the difficulty of excluding the contributions of other possible ‘causes’. Daim, Monalisa, Dash, and Brown (2007), for instance, showed the variable time lag between different media of communication, outputs and outcomes in the case of nanotechnology. These problems are exacerbated when dealing with systemic interventions such as a rating system. In line with international evaluation literature, it was acknowledged that the concept of impact is conceptually, operationally and strategically multidimensional and multi-phased (cf. Chen, 1990, Part 4). The study consequently defined impact as covering attitudinal change over the shorter
term, outputs over the medium term and outcomes over the long term and not going much further than looking for significant co-variations between the NRF Rating System and variables such as researcher attitudes and outputs. (In view of these qualifications, the term ‘impact’ has been used in the rest of the report.)

Secondly, the call for proposals in essence requires analysis of the impact of the NRF Rating System on different layers of the R&D system. The common distinction between the following layers in the R&D system was used in scoping the study: individual researcher (e.g. attitudes and outputs), discipline/field of knowledge (e.g. orientation), institutional level (e.g. strategy), national level (e.g. government strategy and policy) and research community level (e.g. belief in the value of the rating system). This evaluation project focused primarily on the first two layers, with some comments also on the institutional and community level, taking into account the briefs of the other projects in the portfolio. (The term ‘researcher’ is used throughout this report to refer to the category of individuals who are eligible for participation in the NRF Rating System, irrespective of discipline or institution.)

Thirdly, the study was approached with a view to generating evidence that would serve as input to the NRF’s strategy development rather than an academically orientated conceptual and/or empirical study of all the variables covered in this report.

2 OPERATIONALISATION OF THE BRIEF

2.1 Evaluation questions

With the preceding qualifications in mind, the brief was operationalised into the following set of interrelated evaluation questions:

- Has the NRF Rating System influenced the attitudes and orientations of academics as individuals (also as groups/teams/other types of units) towards research and funding sources for such research? Sample dimensions include willingness to change the direction of research focus, the effects of success and non-success of an application for a rating, and influence on the marketability of individual researchers. Information sources included individual interviews, group discussions and reanalysis of parts of the Stakeholder Survey undertaken for the NRF Institutional Review (NRF 2005a). (The original proposal for the current project included a survey of university researchers’ attitudes and experiences, but that component was not supported by HESA NRF task group, since a survey was at that stage already being undertaken by one of the other commissioned researchers and signs of respondent resistance were detected.)
• Has the *NRF Rating System* influenced the outputs (productivity) of academics as **individuals**? Specific indicators include changes in outputs (publications) and outcomes (e.g. postgraduate students). Information sources included existing NRF data, the SAKnowledgebase held by the Centre for Research on Science and Technology (CREST) at the University of Stellenbosch, reanalysis of parts of the Stakeholder Survey undertaken for the *NRF Institutional Review* (NRF 2005a) and research reports of, for instance, the National Advisory Council on Innovation (NACI).

• Has the *NRF Rating System* influenced any aspects of the fields of knowledge production? Specific indicators include basic disciplines within strong disciplinary boundaries, as compared to more applied/professional disciplines; changing disciplinary boundaries; and the funding of emerging/new/interdisciplinary fields. Data sources included existing NRF data, the SAKnowledgebase, NACI data sets, R&D survey databases and reanalysis of data generated in the Stakeholder Survey for the *NRF Institutional Review*.

• Has the *NRF Rating System* had any influence at the **institutional level** (i.e. on the organisational structures of universities)? Indicators include changing patterns of participation in the *NRF Rating System* by respective institutions over time; and fostering of research as an important component of the institutional mission. Information sources were existing NRF data aggregated at institutional level as well as interviews. (The original intention was to undertake a limited dedicated survey, but since this evaluation question was extensively covered in one of the other commissioned studies, it was only touched on in this project.)

• What are the perceptions of **R&D communities**, particularly in the higher education sector, of the *NRF Rating System*? The specific dimensions covered were whether the rating system is regarded or experienced as facilitating, inhibiting or discriminatory with respect to knowledge production. The information sources for this aspect of the project were the inputs of individual interviews and group discussions.

The following two points should be noted:

• The nature and availability, or otherwise, of information led, in certain instances, to amendment of the evaluation questions and sub-questions as well as the scope of sub-sections of this study.

• The focus of the study was predominantly on rated researchers attached to higher education institutions, since that sector represented more than 80% of all rated researchers.
3 **DESIGN OF THIS EVALUATION PROJECT**

In summary, the operationalisation of the project brief required an evaluation design that would focus on five different levels of analysis, namely, the individual researcher, outputs, disciplines, institutions and community. Furthermore, these five areas of focus required different approaches to information, ranging from quantitative survey-type to qualitative interview-type approaches. Finally, the methodological ideal of using different methods or techniques to probe the same issue was applied by approximating a convergent-discriminant validation design. The result of these three requirements was a multi-layered evaluation design, as represented in Figure 1.1.

**Figure 1.1: The evaluation design**

The figure shows that the facets, viz. data gathering approaches (quantitative and qualitative) and the levels of analysis intersect and the information located at such intersections formed the core of data presented in this report. The design of this evaluation project could best be described as a mediated known representative sources design (the point of departure being the ‘known groups’
design in psychometrics) – *known representative sources*, since the sources of information were deliberately chosen for their informedness, representivity and availability; and *mediated*, since the project leader and staff actively engaged with the sources to gain the best possible information from them. The consequence of this design is that, while one cannot statistically generalise the results, there is reason to believe that they reflect the influence of the rating system on the various layers of the research system.

3.1 Instruments and sources of information

The techniques used and/or sources from which to gather information that would be best suited to addressing the five evaluation questions (see section 2.1 of this chapter as well as Figure 1.1) are described below. The approaches to analysing the information generated by these techniques are also briefly described.

3.1.1 Individual in-depth interviews with key role players

In-depth interviews (averaging approximately 75 minutes each) were conducted during August and the first week of September 2007 with 10 key role players in the rating system to obtain qualitative information on their experiences as well as their perceptions of the strengths and weaknesses of all aspects of the system. Each interviewee was assured that his/her contributions would remain anonymous and would not be attributed in the report to any particular individual.

- The 10 interviewees represented the following facets of the system: one who was responsible for its initiation and the management of the early phase; a retired vice-chancellor of a historically white university; a former CEO of a museum; a recent executive manager of the system at the NRF; four executive university managers (two from universities with an established research culture, one from a formerly disadvantaged university and one from a university of technology); and two established senior scientists (one sceptical of and the other strongly supportive of the *NRF Rating System*).

- The interview framework consisted of the following themes (variously nuanced according to the specific background of the interviewee): involvement in the *NRF Rating System*; achievements and failures of the system; effects of the system on individual researchers, research and institutions; future of the system; changes or alternatives to the system; missed opportunities; and any other comments.

- Essentially the same analytical framework was used for the group discussions (see below), and the findings, presented in the following chapters, were based on points identified by at least two interviewees.
3.1.2 Focus groups and directed small group discussions

The main purpose of the group meetings was to elicit qualitative information on the R&D community’s interpretations of the functions/dysfunctions, and dynamics of participation in the NRF Rating System, as well as amendments to or alternatives for it, to some extent at the level of the stories and narratives that are attentive to local conditions and historical circumstances, to use IDRC terminology (IDRC, 2007). As with the in-depth individual interviews, all groups were assured that their inputs would remain anonymous and would not be attributed in the report to any particular individual.

- The following six group meetings took place during the first week of September 2007:
  - Durban (six participants)
  - Cape Town (seven participants)
  - Potchefstroom (six participants)
  - Stellenbosch (five participants)
  - Polokwane (six participants)
  - Pretoria (seven participants).

(The timing of the individual interviews and the group discussions was determined on the basis of two considerations. Firstly, the results of the secondary analysis of the NRF Stakeholder Survey (see below) at the end of July had to co-inform the interview framework and the interviews themselves. This meant that the interviews and group discussions could only begin in August. Secondly, in the process of arranging the interviews, it was discovered that many role players were confused by the fact that project leaders of other aspects of the HESA NRF study had already conducted interviews and group meetings on apparently similar topics. This discovery led to moving the interviews and group discussions to the latest possible date, namely early September.)

- The framework for the group discussions consisted of the following themes (variously nuanced according to the specific background of the group): participation in the rating system; functions; strengths and weaknesses; specific problem areas and remedies; advantages and ways of strengthening them; relevant disciplinary differences in the applicability of the system; recommendations; and new perspectives.

- The proceedings of each meeting were summarised according to the following three dimensional frameworks and the findings, presented in the following chapters, were based on points raised by at least two participants per group.
• Each session was also evaluated by the facilitator according to the following five-point rating scales: meeting was lively – passive; participants’ involvement – detachment; debate – once-off inputs; perception of relevance – irrelevance; consensus – lack of consensus; optimism – pessimism about the future of the rating system.

**Figure 1.2: Framework developed for the individual interviews and group discussions**

- The group sessions were facilitated by and the proceedings drafted by Jon Taylor and Susan Ellison (Durban), Willem and Evanthe Schurink (Potchefstroom and Polokwane) and the project leader (Cape Town, Stellenbosch and Pretoria).

### 3.1.3 Secondary statistical analysis of an earlier NRF Stakeholder Survey

The first version of the evaluation research proposal to the NRF made provision for a stakeholder survey among a sample of rated and non-rated South African researchers in which relevant aspects, such as attitudes, outputs and outcomes, would be scanned. However, the HESA NRF Review Steering Committee did not approve that part of the proposal in view of respondent ‘resistance’ encountered to a survey undertaken for one of the other projects in this evaluation programme and suggested that the present study rather be informed by findings from a Stakeholder Survey the NRF had commissioned in 2004 as an input to its most recent NRF Institutional Review (the service provider for which was Marketing Surveys and Statistical Analysis (MSSA) (see NRF 2005b). The stakeholders from among whom the sample was drawn included NRF grantees, panel members, reviewers, research organisations, NRF staff and NRF board members. The questionnaire items did not exactly match the variables covered in the present study and should be seen as proxies at best. The original data set required the introduction of ‘rating status’ as a new variable, and a certain amount of re-coding (partly to ensure the anonymity of respondents), and the use of proxies for the originally intended variables.
Secondary statistical analysis was conducted on the data of items of the MSSA questionnaire dealing with the NRF’s performance with regard to increasing the quality and quantity of researchers and students, facilitating the utilisation of knowledge, adherence to quality, and provision of a useful rating of individual researchers.

Details on technical aspects of the survey design can be found in the report (NRF 2005b: 11-14) and are summarised here:

- A mail questionnaire, focusing on the mandate and impact of the NRF, was faxed and e-mailed at the end of 2004 to 2 000 grantholders, 457 panel members and 2 904 reviewers; the reported response rates were 12.6%, 16.4% and a low 3.7% respectively.

- A special series of statistical reliability and validity checks conducted for the present project showed the questionnaire to be satisfactorily reliable and valid.

- During the series of secondary data analyses (Mann-Whitney U tests) to test for differences between rating categories, the three groups of respondents, totalling only 163 respondents, were combined and the following new rated groups were created: AB, C, P and N. Combining the A and B category respondents in the analysis was necessary because the numbers would otherwise have been too small for meaningful statistical analysis. As already indicated, items dealing with perceptions of aspects of the NRF’s performance were used as proxies for attitudes towards the rating system, while a new variable, ‘NRF rating of the respondent’, was used as predictor variable. Kruskal-Wallis analyses were conducted on the new sets of data. (The conversion of the database and analyses were undertaken by Maria Sikaundi and Simon Gathua under the supervision of Schalk van Vuuren, the service provider of MSSA.)

3.1.4 Analysis of SAKnowledgebase at CREST

The SAKnowledgebase database developed by CREST at the University of Stellenbosch is the most comprehensive bibliometric source of data on scientific journal articles authored and co-authored by South African researchers (for further information see http://academic.sun.ac.za/crest/). It contains more than 90 000 titles and 9 069 authors and covers the 243 ISI field-specific journal categories developed into a four-tiered hierarchical scientific field classification ranging from 243 very detailed distinctions between fields, though broader groupings of 33 and 19 fields to 4 very broad scientific fields). ‘Transposing’ the names of all rated researchers on to the SAKnowledgebase entailed the following steps:
- The names of rated researchers were matched with those in the SAKnowledgebase, which produced 3,684 matched researchers who had published articles; 567 rated researchers could not be matched.

- Mobility was coded by comparing the last rating with all previous ratings.

- The fields of knowledge production were combined into the following four broad fields: (1) Natural and Agricultural Sciences, (2) Engineering and Applied Technologies, (3) Health Sciences, (4) Social Sciences and Humanities.

- A new database (including authors, identified as rated and non-rated, publishing in journals in each of the four fields) was thus created exclusively for the present statistical analysis of patterns of productivity to enable:
  - Comparison within the NRF rated researcher group
  - Comparisons between ‘NRF-rated researchers’ and ‘non NRF-rated researchers’.

In these analyses, the rating categories were pooled as follows to form three categories: A and B; C; and P, Y and L.

(The preparation of the database and the analyses were carried out by Nelius Boshoff, Derick van Niekerk and Maria Sikaundi, under the guidance of Johann Mouton.)

### 3.1.5 NRF data sets

The study relied heavily on accessing and analysing NRF management data sets, which provide data on patents, publications (other than journal articles), funding and related subjects. The specific sources are acknowledged at appropriate points in this report. (the NRF officials that provided the formatted information on request were Robin Drennan, Gudrun Schirge, Anke Rädel, Elaine Lemmer, Ron Grace, and Dot Moller.) It should be noted that for technical reasons, it was not possible to use the same periods, categories of researchers and/or intervals throughout for all the various analyses.

### 3.1.6 Published sources of information

Information from a series of recent policy analyses was consulted and used in sections of this report; the more prominent being the following:


3.2 Concluding summary

The design of this evaluation project followed conclusions from the literature and personal experience that the effect of a systemic intervention such as the NRF Rating System requires, firstly, that impact (or, more cautiously, effect or influence) should be conceptualised in more than one way; secondly, that divergent ways of measuring it should be used and, thirdly, that all this should be done at different systemic levels. A three-dimensional design was consequently developed in which the brief was approached from the following angles:

• ‘Impact’ was operationalised in four ways, namely: attitudes, outputs, outcomes and long-term effects.

• The target of the ‘impact’ (or unit of analysis) was differentiated into four levels, namely, individual researcher, discipline, institution and community.

• Five types of measures were used for data gathering and analysis, namely, in-depth interviews with key role players, group discussions with rated scientists, reanalysis of an earlier NRF Stakeholder Survey undertaken in 2004 for the NRF Institutional Review, a specially designed set of analyses of the SAKnowledgebase of journal articles, and references to recent policy studies – producing, in short, both qualitative and quantitative information. The approach was akin to what Martin in a different context called for, namely a multiple indicator approach or what Michelson (2006) called hybrid approaches.

• In summary, the brief for this evaluation project called for a summative evaluation, i.e. describing what happens subsequent to the assessment administration of the NRF rating system. The other projects could be described as a formative evaluation examining the delivery of the NRF rating system (cf. http://www.socialresearch methods.net/kb/intreval.php). This study could also be classified as an ex post evaluation (Marais, 2006).
This report brings together information from diverse sources, namely, quantitative information for secondary analysis from a previous NRF Stakeholder Survey, quantitative analysis of a comprehensive bibliometric database (SAKnowledgebase), secondary analyses of data from NRF systems, qualitative information collected in the course of individual interviews with a number of key role players in the R&D system, and qualitative information obtained by means of two focus group sessions and three group discussions with researchers that at some time or another had participated in the rating system. The potential complexity of such a spectrum of hard and soft empirical information had two consequences for the style and structure of this report.

The first implication concerns the approach followed in reporting on existing information. It was initially decided to restrict the report to information specifically collected for this project in order to keep it focused as sharply as possible on the brief, namely to demonstrate the ‘impact’ of the **NRF Rating System**. Unfortunately, this approach allowed little cross-referencing to the extensive body of scholarly literature on evaluation methodology, peer evaluation, and public research promotion strategies and systems, to name but a few themes. Furthermore, this report was not informed in any depth about the findings and recommendations of the other commissioned studies in the HESA NRF portfolio, except for limited references to the studies on institutional dimension, and cross-references were therefore kept to a minimum. Finally, only a small portion of the large amount of data and information collected for this study was included in the form of figures and tables so as to allow space for provisional high-level interpretation.

The second implication concerns the structure of this report. It was decided to organise the empirical chapters around the evaluation questions (see above) so as to promote as much interaction as possible between the quantitative and qualitative information. This approach could at first glance appear incoherent, since each chapter would report on part of the information sets, such as the quantitative analyses.

- Chapter 2 offers an overview of the **NRF Rating System** and as such represents the reference framework for this study.
- Chapter 3 presents the findings with respect to the first evaluation question on the attitudes and orientations of researchers.
- Chapter 4 reports the findings on output productivity.
• Chapter 5 reports on the influences of the *NRF Rating System* on fields of knowledge production.

• Chapter 6 covers the findings on both evaluation questions 4 and 5, namely, institutional effects and community orientations.

• Chapter 7 firstly attempts a synthesis of all the preceding findings and, secondly, offers a set of recommendations based on the findings.

The next chapter provides an overview of the object and context of the *NRF Rating System* and the source of information used to investigate this aspect of the report.
CHAPTER 2

THE NRF RATING SYSTEM

The purpose of this chapter is to:

- Give a short description of the object of this study, namely, the evaluation and rating system within its context over time

- Serve as an input or resource of information for the analyses in the following chapters.

The first section of this chapter provides a cursory overview of the rationale for the *NRF Rating System* and the major policy decisions regarding the system within the context of organisational and programmatic changes over time. The second part of the chapter reviews the processes and efficiency of the rating and evaluation system.

1  RATIONALE FOR THE RATING SYSTEM

In order to understand the current method and criteria used in the evaluation and rating system and to eventually assess the impact of the system, the original context and motivation for the creation of the system should briefly be considered.

1.1  The funding systems for research in South Africa

At its inception in 1984, the purpose of the evaluation and rating system was to stimulate excellence in research in the Natural Sciences by providing funding incentives to researchers with a good track record. At a systemic level, the primary motivation for the creation of the rating system was to streamline the funding systems for research in South Africa, which included:

- Parliamentary funds from the education vote of the Department of Education (DoE) to higher education institutions for research as part of an annual subsidy. Although not ring-fenced, this funding was intended mainly to provide infrastructure for research at higher education institutions. Amounts allocated per annum were determined by the knowledge production of the institution of the previous year, as evaluated through the South African Post-Secondary Education (SAPSE) system.
Parliamentary funds from the science vote made available through an agency of government to researchers at higher education institutions on a competitive basis to promote research excellence.

In addition to these two funding streams, higher education institutions also provided funds to stimulate research activities in departments, which would, in turn, have an impact on the DoE funding to the institution in future.

The differentiation between the purposes of the various funding streams during the period of the inception of the evaluation and rating system is summarised below.

Table 2.1: Funding streams in 1984

<table>
<thead>
<tr>
<th>Source of funds</th>
<th>Agency</th>
<th>Beneficiaries</th>
<th>Purpose of funds</th>
<th>Basis of evaluation for distribution of funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parliament: Education Vote</td>
<td>DoE</td>
<td>Higher education institutions</td>
<td>Intended for provision of research infrastructure</td>
<td>SAPSE formula</td>
</tr>
<tr>
<td>Higher Education Institutions</td>
<td>HEI</td>
<td>Research students and staff (science, engineering and technology (SET) and Social Sciences and Humanities)</td>
<td>Introducing research staff and students to research activity and training</td>
<td>Achievement of departments. In terms of research outputs and students?</td>
</tr>
<tr>
<td>Parliament: Science Vote</td>
<td>CSIR</td>
<td>Meritorious researchers at higher education institutions</td>
<td>Complementing the investment of higher education institutions by funding the development of research excellence</td>
<td>Research evaluation and rating</td>
</tr>
</tbody>
</table>

2 CONCEPTUAL CHANGES THAT IMPACTED ON THE RATING SYSTEM

2.1 Institutional arrangements according to knowledge fields

Over time, the number of funding agencies increased along the lines of broad knowledge fields. The Foundation for Research Development (FRD) was initially part of the CSIR (from 1984-1989) and was responsible for research funding for the Natural Sciences. The dual mandate of the CSIR (namely, to support researchers at higher education institutions and museums on the one hand and projects of the CSIR itself) created potential conflict of interest. Clear guidelines and criteria for the funding of research were therefore required. In the late 1980s, the science councils came under increasing pressure to generate contract funding. This led to a clear conflict of interest within the CSIR, and the independent Foundation for Research Development (FRD), reporting to its own senate, was established through the Research Development Act (Act No. 75 of 1990). For funding the Social Sciences and Humanities, the Centre for Science Development
(CSD) of the Human Sciences Research Council (HSRC) was also formed in 1990. The Medical Research Council had, and still has, a separate funding mechanism for the medical sciences.

2.2 Programmatic interventions

The ‘pure’ model of the early 1980s, in which the purpose of funds allocated from the respective funding streams was relatively clear, soon became outdated. In the period of political and social transformation that followed as from the late 1980s, the population that had previously been on the periphery of the science system, as well as institutions that had been disadvantaged, were gradually brought into the mainstream of research activities. The financial and other strains of these developments, especially on disadvantaged institutions, led to the blurring of boundaries between the funding streams. To assist higher education institutions, the FRD, CSD and MRC initiated special institutional and research capacity development programmes of the sort that had previously fallen within the ambit of higher education institutions.

2.3 Mandate shifts and evaluation criteria

Pienaar, Blankley, Schirge and Von Gruenewaldt (2000) indicate that during the initial conceptualisation of the rating system, the following underlying principles were articulated:

- The most important element contributing to good research is the quality of the researcher.

- Adequate funding should be provided to allow researchers to attain their full potential. (A- and B-rated scientists received comprehensive funding for up to five years; and C- and Y-rated researchers partial funding, also for up to five years.)

- Research that challenges the researcher, whether the research is self-initiated or programme-oriented, is most satisfying to the proven researcher and has the highest potential for the most productive research.

- Good research will be done by established researchers whose creativity is given free reign within a specific support framework. The assumption is that established researchers are highly responsible individuals that can be depended upon to conduct relevant research.

- The recent achievements of the researcher should be an important consideration in determining the level of future research support.
Over time and given the changing context, these principles could not be unconditionally upheld. The following major changes therefore took place:

In 1995, when the FRD announced the Open and Directed research programmes, evaluation criteria for funding included:

- Competitive research in Science, Engineering and Technology based on research excellence
- Corrective action
- Academic-industry cooperative research.

These evaluation criteria acknowledged the changing political and social context in South Africa with regard to transformation as well as the developments in the philosophy and practice of science (e.g. academic-industry cooperative research – Mode 2 and Triple Helix – and having Directed programmes).

The rating system was adapted at that stage by requiring that the track record of the researcher should be supported by future research plans, in which there should be explicit commitment to the above three evaluation criteria. Rated researchers were eligible for longer-term funding (for five years), and the outputs of the preceding five years were evaluated at the time of re-evaluation. The level of funding was still linked to the rating category. In addition, both self-initiated and directed projects were funded. As from 1996, a Multi-criteria Decision Model (MCDM) was used to prioritise research proposals based on the track record and research plans/projects submitted by researchers. The criteria for evaluation were the same as those that pertained in 1995. However, funding was not linked exponentially to the track record/rating of the researcher. Comprehensive funding would not be made available in future.

When the NRF was established in 1999, its mandate was expanded to support and promote research in all fields of science and technology, including indigenous knowledge (RSA 1998: Section 3). The implication was that the new entity would fund the fields of both the Natural Sciences, Engineering and Technology as well as the Social Sciences and Humanities. (The Medical Sciences are still funded through the Medical Research Council.) The mandate of the NRF further specified that the support of research should be done “…through funding, human resource development and the provision of the necessary facilities in order to facilitate the creation of knowledge, innovation and development” (RSA, 1998: Section 3). It is clear that the scope of the NRF mandate was refocused and expanded considerably from human resource
development through research in the case of the FRD to the promotion and support of research with new knowledge and innovation as the main goals. Between 1999 and 2002, separate evaluation criteria were used for funding researchers in SET and researchers in the Social Sciences and Humanities. In 2002, the NRF introduced an evaluation and rating system for the Social Sciences and Humanities. In contrast to the SET evaluation system, research outputs of the preceding seven years (rather than five years) were considered (NRF Evaluation Centre, 2007).

3 PROCESS OF EVALUATION AND RATING

3.1 Summary of the process

Table 2.2: Outline of the evaluation and rating process

| Inviting and calling for applications from researchers that wish to be rated |
| Submission of documentation of individual researcher via the employing institution to the NRF Evaluation Centre |
| Screening of applications by staff of the NRF Evaluation Centre |
| Subject-specific Specialist Committees screen applications and select/appoint at least six appropriate peer reviewers |
| NRF Evaluation Centre submits the documentation of individual researcher to peer reviewers and ensure that an adequate number of peer review reports are received per applicant |
| Peer reviewers must provide an estimate of: |
| • The quality of the research-based outputs of the last seven years as well as the impact of the applicant’s work in his/her field and how it has impacted on adjacent fields |
| • The applicant’s standing as a researcher in the field from both a South African and an international perspective. |
| Each subject-specific Specialist Committee, the chairperson and an independent assessor (who together constitute an Assessment Panel) receive the peer reviewers’ reports for each applicant four weeks prior to the Assessment Panel meeting. |
| During the Assessment Panel process, the functions of the Specialist Committees are to: |
| • Reach consensus on and assign a rating to individual applicants based on the reports of the peer reviewers independent from the assessor |
| • Evaluate the quality of the reviewers’ reports |
| • Select constructive feedback to individual applicants from the reviewers’ reports. |
| When the entire Assessment Panel convenes, each application is discussed in response to the presentation by the Specialist Committee and the independent suggested rating of the assessor. The following outcomes of the discussion are possible: |
• Consensus regarding rating
• Consensus regarding rating cannot be reached
• The meeting requests additional reviewers’ reports before an informed decision can be taken.

The assignment of the B, C and Y ratings are finalised by the Assessment Panel. For other categories, the Assessment Panel submits its recommendations (1) to the Executive Evaluation Committee* in the case of A and P ratings, as well as in cases where consensus could not be reached between the Specialist Committee and the assessor; and (2) to the so-called L Committee for L ratings.

Assessment Panel decisions, Executive Evaluation Committee decisions and L Committee decisions, together with any feedback, are forwarded to the appropriate authority at the applicant’s employing institution to be communicated to the applicant.

An extensive appeals process is in place, should the appropriate authorities at the employing institution lodge a written appeal (see NRF, 2007b: 10-11).

* The Executive Evaluation Committee comprises the NRF President, the NRF Vice-President (Research and Innovation Support Agency), the NRF Executive Director with responsibility for evaluation and rating, the Chairpersons of the Assessment Panels, two convenors of the Assessment Panels, and relevant NRF Executive Directors on a rotational basis.

3.2 Administrative and decision-making structures

The administrative and decision-making structures for the evaluation and rating system are (see http://evaluation.nrf.ac.za/Content/evaluation/committees.htm):

• Specialist committees (22)
• NRF Assessors
• Assessment Panels
• L Committee
• Executive Evaluation Committee
• Appeals Committee
• NRF Evaluation Centre.

3.3 The role of the Specialist Committees in the rating process

There are 22 Specialist Committees, constituted according to broad disciplinary fields: 11 each for the Natural Sciences and for the Social Sciences and Humanities. Each committee comprises three to six respected members in the South African research community appointed by the responsible NRF executive member after a process of nomination and consultation. The following issues can be noted with regard to the Specialist Committees:
• The Specialist Committees have a strong disciplinary orientation, although several key research areas may be covered by a specific Specialist Committee.

• The Specialist Committees provide advice on the key research areas in their field of expertise as well as the boundaries between and possible overlap with adjacent fields.

• Demand (i.e. the number of applicants in a specific field), supply (the availability of the relevant expertise) and administrative efficiency seem to contribute to the current clustering of Specialist Committees. (See NRF, 2007b for the scope of each.)

• The Specialist Committees assign a ‘weighting’ or prioritisation of research output types within the various disciplines, taking account of differing research cultures.

• It would seem that the strategy outlined by the NRF in its Draft Strategic Plan has been implemented, namely: “… it is essential that it (the rating system) be redeveloped to encompass all disciplines in a suitable way. This will need to be done in consultation with stakeholders and participants, to ensure an acceptable and comparable system” (NRF, 2000: Chapter 9: 4). Considerable work has been done to consult with and obtain the inputs of respected researchers in the various fields of enquiry to design and improve the evaluation and rating system so as to be relevant to each field.

• Fitness for purpose, rather than a ‘one size fits all’ approach, seems to be the golden rule.

• The task of the Specialist Committees is not to judge the quality of the research but to interpret the comments of the reviewers, and this task of hermeneutics requires ‘wise people’ with research experience.

• The Assessment Panels interpret reviewers’ comments based on the definitions provided for each of the rating categories, as summarised in the next section.

4 Definition of the Rating Categories

It is noteworthy that although research outputs as indicators of quality form the main focus of the evaluation process, the results of the evaluation are translated into the rating of the researcher as an individual. However, this process of translation and the related methodological issues should be explored separately. The rating categories are (NRF, 2007a, 18-19; cf. Appendix B).

4.1 A-rating: Leading international researcher

Researchers who are unequivocally recognised by their peers as leading international scholars in their field for the high quality and impact of their recent research outputs.

4.2 B-rating: Internationally acclaimed researcher

Researchers who enjoy considerable international recognition by their peers for the high quality of their recent research outputs.
4.3 C-rating: Established researcher

Researchers with a sustained recent record of productivity in the field and who are recognised by their peers as having produced a body of quality work, marked by coherence and the ability to conceptualise problems and apply research methods.

4.4 P-rating: President’s awardee

Young researchers (normally younger than 35 years of age) who are considered likely to become future leaders in their field; they have held the doctorate or equivalent qualification for less than five years and have demonstrated high quality research in their published doctoral work and/or their research outputs in early post-doctoral careers.

4.5 Y-rating: Promising young researcher

Young researchers (normally younger than 35 years of age), who have held the doctorate or equivalent qualification for less than five years at, and who are recognised as having the potential to establish themselves as researchers within a five-year period after evaluation, based on their performance and productivity as researchers during their doctoral studies and/or early post-doctoral careers.

4.6 L-rating: Late-entrant into research

Persons (normally younger than 55 years) who were previously established as researchers or who previously demonstrated potential through their own research products, and who are considered capable of fully establishing or re-establishing themselves as researchers within a five-year period after evaluation. Candidates who are eligible in this category include; black researchers, female researchers, those employed in a higher education institution that lacked a research environment and those who were previously established as researchers and have returned to a research environment.

5 Efficiency and Economy of the Evaluation System

5.1 International nature

Between 2002 and 2006, 13 000 reviewers from around the world were invited to provide input to the NRF rating and evaluation process (Social Sciences and Humanities: 59% from abroad, Natural Sciences and Engineering: 73% from abroad). This underscores the strong international nature of the rating system as a benchmarking tool. The majority of the reviews from abroad are
received from reviewers in the United Stated of America, the United Kingdom, Australia and Germany. Other overseas countries that are frequently approached include Canada, France, Italy, the Netherlands and Sweden (NRF 2007a).

5.2 Turn-around time and reviewer response rate

The following information gives a sense of the economy of the evaluation process:

- The average time lag in 2006 between the closing date for applications and the announcement of the outcome was 8.4 months (NRF 2007a: 22).

- The most time-consuming aspect is obtaining sufficient quality review reports for a decision.

- At least six review reports per applicant are required, but an average of more than ten reviewers per applicant has to be approached.

- In 2006, 452 applications were submitted and 4 903 reviewers were approached, 3 708 of whom responded. Since 2003, the response rate by reviewers has decreased from 82% to 76%. The NRF should consider innovative ways of managing the review process and here one is reminded of critical studies such as Gläser and Laudel (2005) on ‘the taylorisation of the review process.’

- The percentage of appeals ranged between 4% and 7% over the period 2002-2005 (NRF 2007a: 24).

5.3 Success rate

The very high success rate of the number of applications is an indicator of the efficiency of the system. This state of affairs can be attributed, amongst others, to the value-adding service of the NRF Evaluation Centre in referring back to institutions those applications that represent a premature submission.

5.4 Institutional cooperation

The success of the evaluation and rating system is dependent on the cooperation of research institutions in aspects such as ‘marketing’ the system, advising and assisting applicants, screening applications, submitting applications, announcing results to applicants, and filing for appeals.
5.5 Cost of evaluation
The foregoing paragraphs indicate the indirect cost of the rating system in terms of the time and effort required of both national and international reviewers, as well as institutions. Such support depends on the goodwill of researchers and institutions, and it would not be possible to calculate its monetary value.

The direct cost to the NRF of evaluation and rating in terms of resourcing and operating the NRF Evaluation Centre amounted to R2,28 million for the 2006/07 financial year. It is, however, difficult to find evidence of the causality of these input factors and potential outputs (i.e. the return on investment).

5.6 Transparency of the system
Since 1991, the system has provided a degree of transparency. A feedback process is in place by means of which the Assessment Panels advise on appropriate excerpts of reviewers’ reports that can be forwarded to applicants with the permission of the reviewer.

6 IN CONCLUSION: REVIEWS OF THE NRF RATING SYSTEM

The processes of the NRF Rating System are under constant ‘internal’ review in that Assessment Panels are requested to comment on such aspects as the appropriateness of methods, disciplinary boundaries, relevant outputs in the various fields and the quality of reviewers’ reports. Furthermore, the interaction with individual researchers and research administrations with the NRF seems to often provide the basis for considering changes to the system.

Since its inception, the rating system has undergone several evaluations by external reviewers. The following paragraphs offer a selective overview of these.

Hawkins reviewed the rating system in 1991 and McKenzie conducted a second evaluation in 1996.

The main points addressed in these two evaluations were:

- Insufficient credence was given to the research outputs of engineering research.

- Funding levels in the C and Y categories were criticised, as well as the lack of feedback or guidelines to researchers on how to improve their rating.

- Researchers benefited if their research institutions were selective and did not submit applications before a researcher was ready to be rated.
The system was biased in favour of disciplinary specialists.

The system discouraged researchers from changing direction within and between research fields.

These comments led to amendment of the rating and evaluation criteria as well as the structuring of the programmes of the NRF and its predecessor, the FRD, for example:

- Recognition of a wider range of research outputs
- Initiation of the process of providing feedback
- Establishment of programmes to fund the development of young and disadvantaged individuals and institutions (*NRF Guide 2003: 5*).

In 1998, the Department of Arts, Culture, Science and Technology (DACST) commissioned the *Agency Review of the FRD and CSD* (DACST: 1998a) and recommended that a new funding entity be established to serve the Natural and Social Sciences. With regard to the rating system, three options were recommended, namely, retaining the system, amending the system to accommodate the Social Sciences, or using a plurality of evaluation mechanisms. In practice, the last option was implemented in 2002 when the evaluation and rating system for individuals in ‘all fields of science’ (see NRF mandate) was approved, while funding decisions were based on a two-tiered process of the *NRF Rating System* and assessment of a project proposal. (The inclusion of the Social Sciences and Humanities required and resulted in significant changes to the rating system, such as a redefinition of rating categories and the extension of the review period from five to seven years to account for the longer lead time for the impact of Social Sciences and Humanities.)

In 2000, a review panel was appointed to conduct the *Evaluation of the programmes and activities of the former Foundation for Research Development (FRD) and the Centre for Science Development (CSD)*. The panel also investigated evaluation practices.

In 2005, the *NRF Institutional Review* concluded:

“The ‘rating system’ (...) is the subject of intense contestation and debate in the higher education sector, varying from advocacy by institutions developing a research profile (as an indicator of progress, for example) to active opposition and doubts on the part of serious scholars in the system.
“We have found the rating system to be divisive ...; its alignment with the NRF missions and the criteria used in the NRF’s research funding system (have) been queried, (...) the rating system was increasingly irrelevant because its only link to funding was eligibility for longer-term support; (...) there is unevenness in the instruments used, (...) problems with the ‘one size fits all’ assumptions; and are concerned about the system’s inherent bias and excessive operational complexity.

“... we are sceptical about the merits of the NRF’s rating system, (...) a fully merit-driven competitive process of awarding NRF grants on the basis of proposals, weighing track record into the evaluation, would be an improvement on the current NRF policy (...) a decision on the rating system should not be imposed, but (...) should be developing a fully consultative process driven by the research community itself.” (NRF 2005b)

The review panel recommended that the system be reconsidered with regard to its purpose and utility.

Based on these recommendations, the current review of several aspects of the rating system is being conducted by individual service providers, whose reports will be used to compile a synthesis report.

The following three observations may be relevant to the present evaluation study. Firstly, the reports of the preceding reviews were taken as the point of departure – but not as the hypotheses – for the current study. Secondly, the 2005 institutional review appears somewhat one-sided. This perception was encountered in the course of the qualitative research. In one interview, as well as in a group discussion for the present study, the respondents provided unsolicited comments to the effect that they considered the orientation of the 2005 review to be biased against the NRF Rating System. As will be shown in Chapter 3, the Stakeholder Survey (which was an input to the 2005 review) reported more nuanced and positive results. Thirdly, many of the criticisms raised in previous reviews seem to be repeated in subsequent reviews, despite the fact that policy and procedural changes have since been made.

The following chapter reports on the findings in response to evaluation question 1, namely, whether the NRF Rating System has influenced the attitudes and orientations of academics as individuals (also as groups/teams/other types of units) towards research and funding sources for such research.
CHAPTER 3

ATTITUDES AND ORIENTATIONS OF RESEARCHERS

The HESA NRF brief emphasised the influence of the NRF Rating System as one of the main objectives of this evaluation study: “this study should address the social impact of the rating system, i.e. how the introduction of the rating system changed researchers’ attitudes to research and their focus within fields of research. The review panel would be interested in an analysis of the effect of the rating system on attitudes to undertaking research by staff of universities.” This emphasis on the ‘impact’ of the rating system on the individual researcher makes sense if it is recognised that the researcher represents the origin of the research process and that his/her skills, perceptions, attitudes, motivation and expectations are key to the quantity and quality of any research endeavour. In this chapter, these and related aspects will be highlighted by modest quantitative information from secondary analysis of the NRF Stakeholder Survey, as well as qualitative information gathered by means of personal interviews with selected individuals as well as directed group discussions. The following dimensions will be covered: attitude towards the NRF Rating System (quantitative), qualitative results of attitudes towards the system, and finally, the effects of a rating on an individual (self insight, clarity on career development, motivation, dedication).

1 ATTITUDES TOWARDS THE NRF RATING SYSTEM (QUANTITATIVE)

As indicated in Chapter 1, selected general items from the NRF Stakeholder Survey questionnaire were used as proxies for direct probes of attitudes. The reasonable assumption was that if a respondent reacted positively towards an item dealing with rating-related matters, it would indicate a positive attitude towards the rating system itself. The sample consisted of researchers, members of panels and reviewers. The following paragraphs cover some of the results of the secondary analysis.

- More than half of the respondents (57.5%) agreed that the quality and quantity of researchers and students had increased since the establishment of the NRF; there were no significant differences ($p=0.66$) between the different rating categories.

- Slightly more than 60% of the respondents agreed that the NRF adhered to quality (in all its initiatives).

- The most directly relevant item enquired about the evaluation of the rating system itself. More than two thirds of the respondents (68.13%) agreed that the NRF provided useful ratings to researchers, while just less than 20% did not agree with that sentiment. A
Kruskal-Wallis test showed significant differences among the groups (chi-square=15.95, df=6, p=0.014), even though, on average, the respondents reacted positively to the statement. Group comparisons showed that the AB category was, not surprisingly, the most positively oriented.

- Finally, on the question of whether the NRF had made an impact (across all its research support functions), 63.13% agreed that the NRF had indeed made an impact, as opposed to less than 10% who denied such an impact.

The foregoing results show that the sample of respondents from the NRF Stakeholder Survey, all of whom were involved in the rating system, was generally favourably oriented towards the proxies used for the rating system. As argued in Chapter 1, however, this does not mean that the NRF Rating System itself was necessarily the cause of the positive attitudes. Some weight has to be attributed to this finding, given that the questionnaire appeared to be reliable and valid (including external validity), and social desirability dynamics would not have played a significant role in the responses, since the interviews had been conducted telephonically. However, three important qualifications should be emphasised: firstly, the survey was undertaken almost three years ago; secondly, the sample was small; and, thirdly, the secondary analysis used proxies, except for one item that dealt directly with the rating system.

The possibility of performing secondary analysis on the survey data related to Y-rated scientists (Kaniki, Maepa, Netshifhefhe and Tsebe 2007) was considered, but the intact data set was unfortunately no longer available. It was nevertheless decided to note the following relevant findings from that report on the responses of 327 then current or former Y-rated researchers:

- Approximately 33% of the sample later obtained at least a C-rating status.

- Approximately 6% attained considerable recognition and became international leaders.

- Seven per cent did not avail themselves of the opportunity for re-evaluation when invited to do so.

- In sum, it would appear that the Y-ratings have yielded a satisfactory return on investment.

2 Qualitative Information

The brief for this project referred to the following more subjective experiences and perceptions of the NRF Rating System: ‘social impact’, ‘changed researchers’ attitudes to research’ and
‘networking’. The study was widened to probe researchers’ attitudes towards the rating system itself, since it was assumed that often such attitudes would form the backdrop for personal experiences. The findings of the in-depth personal interviews and the directed group discussions are reported separately as regards attitudes towards the rating system, on the one hand, and the effects on the individual himself/herself, on the other. The frameworks presented in Chapter 1 were used to structure the agenda of the meetings and as the point of departure for interpreting the outputs of the meetings. (It should be noted that the actual contributions and discussions by respondents were often far more nuanced than the following abstracted high-level summaries and interpretations may imply.)

2.1 Attitudes towards the rating system itself

Much of the discussion in the individual and group interviews revolved around the NRF Rating System itself, touching on aspects such as its rationale, strengths and weaknesses, and the way ahead. These discussions are summarised in the following sections under the headings of support for or rejection of the system, differences between university staff echelons, and technical aspects of the rating system.

2.1.1 Support for or rejection of the NRF Rating System

As could be expected, the attitudes and opinions ranged from strong support to what could be interpreted as cynical rejection. Different sets of overlapping reasons underlying the positive attitudes can be distinguished. One set of reasons centred on quality issues, including the internationally accepted strengths of peer evaluation in general and the importance of researchers’ track records in particular. These respondents were generally well informed about the rationales and even research underpinning such topics. Another set of reasons were perhaps more subjectively inspired and came from individuals who had obtained ratings in line with their expectations and were therefore satisfied with the system without being overly concerned about the underlying rationales for the system. They had gone through the exercise and simply wanted to continue with their research.

Negative positions were mostly based on one of two motives, and sometime on both. One set of reasons concerned aspects of the rating system itself; the two aspects that surfaced most often were, firstly, the delinking of individual ratings from (automatic) funding (in 1996) and, secondly, the fact that rated researchers were partly dependent on funding from the Focus Area Programmes and application for that funding should be done separately (the mean awards in 2007, shown later in Table 6.1, were, e.g.,: A-rated: R1 255 657; B-rated: R778 302; C-rated: R512 965). The third facet was the ‘bureaucracy’ surrounding the two-system applications and evaluations, first for the ratings and secondly for funding. These and related reasons were
summarised by statements such as: “Why should I invest so much time on an exercise that will not provide me with research money at the same time – the thing I need!?”. It should be added that these negative factors were also on occasion identified as irritants by those who were positively inclined towards the *NRF Rating System*.

A second set of reasons for rejecting the system could best be described as the disillusionment dynamic, from those who had not attained the rating they thought they deserved. Their interpretations centred mostly on technical aspects of the evaluation system, such as inappropriate reviewers, uniqueness of the research field and publication media.

There were, of course, individuals that were positioned around the middle of the continuum and tended during discussions to oscillate between the two poles. This was a mixed and diffuse category, as can be seen from the types of statements defining this space on the continuum. A few rated researchers said that they could see the need for a system such as the *NRF Rating System*, but that it required just too much administration and too little return on the time invested to bother (further). (These were often individuals that had allowed their ratings to lapse. Those that allowed their ratings to lapse were very often in research fields where external research funds were readily available for good researchers.) A few C-rated researchers felt reasonably comfortable with the system, but considered that the label ‘C-rated’ did not do justice to their position and role.

### 2.1.2 Position of institutional management

University managers, who were included in the individual interviews and group discussions, generally reflected a more positive attitude towards the *NRF Rating System* than the broader spectrum of researcher attitudes. These attitudes found expression in comments such as, “useful, even indispensable guide to the university”, “the system served as strategic map for us to establish this institution as a research university”, “the university has incorporated the rating criteria into its own performance evaluation approach”, “we have developed a coaching workshop based on the application requirements”, “an excellent road map for career planning and development”, “in general, a reliable evaluation system, although there are a few surprises”, “it keeps all focused on quality”, and “in principle, the system treats all in the same way”. It would be reasonable to conclude that the top research performing universities have adopted the *NRF Rating System* and incorporated it into their own policy and strategic systems and procedures. The few that have not yet done so reported that they were in the process of doing so.

It could be argued that universities are not free to choose to adopt or not to adopt the essence of the *NRF Rating System*, since they are, at least partially, dependent on it. It could thus be argued, as one official put it, that: “As long as this happens to be the system, we will [have to] support
it.” While this pragmatic argument would be valid, many inputs at meetings explicitly referred to the applicability, usefulness, logic and validity of most, if not all, dimensions of the NRF Rating System. What became clear from the group discussions was that there is considerable appreciation for the rationale for, elements of and approach to evaluating individual researchers and that there were solid grounds for motivating the rating system.

The very positive ‘impact’ of the rating system on institutional management has a downside, however. One of the serious dysfunctions, albeit unintended, of this positive ‘impact’ is that it alienates some researchers to varying degrees from the management of their institution. A number of researchers – mostly, but not exclusively, the disillusioned ones – indicated that they felt that they were being ‘used’ by their institutions, which incorporated information on their rated researchers in marketing communications and seemed insufficiently sensitive to the researchers’ doubts about the system.

2.1.3 Technical aspects of the rating system

In the introduction to the individual interviews and group discussions, it was explicitly stated that these sessions were not designed as ‘gripe sessions’. As could be expected, however, participants did raise their views on aspects of the system that they considered to be weak, vulnerable or just not good enough. The substantiated views that have not already been alluded to in the preceding paragraphs are listed below in generic form, without substantiation and elaboration, and should be audited in any new dispensation. The comments address the nomination, selection and appointment of reviewers; the composition of Assessment Panels and their chairs; renewal procedures; level, content and quality of feedback; utilisation and over-utilisation of rated researchers in other NRF functions; and the reliability of the online system.

2.1.4 Conclusions

The following interpretations of the material presented in this section are offered in concluding this section:

There is a noticeable degree of variation in attitudes towards the rating system within and between university staff categories. It would nevertheless seem that researchers and university management support the system and would like it to continue, on condition, firstly, that ratings be directly linked to funding – approximating the pre-1996 dispensation; secondly, that serious consideration be given to differences between research fields, especially with respect to disciplines that are claimed not to be amenable to the rating system as currently applied; and thirdly, that all aspects of the rating process be subjected to a careful audit to ensure that they comply with the stated requirements and standards.
2.2 Effects of the NRF Rating System on the individual researcher

The qualitative information-gathering yielded a useful crop of perspectives on how the NRF Rating System ‘impacts’ on the individual researcher. Those raised by more than one respondent are recorded in the following sections under the following interrelated themes, expanding from the micro level (the self) to the macro level (the relevant social system): self-insight as researcher, motivation for research, lapsing of ratings, career development and mobility, and other effects.

2.1.1 Self-insight as researcher

It was mentioned by more than one rated researcher that preparing and applying for a rating was of great help in taking stock of what one had been doing up to that point, what one’s ‘objective’ strengths and weaknesses were, what one’s immediate priorities should be and what one’s more or less realistic personal and professional expectations should be. One person described the process as having been a singularly important personal growth experience. Seen within the context of the interviews and group discussions, it became clear that this unintended consequence of the rating system amounted to a form of mentorship/coaching that was not readily available to researchers (and probably others as well) that had not participated in the rating system.

2.2.2 Motivation for research

A recurring theme, especially among first-time applicants and younger researchers, was the motivational effects of the NRF Rating System. This effect was of a dual nature, namely, commitment to quality and the need for specialisation. The application and subsequent processes and outcomes seemed to serve as a sort of compact between the researcher and the larger research system and discipline, rather than being narrowly conceived as involving only the institution and the NRF. These interpretations were borne out by comments to the effect that the process of applying for a rating led the researcher for the first time to realise the full spectrum of role expectations related to being a (rated) researcher and the standards required of such a position and role.

2.2.3 Lapsing of ratings

If the rating of an individual researcher is an important achievement, as can be concluded from information presented in this report, it follows that deliberately allowing a rating to lapse is a serious indictment of the system itself. This issue therefore merits attention with respect to the
effects of the system on the individual researcher. It is therefore not surprising that this has become a sensitive issue in the current debate on the pros and cons of the *NRF Rating System*. Why do researchers allow ratings to lapse, if it took such an effort to get rated in the first instance?

What is the quantitative extent of the phenomenon? Some quantitative information: According to the NRF information for the period 2003-2007 a total of 392 rated researchers allowed their ratings to lapse over a year period. Analysis of the institutional association and disciplines produced the numbers reflected in the table below.

**Table 3.1: Lapsed ratings: Institutions and disciplines**

<table>
<thead>
<tr>
<th>Year</th>
<th>Top five**</th>
<th>Rest</th>
<th>Other*</th>
<th>Nat Sci</th>
<th>Soc Sci</th>
<th>Eng</th>
<th>Hum</th>
<th>Health</th>
<th>∑</th>
<th>% p.a.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>43</td>
<td>24</td>
<td>3</td>
<td>43</td>
<td>6</td>
<td>10</td>
<td>0</td>
<td>10</td>
<td>70</td>
<td>5.5</td>
</tr>
<tr>
<td>2004</td>
<td>23</td>
<td>15</td>
<td>3</td>
<td>23</td>
<td>3</td>
<td>5</td>
<td>0</td>
<td>5</td>
<td>41</td>
<td>3.1</td>
</tr>
<tr>
<td>2005</td>
<td>25</td>
<td>11</td>
<td>17</td>
<td>26</td>
<td>6</td>
<td>6</td>
<td>0</td>
<td>1</td>
<td>53</td>
<td>3.9</td>
</tr>
<tr>
<td>2006</td>
<td>33</td>
<td>22</td>
<td>8</td>
<td>41</td>
<td>7</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>63</td>
<td>4.1</td>
</tr>
<tr>
<td>2007</td>
<td>81</td>
<td>54</td>
<td>30</td>
<td>35</td>
<td>39</td>
<td>9</td>
<td>39</td>
<td>10</td>
<td>165</td>
<td>10.3</td>
</tr>
<tr>
<td>∑</td>
<td>205</td>
<td>126</td>
<td>61</td>
<td>168</td>
<td>61</td>
<td>31</td>
<td>40</td>
<td>30</td>
<td>392</td>
<td>5.4</td>
</tr>
<tr>
<td>%</td>
<td>52.3</td>
<td>32.1</td>
<td>15.6</td>
<td>42.8</td>
<td>15.6</td>
<td>7.9</td>
<td>10.2</td>
<td>7.6</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Sources: NRF (2007) and NRF communication

**UCT, US, Wits, UP, UKZN   *Other: Museums, science councils, unknown    •Unknown: Not specified**

The patterns emerging from Table 3.1 are not altogether clear cut. The top five universities represented approximately 60% of the rated researchers, but accounted for proportionally fewer (52%) of the lapsed ratings, lapsed ratings at the rest of the higher education institutions were proportional to their share of the ratings nationally, but non-educational institutions represented 3.4% of rated researchers, but accounted for 15% of the lapsed ratings. It is difficult to discern a pattern in the case of the disciplines due to the relatively large percentage of unidentified disciplines. No more can consequently be done than to note that the SET and Social Sciences (incl. Humanities) knowledge fields accounted for a smaller proportion of lapsed ratings than their stake holding in the ratings would predict (58% : 68% and 25.8% : 31%, respectively), but this picture is likely to change once the unidentified ones have been identified.

Cursory inspection of the lists of lapsed ratings indicates a range of obvious but also unknown reasons. Obvious reasons include promotion to executive positions, leaving research institutions to join other professions (not unlikely because of the acknowledgement inherent in the rating!),

37
retirement and other forms of mobility. These seem to represent a minority of perhaps 10%, however. The majority of the researchers have apparently let their ratings lapse for other reasons, one probably being loss of interest in being rated. It would be important in future to analyse lapsed ratings and reasons for them over time, but that would require first of all reliable information on those reasons. Feedback from group sessions indicated that some researchers did not give their true reasons “not to embarrass anyone”, as one respondent put it. Further analyses were consequently not undertaken.

The issue was probed in two ways in the course of the qualitative part of this study. Firstly, a few individuals who have allowed their ratings to lapse, or considering to do so, participated in individual interviews and group discussions. Secondly, the issue was explicitly raised at group discussions and individual interviews with university managers. The following notes summarise the perspectives that emerged from these sources:

- The problem is serious – in terms of numbers, in terms of social psychological intensity and in terms of the interpretation attached to it in many quarters namely that it invalidates the NRF rating system in some respects - and deserves dedicated attention from the NRF.

- Universities are taking the issue seriously, although they would in academic tradition respect the individual’s rights in this regard. They would, however, not encourage this option – to the contrary.

- The attitudes of individuals who have allowed their ratings to lapse for other than mobility reasons vary from treating it as a private matter and “I still encourage my colleagues to apply for ratings” at the softer end of the continuum to actively discouraging of, especially junior, colleagues not to apply for ratings at the harder end.

- The four main reasons for choosing to allow a rating to lapse for other than mobility reasons were the following, separately and in combination: the amount of administrative preparation for applying for a renewal, the experience of limited direct rewards attached to a rating, the lack of automatic research funding attached to a rating, and disillusionment on a rating that was not in line with expectations, especially where downward mobility occurred.

There are clearly multiple reasons for the relatively large number of lapsed ratings as the statistics in Table 3.1 show. The lapsed ratings which resulted from changing attitudes towards the rating system, confront the system with the dilemma of researchers that originally participated, but could not be retained in this international benchmarking system and as such
raises the question whether it is the researcher or components of or the entire system or both that are to be blamed for this situation.

2.2.4 Career development and mobility

A number of researchers and managers emphasised what could be described as the liberating effect of the rating system on individual researchers to enter and move around in the labour market with more self-confidence. Mention has already been made in this report of the fact that institutions generally consider NRF ratings as a factor in the recruitment of staff. Researchers likewise make proactive use of the system to consider greener pastures. The scope of this study did not permit an analysis of the mobility of rated as opposed to non-rated researchers, but it could be hypothesised that there would be a positive correlation, other factors (such as age and seniority) being equal. The effect of this on the individual career as well as on human resource planning of institutions is very complex, but potentially interesting to investigate further.

3 CONCLUDING DISCUSSION

On balance, the quantitative and qualitative information submitted in this chapter indicates that the NRF rating system has had a positive influence on the attitudes and orientations of researchers as individuals. The picture emerging from the preceding quantitative and qualitative analyses is, as could be expected, rather complex, and what follows can be no more than broad brushstrokes on a canvas prepared for strategy development.

It would be fair to say (in contrast to the somewhat categorical conclusions reflected in the NRF Institutional Review), on balance, that the NRF Rating System is still assessed more positively than negatively by the various sectors of the research community and that it offers a reasonable foundation from which to launch future strategies. A relatively small proportion of inconsistencies in and between ratings do appear from time to time, but apart from these there is reasonable consensus that the NRF rating system offers a sufficiently reliable and valid evaluation of the relative standing of researchers. If evaluation of a short to medium term research and funding plan could directly be linked to that the return on investment for rated researchers would be significantly improved and the efficiency of the rating and funding system would be enhanced.

The preceding positive situation is, however, precariously balanced. The acceptance of and support for the NRF Rating System has, over the years, and especially since its delinking from direct funding, fluctuated across subsectors in the research community and between individuals within subsectors. The current situation is characterised by a growing number of successful researchers that have already allowed their ratings to lapse and even refrain from encouraging
their junior collaborators to apply for NRF funding. Questioning of the system should be taken seriously and not be interpreted as being a way of reducing dissonance by researchers that had not been awarded the rating they thought they deserved. This is especially the case if we accept that the earlier observation, namely that negative views on the rating system are not necessarily expressed in public.

At least three contextual factors have to be considered in any future planning related to the system, namely, the dynamically changing context and modes of knowledge production, the ‘value’ of a rating against the background of available financial support from business and international agencies, and the scepticism among social scientists. Future planning will firstly have to acknowledge the validity of and secondly directly address the reasons for dissatisfaction identified in this and other chapters.
CHAPTER 4

OUTPUT PRODUCTIVITY

The basic rationale for the NRF Rating System, from conception and inception, notwithstanding important policy changes in recent years, has remained the acknowledgement of the researcher’s relative position in the particular field of knowledge production. The single most important basis for such an assessment is the individual researcher’s research outputs and their outcomes. Enquiring about the ‘impact’ of the rating system consequently has to rely in important respects on information on the outputs of rated researchers. The following aspects are covered in this chapter: publications (including journal articles, books and other publications) and outcomes (including patents and artefacts and students).

Before presenting the results, however, it should again be mentioned that while outputs as such may not be direct proof of the ‘impact’ of the NRF Rating System (but could, for example, validate the rating itself), the fact of associations between ratings and outputs in themselves serve as evidence of the value of the rating system.

1 PUBLISHED OUTPUTS

The series of analysis of the CREST SAKnowledgebase at the University of Stellenbosch produced the following results:

1.1 Rated researchers in SAKnowledgebase

The database contains the names of 90 611 authors. Of these authors, 3 684 are rated researchers and/or formerly rated ones. Rated researchers, in this sense, have influenced the profile of authors of journal articles. Summary statistics are presented in Table 4.1. Initial inspection of that table shows several relevant statistics in anticipation of further analysis reported later in this section. Firstly, the rationale for the NRF Rating System ‘predicts’ that rated researchers should be more productive than non-rated researchers; this observation is strongly borne out by Table 4.1, in which the average article equivalents for four periods for each of the knowledge domains are reported, and rated researchers produced between three times and eight times more average article equivalents than non-rated researchers during the period 2002-2005. (It should be noted that the numbers probably include a proportion of articles based on postgraduate dissertations and a small number of publications by visiting scholars, since these cannot be identified in, or separated out from, the database.)
Secondly, Table 4.1 shows an interesting trend over time in that the number of articles has increased steadily, but the productivity of individual researchers, expressed in terms of average article equivalents, has declined in all fields except the Social Sciences and Humanities, where productivity has remained more or less constant. This pattern correlates with the NACI finding of a decline in productivity between 1995 and 2001 (NACI 2004). Thirdly, it becomes clear from an inspection of Table 4.1 that the productivity per rated researcher during the period 2002-2005 was highest in the Natural Sciences, followed by the Social Sciences and Humanities, Engineering and Technology, and the Health Sciences.

In addition to the journal articles reflected in Table 4.1, the publication outputs for 2002-2006 reflected in Table 4.2 should be added (the information was provided by the NRF). The only comparative information for researchers in general was that produced by CREST for a NACI
CREST reported a mean annual unique book title hovering around 450 per year between 1990 and 1998, declining, however, to a range between 361 and 153 since then to 2004. Furthermore, CREST reported a higher percentage for the Social Sciences, namely 70% of total production as opposed to the 59% reported in Table 4.2. It would seem that the book output of rated researchers was higher than the outputs of South African researchers in general as reflected in the CREST report.

### Table 4.2: Other publication outputs (2002-2006)

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Chapters in books</th>
<th>Books</th>
<th>Research-based technical reports</th>
<th>Technical reports</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Sciences and Engineering</td>
<td>1 023</td>
<td>520</td>
<td>967</td>
<td>355</td>
<td>2 865</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>1 479</td>
<td>670</td>
<td>271</td>
<td>69</td>
<td>2 489</td>
</tr>
<tr>
<td>Total</td>
<td>2 502</td>
<td>1 190</td>
<td>1 238</td>
<td>424</td>
<td>5 354</td>
</tr>
</tbody>
</table>

The only comparison base for technical and research-based reports that could be found was the study undertaken by CREST for NACI (2003) on the utilisation of research findings. In that study it was reported that when respondents in universities were asked about their most preferred communication media, refereed journals was chosen most (780), followed by reports (419), followed by books and chapters in books (338). The only conclusion relevant to the current study is that researchers in the higher education sector rate reports (including technical and research-based ones) as being quite important as communication media. The statistics in Table 4.4 gives credence to those preferences.

### 1.2 Journal articles per rating categories

Four questions were addressed in the analyses using rating categories as pivot, namely, whether there are differences between the output performance of different categories of ratings (A, B and C), whether researchers in higher categories publish more in ISI-indexed journals than in South African journals, whether upwardly mobile rated researchers (for example, those that move from C to B) perform better than downwardly mobile researchers (for example, those that move from B to C) and, finally, whether rated researchers collaborate more with international researchers than non-rated researchers. Figures 4.1-4.3 show the patterns that emerged.

Figure 4.1 clearly shows that in the case of researchers that received their rating in the period 2002-2006, upward mobility was associated with increased article productivity. In contrast, additional analysis showed that the average article equivalent outputs of ‘immobile’ and downwardly mobile researchers declined over the two publication periods. The same trend applied to non-rated researchers.
Analyses of the preference for ISI as opposed to South African journals showed that all categories of mobility (upward, downward and immobile, as well as non-rated) increased their share of ISI publications; the opposite applied to the share in South African journals (see Figure 4.2). Unfortunately, time did not allow entering journal impact factor into the analyses, since the ratings of journals change over time and would have required extending this part of the study substantially. Another interesting issue that at the time of writing was being looked at relates to the publication preferences of researchers in the Social Sciences and Humanities. The question is, namely, whether the fact that the rating system is internationally benchmarked, would have stimulated rated researchers in the Social Sciences and Humanities to increase the international component of their portfolio of journal articles.

1.3 International co-authorship

International co-authorship could be expected to be linked to ratings, especially if the criterion of international scholarship and recognition (A and B ratings) is considered. Figures 4.3, 4.4 and 4.5 offer an overview of the pattern of the share of foreign article co-authorship.

As could be expected, a significantly larger percentage of rated researchers’ article output was in co-authorship with international authors than was the case for non-rated researchers during the period 1990-1993 to 2002-2005 (as shown in Figure 4.3). Furthermore, Figure 4.4 shows a positive relationship between rating category and percentage of international co-authored articles stretching over more than a decade since 1990-1993.

Further inspection of Figure 4.4 shows that, over the period 1990-1993 to 2002-2005, not only was there an increase in international co-authorships as a percentage of publication output in all rating categories, but that the percentage increase was also positively associated with the rating category, namely A: 19.7%, B: 11.4%, C: 9.49%, and P/Y/L: 11.46%.
Finally, Figure 4.5 deals with the influence of mobility and its relationship with the percentage of international authorship collaboration. Figure 4.5 shows several interesting phenomena. Rated researchers that retained the same rating over the period 1990-1993 to 2002-2005 (so-called ‘immobiles’) have in the past six years increased their international co-authorship very strongly, and the highest percentage of their articles fall into this category. Although an analysis was not done to identify the rating category (or categories) within the group responsible for this strong international performance, it would be reasonable to ascribe the high percentage to A-rated researchers, if their high rate of international collaboration reflected in Figure 4.5 is taken into account. Upwardly mobile researchers (for example, those that move from a C to a B rating) show a consistent increase in their international co-authorship rates over the period, whereas downwardly mobile researchers show a less consistent pattern, marked by a decrease in the period 1998-2001 and relatively slow growth from 1994-1997 to 2002-2005.

Figure 4.5: Rating mobility compared with international co-authorship
1.4 Knowledge fields: Rated versus non-rated researchers

The following results focus on fields of research and the journal publication performance of rated researchers. In certain respects, this section should be read in conjunction with the next chapter, which deals specifically with fields of knowledge production. The specific questions addressed here were whether there were any differences in the output production between the four fields (Natural Sciences, Engineering, Health Sciences, and Social Sciences, including the Humanities). Two comparisons were done to shed light on this question (Table 4.1). Firstly, the article equivalents were compared across disciplines and, secondly, the ratio of 2002-2005 article equivalents of researchers rated in 2002-2006 were compared to those of non-rated. The first comparison yielded the following rank-order of article equivalents: Natural Sciences, Social and Human Sciences, Engineering and Technology, and Health Sciences. This rank-order indicates the relative contribution researchers in each of these fields made to the article output. The second comparison produced the following rank-order of disciplines (the number is the times that rated researchers outperformed their non-rated colleagues: Natural Sciences (9.3), Health Sciences (6.1), Engineering and Technology (4.5) and Social and Human Sciences (3.9).

1.5 Overall performance of rated researchers

This selective overview of the association between the NRF Rating System and publication outputs concludes with a comparison of the performance of rated researchers with the overall production of South African-authored journal articles. For this purpose, authors with more than three articles to their credit since 2000 were used in order to eliminate once-off articles based on dissertations and possible outputs of visiting scholars. This, of course, decreased the number of authors significantly (from 90 611 to 7 353), but was considered justified by the fact that the numbers would cover only professional South African researchers. The idea for and the results of this analysis (which was the initiative of CREST), can be found in Table 4.3.

Table 4.3: Relative publication performance of rated researchers

<table>
<thead>
<tr>
<th>(1) Scientific field*</th>
<th>(2) No. of researchers with &gt; 3 articles</th>
<th>NRF-rated researchers</th>
<th>(3) No.</th>
<th>(4) % column 2</th>
<th>(5) % NRF-rated researchers among top 100 most productive researchers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Sciences</td>
<td>1 437</td>
<td>304</td>
<td>21</td>
<td>26%</td>
<td></td>
</tr>
<tr>
<td>Engineering</td>
<td>463</td>
<td>248</td>
<td>54</td>
<td>76%</td>
<td></td>
</tr>
<tr>
<td>Natural Sciences</td>
<td>2 651</td>
<td>1 251</td>
<td>47</td>
<td>82%</td>
<td></td>
</tr>
<tr>
<td>Social Sciences</td>
<td>2 802</td>
<td>557</td>
<td>20</td>
<td>43%</td>
<td></td>
</tr>
</tbody>
</table>

* ‘Natural Sciences’ include the agricultural disciplines, while ‘Social Sciences’ include Humanities and Economic Sciences.
Table 4.3 reflects very favourably on the article productivity of rated researchers in absolute and relative terms:

- Firstly, the low numbers reflected in column 2 indicate that a relatively small proportion of South African authors have produced more than three articles since 2000 (7,353 out of approximately 90,611), but that issue is not the focus of the present analysis, although it would justify further exploration in its own right.

- Secondly, columns 3 and 4 could be interpreted as indications of the participation rate of rated researchers in journal article publications in those particular knowledge fields. Column 4 shows that rated researchers in Engineering and the Natural Sciences accounted for approximately half of the total South African publications and in the knowledge fields of Health and Social Science, approximately a fifth of the total. If the estimated percentage that rated researchers represent of all the researchers in those knowledge fields were taken into account (not reported here, since they still have to be validated; the estimated populations were based on sources such as the R&D Survey in order to at least approximate the relative size of the respective researcher populations), then the ‘impact’ represented by the figures become more pronounced.

- Thirdly, the information in column 5 shows the relative prominence of rated researchers in their respective fields expressed as the percentage that were among the top 100 authors. The percentages indicate that rated researchers were more productive than their representation in this specific SAKnowledgebase set of authors would predict (in comparison to column 4) – in fact in the case of the Natural Sciences and Engineering, rated researchers accounted for the overwhelming majority of publications. The Social Sciences also ‘impacted’ beyond expectation, taking into account the relatively small number of rated researchers.

As already noted several times in this report, one should be cautious in interpreting relationships as definitive impacts proven by data in the tables. The question remains whether the data demonstrate the ‘impact’ of the rating system on publication behaviour or the external validity of the rating system. Distinguishing between cause and effect is not possible with the available information, as presented here, but it would be fair to conclude that this analysis showed a strong relationship between ratings and publication behaviour and at least does not invalidate the NRF Rating System. The following question is worth considering: What would a lack of any association between ratings and publication output mean?
2 OUTCOMES

Three types of outcomes were included in the present analyses, namely, patents, artefacts and students. Most of the information was obtained from the NRF. Unfortunately, it was not possible within the parameters of this study to obtain external benchmarking statistics required for an in-depth evaluation.

2.1 Patents

The first data set was compiled by identifying rated researchers in the Technology and Human Resources for Industry Programme (THRIP) and Innovation Fund (IF) lists of grants and then inspecting the records to identify patents, irrespective of the stage of registration or the patent office to which it had been submitted. This somewhat arduous process produced the information summarised in Table 4.4.

Table 4.4: Number of patents in the THRIP (and IF) databases ascribed to rated researchers

<table>
<thead>
<tr>
<th>Period</th>
<th>THRIP</th>
<th>Innovation Fund</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>By NRF-rated researchers</td>
</tr>
<tr>
<td>1992-2007</td>
<td>468</td>
<td>168</td>
</tr>
</tbody>
</table>

The information shown in Table 4.4 could be interpreted as reflecting relatively favourably on the patent productivity of the NRF Rating System, at least in the case of rated researchers supported by THRIP (a comparison with the Innovation Fund not having been possible). This is especially the case since the NRF Rating System rates social and economic ‘impact’ relatively low in its list of possible ‘impacts’ (see NRF 2002b). A comparative base can be found in Lubango and Pouris (in press) who reported that the five most productive universities submitted 245 patent applications to the South African Patent Office in the period 1996-2006, i.e. an annual mean of 24.5 as opposed to the 31 reported under THRIP. Correcting for the fact that the Lubango and Pouris statistics concerned only five universities, the mean outputs of the two studies appear reasonably comparable, but favouring Table 4.4. Taking the comparisons a bit further suggests that the patenting output of rated researchers might in fact be higher than the general mean, since rated researchers represent approximately 10% of the instruction and research population in the higher education sector, but in terms of Table 4.4 produced approximately 36% of the THRIP supported patents. The tabulated statistics probably overlap to a marked degree with the Lubango and Pouris statistics, and this is currently being cross-
checked. Nevertheless, the performance of the rated researchers seems to be higher than that reported by Lubango and Pouris. The above interpretation should, however, be seen against the well-known background of the low patent productivity of South Africa in general and South African universities in particular.

2.2 Artefacts

One of the challenges to be addressed when the Social Sciences and Humanities started participating in the NRF Rating System was how to account for embodied knowledge in the form of artefacts typically produced by the Humanities. The solution was to consider ‘artefacts’ as an output category. The NRF rating database showed that rated researchers produced 285 artefacts during the period 2002-2006 (i.e. an average of 0.774 per rated researcher in the Humanities in general and 1.53 if the fields of Historical Studies and Law are excluded). The mean artefact output is small when expressed as a proportion of rated researchers. This topic requires further investigation, however.

2.3 Students

Finally, the number of students that rated researchers indicated they would involve in their research programmes, was used as an outcome indicator, since any form of participation could be considered as capacity building. Table 4.5 shows the information for the period 2002-2006 that was generated from the NRF databases. The total head count of NRF funded postgraduate students in 2002 was 103 659 according to the CHE, suggesting that approximately 14.3% of the postgraduate population was funded by the NRF and associated with rated researchers. (This is probably a conservative estimate since part-time students were included in the headcount.) During that period an average of 1 500 rated researchers were active in the system which means that the mean number of NRF funded students associated per rated researcher was approximately 10.

Table 4.5: Number of students directly involved in projects of all rated researchers

<table>
<thead>
<tr>
<th>Study level</th>
<th>Σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctoral</td>
<td>4 854</td>
</tr>
<tr>
<td>Final year undergraduate</td>
<td>529</td>
</tr>
<tr>
<td>Honours/BTech</td>
<td>751</td>
</tr>
<tr>
<td>Masters (general)</td>
<td>6 977</td>
</tr>
<tr>
<td>Masters by coursework</td>
<td>128</td>
</tr>
<tr>
<td>Masters by research</td>
<td>1 235</td>
</tr>
<tr>
<td>Masters by research and coursework</td>
<td>818</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>14 892</strong></td>
</tr>
</tbody>
</table>
3 CONCLUSIONS

The analyses in this chapter are a response to the following part of the HESA NRF brief: “an analysis of the effect of the rating system on (...) the transformation of universities into research intensive institutions.” To this end, a large volume of information was accessed and processed, but only a limited part could be included in the chapter. The process of selecting material for inclusion was guided by the desire to minimise interesting, but not essential, theoretical and methodological debates, not to overcrowd the chapter with uninterpreted tables and figures, and to allow for provisional interpretations and discussion that would be consolidated in the final chapter. The following conclusions were reached:

- Rated researchers were generally more productive than non-rated scientists, and the higher the rating the higher the productivity.

- While embodied knowledge outcomes such as patents and artefacts were not key criteria for ratings – which are much more focused on knowledge production than on its application – rated researchers were found to be comparatively productive in this regard. That general conclusion also applied to rated researchers in the Social Sciences and Humanities.

- Students: Rated researchers involved advanced research students and it was noted that the mean number of postgraduate students per rated researcher appears encouraging, but that relevant comparison bases should be accessed for further analyses.

- The issue of how to interpret findings such as the above is a vexed one, but it is suggested that the following conclusion be considered in strategic considerations of the future of the NRF Rating System:
  - It would have been cause for considerable concern if there had been no direct positive relationship between the ratings of individual researchers and the levels of their output productivity. Clearly, this would have meant that rated researchers did not contribute more than non-rated ones to the production of knowledge – production of knowledge being the key criterion for, and main objective of, the NRF Rating System.
  - The time frame, scope and objectives of this component of the project as well as the nature of the data sets used in the analysis did not allow a research design that would unequivocally map the causal pathways between ratings, and outputs and outcomes.
  - The positive associations found for all the output dimensions, although their reliability was not tested statistically, can at this stage be taken as, on the one hand, validating the elements of the ratings and, on the other, serving as positive return on
investment. The *NRF Rating System* is probably one of a number of co-producers contributing in a sustained way to relatively high levels of output production. Subsequent appropriate statistical analysis is likely to show this to be at least a plausible interpretation.
CHAPTER 5

FIELDS OF KNOWLEDGE PRODUCTION

Various NRF policy documents dealing with the rating system implicitly and/or explicitly use ‘discipline’ as the space in which research by rated researchers takes place. This is confirmed by structures such as the Specialist Committees, which have a strong disciplinary orientation (see Chapter 2). Against this background, the brief for this study identified the ‘impact’ of the NRF Rating System as one of the objectives of this evaluation study. In response, the third research question of this study (see Chapter 1) reads, “Has the NRF Rating System influenced any aspects of the fields of knowledge production?” This chapter offers quantitative and qualitative empirical information as well as material from NRF publications to explore the influence that the NRF Rating System may have had at the disciplinary level.

The line of argument followed in structuring this chapter is as follows: firstly, the parameters specified in the rating guidelines and the treatment of disciplines and disciplinary boundaries in evaluation criteria and procedures represent a first level of influence; secondly, the distribution of rated researchers across disciplines serves as the backdrop for the rest of this chapter; thirdly, the fact that rated researchers have to apply to NRF interdisciplinary funding programmes for financial support and the ways in which they respond to that arrangement represent the next level of influence; fourthly, the research performance of rated researchers (see elements of the previous chapter) represents a third level of influence; and finally, attitudes, experiences and expectations of researchers vis-à-vis their disciplines can be defined as a fourth level of influence. The results are presented in the above order.

1 NATIONAL AND NRF POLICY AND STRATEGY

Most, if not all, national research and related strategies, such as the National R&D Strategy and the Higher Education Act, promote the notion of research being directed towards addressing national challenges. Operative concepts that are often used include relevant research, Mode 2 knowledge production, strategic research, a post-modern approach to research, and the like. (These approaches to research do not necessarily lie in the same scholarly space, but this is not the place to deal with epistemological and methodological differences, some of which are mere nuances and others radical.) Research aimed at contributing to the stock of knowledge, variously identified as ‘basic’ or ‘fundamental’, or even ‘pure’ research, is mostly offered as a consolation prize in the form of stating that such research should not be neglected. One is tempted to
categorise the research promoted in these policies and strategies as multi- and interdisciplinary research, rather than as disciplinary research.

The framework for the *NRF Rating System*, however, is at least conceptually aimed at the more fundamental end of the research continuum. A good example can be found in the impact criteria of the rating system, which emphasise ‘impact’ on the discipline, growth of knowledge, research capacity building, and the like, but do not to be very concerned with impacts on the national challenges. In some sense, the initial resistance from certain sections of the Engineering research community could be attributed to this very issue, namely, that their more applied orientation is not aligned with the more fundamental orientation of the *NRF Rating System*. Some of the many dynamics that might be at play in the doubt about the ratings expressed by some social and human scientists could probably also be traced to this identified conceptual dissonance. Law would be a good example of this dynamic. A researcher in the field of law commented as part of the qualitative component of the study that: “Our research focuses on local issues and problems and consequently is not really amenable to international benchmarking”. (The validity of this argument is quite tenuous, but at this point it should be noted that the perception has reality value for the individuals concerned on the one hand but that the functions of the specialist committees are such that they should be able to address this issue, on the other.)

It would be possible to elaborate on the apparent conflicting signals emanating from this situation, but suffice it to observe that the *NRF Rating System* in its current form does not seem to have resolved the conceptual dilemmas posed by these seemingly conflicting objectives and approaches. In this sense, the rating system has had at least two effects at disciplinary level: firstly, the rating system has served as promoter of quality research in which fundamental research is given due recognition, and secondly, it has added to the ambivalence around the continuum between fundamental and applied research.

2 DISTRIBUTION OF RATED RESEARCHERS ACROSS DISCIPLINES

By way of introduction, it may be useful to take note of the fact that the number of rated researchers almost doubled from 508 at the launch of the rating system to 1 010 in 2001, the year before the Social Sciences and Humanities first participated in the system. The following year, the inclusion of researchers in the Social Sciences and Humanities helped increase the number of rated researchers to 1 267, with the Social Sciences and Humanities accounting for 269 rated researchers in 2002. Currently, 1 606 rated researchers participate in the *NRF Rating System*, 513 of whom are from the Social Sciences and Humanities. Since 2002, the number of participants from the Social Sciences and Humanities has doubled.

The current total number of rated researchers represent approximately 10% of the total number of higher education staff (15 315) in academic and related positions in South Africa (see Higher Education Management System (HEMIS) Report and NRF [2007]). However, if output
productivity is considered, the impact of the *NRF Rating System* appears more favourable. It would probably be fair to assume that approximately 60% of the more than 15 000 members of staff are active and productive researchers, if, for instance, the observation from the SAKnowledgebase is considered, namely, that the number of South African journal article authors declines dramatically to approximately 8% of the database if a threshold of more than three articles is set. This type of correction would significantly raise the percentage of higher education staff that rated researchers represent and serve as a positive indication of the ‘impact’ of the *NRF Rating System* on the national system of innovation.

The key role players with whom qualitative interviews were conducted emphasised (with examples and references) that the rating system had had a significant impact in the Natural Sciences in contributing to raising of quality of research, benchmarking against international standards and motivating scientists. In terms of the increase in the participation rate by researchers from the Social Sciences and Humanities since 2002, it is conceivable that a similar effect might emerge. In fact, the feedback received in the interviews and group discussions confirmed the expectation that the *NRF Rating System* would have a positive impact on the quality of research in the Social Sciences and Humanities and boost their visibility in the family of disciplines. In short, the *NRF Rating System* has influenced both disciplinary sectors positively.

The most recent figures, from 2006, on the distribution of the different categories of rated researchers across disciplines, reported in the NRF’s Annual Report for 2007 (NRF 2007: 11), were analysed to specify more closely the distribution of rated researchers across the different knowledge fields. To this end, the 22 disciplines were regrouped to yield five knowledge fields, namely, the Natural Sciences, Engineering, Health Sciences, Social Sciences and Humanities. Furthermore, the P- and Y-rating categories were also grouped together, thus yielding five rating categories. The reorganised information can be found in Figure 5.1 which also reflects the total R&D expenditure in the higher education sector per knowledge field in 2005/2006.

Inspection of Figure 5.1 brings to the fore many interesting results that are worth further analysis, but the following results are directly relevant to the current study:

- With respect to whether the *NRF Rating System* contributes directly to the induction of young researchers into the echelon of acknowledge researchers, the answer is mixed for both the Social Sciences and the Natural Sciences. Many of the disciplines that are closer to application, service delivery and specific career options, have a strong cohort of approximately 10% of Y-category researchers. This cohort tapers off to about 3% in the more ‘academic’ fields. The distribution of rating categories is fairly comparable across knowledge fields.
The Social Sciences, Humanities and Health Science are characterised by the fact that approximately two thirds of their researchers fall into the C category.

Figure 5.1: Rated researchers x rating categories x knowledge fields x R&D expenditure

- The Natural Sciences, Humanities and Engineering each have 4% of their rated researchers classified as A-rated; only 1% of rated Social Scientists are A-rated. History shows that these percentages are not static and it is conceivable that more researches from the Social Sciences and Humanities would move up in the ranking system as they establish themselves better in the international literature.

- Comparing the percentage of rated researchers in a knowledge field with the percentage of R&D expenditure yields the following ratios:
  - Natural Sciences: 49% of researchers: 34% of R&D expenditure
  - Social Sciences: 17%: 21%
  - Humanities: 14%: 12%
  - Health Sciences: 10%: 21% (R&D expenditure includes medical research)
  - Engineering: 10%: 10%

The reasons for the imbalances in the case of the Natural Sciences (negative) and Social Sciences (positive) are worth further probing at a later stage.
In conclusion, it would seem that the Natural Sciences remain the major shareholder in the rating system, while the Social Sciences and Humanities have made a good entry with a combined percentage of some 31%; they were clearly not being treated as junior partners who had to perform their way into the senior ranks.

3 PARTICIPATION IN DIRECTED FUNDING PROGRAMMES

As shown in Chapter 2, rated researchers have to apply to other NRF programmes, such as the Focus Area programmes, THRIP and the Innovation Fund, as well as to other agencies for funding for their research, since funding is not automatically linked to a rating. These three funding programmes are all closer to the applied and even innovation end of the continuum (as opposed to the fundamental end), although the Focus Area programmes cater for both fundamental and applied research. It stands to reason that if a significant portion of the financial support for rated researchers were to come from these programmes, it might over time have an impact on their disciplinary orientation. The extent of such support is the focus of this section.

Figure 5.2: Funding sources of NRF-rated and unrated researchers

Inspection of Figure 5.2 shows a range of interesting phenomena, the following of which are of immediate relevance to the evaluation of the NRF Rating System and its influence on knowledge fields:

- NRF research funding is shared proportionally by rated and non-rated researchers.
- Rated researchers obtain slightly more than three-quarters of their NRF funding from the Focus Area programmes, while non-rated researchers rely firstly on the institutional
development programmes for half of their NRF funding and secondly on the Focus Area programme for 28% of their NRF funding.

- THRIP and the Innovation Fund together account for 14% of the NRF funding to rated researchers and 19% in the case of non-rated researchers.

The foregoing overview, which should be read in conjunction with the sections reporting on outputs and outcomes in Chapter 4, allows the following two cross-cutting conclusions. Firstly, rated researchers participate extensively in NRF funding programmes, although no conclusions can be drawn on the portion that NRF funding represents of their total research expenditure. Their participation in these programmes substantiates the complaint raised by rated researchers in many of the personal interviews and group discussions that the double effort (firstly, to obtain a rating, and secondly, for a research grant) required to access funds for research was not efficient, at least, not from their perspective. Secondly (and this may be subject to differing views), the fact that rated researchers rely more on Focus Area support is probably because they have greater freedom in the theme and design of their research than is possible in applying for support from THRIP or the Innovation Fund, which are significantly more directed in their parameters. Another aspect of this scenario is that the outputs of Focus Area-supported projects do not seem to have led to significant ‘impacts’ on the national challenges they were designed to address, since the research of most of the rated researchers (by definition of the rating system) has a more disciplinary focus, rather than being oriented towards national programmes. Without further evidence, suffice it to conclude that rated researchers prefer funding from sources that are the least directed and, according to feedback from group sessions, tend to feel frustrated at the restrictions on research orientation of the Focus Area programmes.

4 Output Performance

A cross-reference to the previous chapter is appropriate at this point in the context of the ‘impact’ of the NRF Rating System on disciplines. It will be recalled that Table 4.3 reported on the share of total production that rated researchers represent in the different knowledge fields. The shares ranged from 20% in the Social Sciences to 54% in Engineering. If the share of NRF-rated researchers among the top 100 most productive researchers is considered, the percentages increase significantly – Health Sciences: 26%, Social Sciences: 43%, Engineering: 76%, and Natural Sciences: 82%. The prominence of rated researchers in knowledge production in their disciplines can be interpreted as a meaningful impact of the NRF Rating System on the broad spectrum of disciplines represented by the four fields - and may suggest an effective way of increasing South Africa’s contribution to global production of research articles.

5 Opinions on the Influence of the NRF Rating System on Disciplines

This section deals with the question of whether the NRF Rating System has influenced the orientation of rated researchers towards disciplinary research in any way. Feedback from the
interviews and group discussions on the following aspects is briefly reported in the following sections, dealing with disciplinary and research focus, teaching and research at the interfaces, commonalities between disciplines as opposed to disciplinary uniqueness, recognition and sustainability of disciplines, and promotion of quality.

5.1 Disciplinary and research focus

There was a fair degree of consensus that the process of applying for a rating contributes both to sharpening the conceptualisation, formulation and implementation of the research as well as to the location of the focus within the discipline. Comments were made that the rating system served as a strong spotlight on a research proposal, with the consequence that considerable time was required to prepare a proposal to meet the demands of (mostly) unknown reviewers. The location of a research programme within the discipline is likewise put under the spotlight. This sentiment was shared among a not insignificant proportion of Social Scientists, including researchers in the Humanities. In short, the process of rating and the subsequent research promote clearer disciplinary demarcation and sharper focus. This consequence, which is perhaps unintended, should be considered a benefit of the rating system. The next section, however, deals with the negative aspects associated with this.

5.2 Research at the intersections of disciplines

A complaint (in fact, a criticism of the system) that was encountered in several interviews in different settings was that the NRF Rating System has not produced consistent results across fields of research. This applied especially to research fields that lie at the cross-sections of disciplines, are characterised by accelerated development and competition and are dependent on technological development. A good example would be biochemistry. Some rated researchers working in such fields, who received a lower rating than they had expected, are of the opinion that the evaluation process failed to do justice to the particular challenges to which their research is subject. Another piece of ‘evidence’ in this regard is the well-known observation that a number of prominent ‘interdisciplinarians’ would not apply for ratings for similar reasons. It was also argued by others that higher ratings were more probable in disciplines and research fields characterised by relatively few researchers, stepwise development and less competition.

This feedback seems in certain respects to relate to the challenge posed by Mode 2 and later versions of knowledge production and should not simply be brushed aside as dissonance reduction, since it touches on deeper systemic and related issues. It should become the subject of wider consultation between the NRF and ‘user groups’.
5.3 Commonalities between and uniqueness of disciplines

Using a wider angle lens to consider disciplinary and research focus, as well as prevailing attitudes towards these, brought into focus the commonality between disciplines across the spectrum. Members of both science domains commented on the fact that the Social Sciences and the Humanities confirmed their acceptance of and by the Natural Sciences by participating in the \textit{NRF Rating System}. (The effective way the Social Sciences and Humanities entered the rating system should not have come as a surprise, if the results of the 1995 analysis of the state of research in the human sciences by the HSRC were kept in mind. That comprehensive analysis concluded, among others, that the South African research compared favourably; cf. HSRC, 1995.) The participation of researchers from the Natural Sciences and the Social Sciences and Humanities in the same rating system did not, however, mean that the gross and subtle differences between the domains were overlooked. There is still scepticism in some quarters about the relevance of the \textit{NRF Rating System} to the Social Sciences and Humanities, but if the NRF provides the necessary insight into the nuances and more fundamental differences between disciplines and research approaches, the system could be expected to become even more firmly established – as was also argued with regard to applying the rating system to multi- and interdisciplinary research. In this regard, the \textit{NRF Rating System} has contributed to the recognition of commonalities and differences between disciplines, and this should stand R&D in good stead in South Africa.

5.4 Recognition and sustainability of disciplines and research fields

The main message, albeit with qualifications, on the influence of the \textit{NRF Rating System} has been that it at least indirectly promoted the standing of disciplines and research fields. The implied argument was more or less that the fact that international and national peers recognised the contributions of a researcher also implied that the particular discipline or research field was well established and developed. (This argument is, in fact, similar to that advanced by universities that use the number of ratings awarded to staff as a marketing strategy.) There is, of course, also direct ways in which ratings contribute to the image of disciplines, namely, in the form of postgraduate students, national and international collaboration, access to equipment and related research-linked requirements. If the rating system indeed contributes in this way to the development of disciplines, it should be scored as a positive contribution.

5.5 Promotion of quality

There was considerable consensus across the interviews with selected key role players and the group discussions that the \textit{NRF Rating System} had made a significant contribution to promoting, raising and maintaining research quality in the country and had thereby also raised the research quality of disciplines. In other words, the peer evaluation system as originally conceived and implemented, had institutionalised quality standards by establishing excellence as both the
criterion and the goal of research. This not only raised the overall quality of research but also the quality of research and teaching in the various disciplines, which in turn had a positive effect on the research standards aspired to, and generally attained, by rated researchers and those with whom they interact. If this had been the only achievement of the *NRF Rating System*, it would have been sufficient to pronounce the system a success. It should be added that in some of the meetings, doubts were raised as to whether the quality assurance function still pertains. In fact, on occasion, such doubts were expressed in rather strong terms. This issue will have to be considered carefully in future, depending, of course, on the outcomes of the current evaluation process.

6 **Special Cases?**

Finally, the past influence of the rating system on Engineering and the potential influence on Law should be touched on, since a possible parallel between the two was raised in the brief. Initially, a section of the Engineering community was concerned that the more applied nature of Engineering would disqualify it from full participation in the rating system. (It will be recalled that ratings were directly linked to funding in the early phase of the rating system.) More recently sections of the Humanities, especially some members of the legal research community, were concerned that their South African focus would put it at a disadvantage in terms of international recognition.

The issue was probed in the interviews and the quantitative analyses. Firstly, qualitative information indicates that the scepticism – even antagonism – has not been as universal as sometimes implied. In the case of Engineering, only sections of that community (read: schools) at the time opposed the introduction of the rating system, but what is often forgotten is the fact that there were also supporters of the system. Similarly in the case of Law, apart from voices of concern, strong views were on occasion expressed why Law would eventually benefit from participation in the *NRF Rating System*; the basis for support ranged from theoretical/methodological to financial strategic ones. The message is, it would seem, that opinions and expectations at the time of the introduction of the system in the early 1980s and more recently when the system was extended to the Social Sciences and Humanities in 2002 were more varied than what the collective memory would suggest.

Quantitative analyses provided limited information. Firstly, no comparative data for Engineering were available for the period before 1984, but information presented in Chapter 4 shows patterns – or ‘impacts’ - similar to those of the Natural and the Health Sciences. Secondly, the period covered by this evaluation, i.e. 2002 to 2006, was too short to interpret any eventual ‘before-after’ differences in an accountable way, unless ‘control groups’ were included in the analyses.

The conclusions are that it is a misconception that the Engineering community was en bloc opposed to the *NRF Rating System* and that its impact on Engineering has not really been
different from other science cultures, while the opinions in the Law community is also more multi-dimensional than initially thought.

7 CONCLUSIONS

It should be borne in mind that this chapter, and previous ones, deliberately explored only a relatively small part of the information gathered for the project, and not in much detail. The following conclusions are offered on the basis of the information presented in this chapter and against the background of this particular study, namely, “the social impact of the rating system, i.e. how the introduction of the rating system changed researchers’ attitudes to research and their focus within fields of research (...) the effect of the rating system on attitudes to undertaking research (...) and the transformation of universities into research intensive institutions.” The following conclusions can be justified on the basis of the information presented in this chapter:

- There is a hint of tension between the rationale underpinning the rating system, namely quality research irrespective of other considerations, and NRF funding sources that encourage strategic science (Rip) to address national challenges. The Focus Area programmes are the main source of NRF funding for rated researchers, and some researchers felt uncomfortable about having to adjust their projects to suit the requirements of those programmes.

- There is agreement that the rating system has, in the past, contributed to sharpening a disciplinary focus in the Natural Sciences through the required concentrated focus on a topic, the quality criterion, international benchmarking and related criteria. It could be speculated that should the rating system continue, a similar dynamic might become influential.

- The Social Sciences and Humanities have started their participation in the rating system in a prominent way, given that they comprise some 31% of all NRF-rated researchers.

- A perception exists that the rating system is biased in favour of researchers working in narrowly focused disciplines as opposed to researchers that are involved in multi- and interdisciplinary research projects, working mostly in teams. It seems that a not insignificant number of dedicated researchers are currently frustrated with the NRF Rating System and are even considering allowing their ratings to lapse.

- In summary, the NRF Rating System has positively influenced research and the standing of disciplines in South Africa, particularly, but not exclusively, through insistence on the criterion of quality and international benchmarking. The rating system can be expected to continue to have this type of positive impact if the weaknesses and dysfunctions of the current version of the system can be fundamentally addressed.
CHAPTER 6

INSTITUTIONAL AND COMMUNITY EFFECTS

Higher education institutions (HEIs) have a mandate for teaching, research and community development. The funding provided by the NRF is intended to support the research mission of the HEIs.

As such, research support and funding programmes form an integral part of the national R&D system, which is characterised by a complex and dynamic network of subsystems and inter-institutional relationships. As indicated in Chapter 2 (based on a scan of NRF policy and procedure documents), the role players involved in the early years of the rating system made it very clear in personal interviews that one of the primary reasons for the development of the rating system was the need to systematise the positions, roles and functions of the Department of Education, research funding agencies (the CSIR at that stage) and higher education institutions in the process of supporting quality research and researchers. It follows that assessing the ‘impact’ of such a system on researchers and disciplines has to account for its influence also on the institutions themselves and the community of research workers. The design of this study consequently included, albeit as a secondary objective, an exploration of the influence of the NRF Rating System on institutions and the community of researchers itself. This chapter represents a scan of the subject only, since one of the projects in this evaluation programme focused primarily on the ‘impact’ at institutional level, namely Formal and informal use of the rating system over time by various institutions.

Although the differentiation of the roles of HEIs and the merging of institutions make it difficult to generalise across institutions (and time), it became apparent that HEIs use the NRF Rating System for purposes for which it was not originally designed. This ‘impact’ on HEIs is acknowledged by the NRF (2007) and seems to have become entrenched practice at a substantial number of HEIs, particularly research-intensive institutions.

The internal and external ‘impacts’ of the NRF Rating System on institutions are covered separately.

1 INTERNAL ‘IMPACT’

A wide range of internal effects of the NRF Rating System are known in the research sector and were reconfirmed in the interviews and group discussions. The following paragraphs briefly discuss several of these issues, namely: policy, strategies and structure (with respect to R&D, marketing and human resource management), financial effects and the influence of the knowledge production divide.
1.1 Policy, strategies and structure

Even a relatively superficial scan of the way in which most universities approach their research mission would show that the *NRF Rating System* has had far-reaching effects on such institutions. These influences include policies on the promotion of R&D, the structuring of the research management and administration function, and the use of the rating system as a guide for career development and even performance evaluation. A quote by a senior member of the executive of a university put it this way: “The *NRF Rating System* served as a strategic map for us to establish this institution as a research university.” These functions are folded into one in the administration of applications for ratings. Most universities screen applications to promote a high success rate and to mediate the potential negative impact of the *NRF Rating System* on researchers.

The influences of the rating system reach beyond the research function to those in human resource management and marketing. As regards the impact of the *NRF Rating System* on human resource management, a single example should suffice. Institutions use the NRF-administered peer-evaluation of research performance as a proxy for the quality of work by staff. The system thus impacts on the appointment and promotion of staff. The negative aspect of this practice is that academics that would not subject themselves to NRF evaluation may be at a disadvantage as regards promotion and similar considerations, other things being equal.

It has already been indicated in an earlier chapter that this unintended effect of the rating system on universities has a negative aspect. In group discussions, it was claimed several times that universities misuse the ratings of their research staff to promote the university. Participants doubted whether the university would be willing to oppose the rating system at the risk of losing this marketing edge. One of the participants summarised this feeling very strongly by claiming that he/she felt misused and even violated, since participation in the rating system meant considerable effort without immediate financial reward. HEIs use the ratings to showcase the research achievement of their academic staff and to promote a research culture on campus. In many instances, institutions provide monetary incentives to researchers that have attained, maintained or improved their ratings. This means the institution has to spend money in the form of incentives in order to increase the possibility of being awarded research grants.

1.2 Financial effects

Ratings impact on the funding security of institutions, albeit to a limited extent. “More than 65% of funds awarded in 2005 in the NRF’s Focus Area programmes and capacity development programmes went to rated researchers” (NRF 2007: 25). The most recent amounts (across all NRF funding programmes) for 2007 are reflected in Table 6.1 per rating category. The mean grant size per category is dealt with elsewhere in this report and the following observations have relevance for the interinstitutional dimension of the rating system.
Table 6.1: NRF funds allocated to rated researchers (Call year 2007)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Number</th>
<th>Awards for 2007</th>
<th>Mean per researcher</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>20</td>
<td>R 25 113 152</td>
<td>R 1 255 657</td>
</tr>
<tr>
<td>B</td>
<td>134</td>
<td>R 104 292 479</td>
<td>R 778 302</td>
</tr>
<tr>
<td>C</td>
<td>270</td>
<td>R 138 500 739</td>
<td>R 512 965</td>
</tr>
<tr>
<td>P</td>
<td>6</td>
<td>R 3 023 950</td>
<td>R 503 991</td>
</tr>
<tr>
<td>Y</td>
<td>73</td>
<td>R 23 611 953</td>
<td>R 323 451</td>
</tr>
<tr>
<td>L</td>
<td>24</td>
<td>R 11 663 470</td>
<td>R 485 977</td>
</tr>
<tr>
<td>Total</td>
<td>527</td>
<td>R 306 205 743</td>
<td><strong>R 581 035</strong></td>
</tr>
</tbody>
</table>

(Source: Information kindly made available by the NRF.)

To the amount listed in Table 6.1 should be added amounts brought forward from the previous years to give a grand total of approximately R330million awarded to rated researchers who are mostly attached to universities.

An aspect that deserves a comment here is the following: The amount of R330million is a relatively small one by OECD-type standards, but a not insignificant amount by South African standards. In this regard reference can be made to, for instance, the report by the R&D survey namely that government funding to R&D at universities amounted to approximately R1,610million (out of total of R2,534million) in 2004/2005 (DST 2006: 23; also see NACI, 2006). This amount shows the NRF to be a modest role player in the funding of research in the higher education sector, given the strong third stream funding flowing into universities. It has become, however, an essential part of university research funding – not the least for the fact of credible peer evaluation attached to such funding.

Focussing on the relationship between the number of rated researchers per university and the amount of NRF funds (Innovation Fund excluded) allocated to each university yields interesting patterns. Inspection of Figure 6.1 which was kindly made available by Von Gruenewaldt, shows the following facts relevant to the present study:

- There is quite a strong positive association between number of rated researchers and NRF funding of universities.

- Universities such as UWC, UNW, UKZN and US are successful in leveraging substantially more per rated researcher than other universities.

- The ratio between number of rated researchers and funding leveraged from the NRF is not a simple function of the size of the university.
Although this project did not provide time for a comparative study of best practices, it would add to the understanding of the contribution of NRF funding in general and the leveraging thereof through rated researchers in particular.

1.3 Knowledge production divide

While the institutional impacts are very real and clearly value-adding, the NRF Rating System in certain respects – and despite strategies to the contrary – exacerbates the divide between previously advantaged and disadvantaged institutions and researchers. The science system, with its emphasis on scholarly merit, is not typically democratic in its intentions (Marais 2000). The NRF Rating System is a relatively sharp instrument for promoting merit and quality, irrespective of other considerations. One participant in a group discussion summarised the effects of this point as follows: “The system should be continued, but the question should be asked whether it does not further entrench institutional inequalities?” Disadvantaged institutions, in particular, do not have the infrastructure and resources to support their researchers to the same extent as advantaged institutions. As a participant at a historically disadvantaged institution stated: “We will never catch up; in fact we are slipping back!” This is borne out by the fact that only one previously disadvantaged university is listed among the top ten universities with respect to rated staff. In 2002, the historically disadvantaged universities accounted for only 108 rated scientists (or 8.6% of the total at the time). (Of course, this argument is not meant to equate the race of the researcher with the current status of any institution.)

However, the situation is probably more complex than these figures would suggest, as the data in the following table show that a statistic that accounts for the size of a university, presents a picture that differs from simple rating-counting. Table 6.2 of the NRF most recent Facts &
Figures - 2007 shows the ranking of the top ten universities if the ratio between number of rated researchers and the size of the instruction and research staff is taken as point of departure. The rank-order of universities is (percentage rated to instruction/research staff is given between brackets): UCT (31.6%), US (26.9%), U Wits (16.9%), Rhodes U (15.4%), UWC (14%), UFS (11.6%), UP (11.2%), NWU (11.1%), UKZN (10.5%), and NMMU.

Table 6.2: Rank-order of universities (above mean) on the basis of the ratio between number of rated researchers and total instruction/research staff (2005)

<table>
<thead>
<tr>
<th>Rank (1)</th>
<th>Institution (2)</th>
<th>Σ rated (3)</th>
<th>Σ staff (4)</th>
<th>% Col. 2/col. 3 (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>UCT</td>
<td>262</td>
<td>829</td>
<td>31.6</td>
</tr>
<tr>
<td>2</td>
<td>US</td>
<td>220</td>
<td>818</td>
<td>26.9</td>
</tr>
<tr>
<td>3</td>
<td>U Wits</td>
<td>161</td>
<td>952</td>
<td>16.9</td>
</tr>
<tr>
<td>4</td>
<td>Rhodes U</td>
<td>47</td>
<td>306</td>
<td>15.4</td>
</tr>
<tr>
<td>5</td>
<td>UWC</td>
<td>65</td>
<td>465</td>
<td>14.0</td>
</tr>
<tr>
<td>6</td>
<td>UFS</td>
<td>72</td>
<td>620</td>
<td>11.6</td>
</tr>
<tr>
<td>7</td>
<td>UP</td>
<td>177</td>
<td>1 575</td>
<td>11.2</td>
</tr>
<tr>
<td>8</td>
<td>NWU</td>
<td>85</td>
<td>769</td>
<td>11.1</td>
</tr>
<tr>
<td>9</td>
<td>UKZN</td>
<td>152</td>
<td>1 448</td>
<td>10.5</td>
</tr>
<tr>
<td>National totals (cols 2 &amp; 3) &amp; mean (5)</td>
<td>1 501</td>
<td>13 315</td>
<td>9.8</td>
<td></td>
</tr>
</tbody>
</table>

Source: NRF 2007: Table 2, 5

Table 6.2 contains interesting information with regard to the proportion of rated researchers, the most important for the moment being the following:

- The proportion of rated researchers is not primarily a function of the size of the university.
- It seems to be moderately related to proximity to an industrial centre.
- It is likely that active steering of research through a research strategy aligned to the evaluation and rating system does contribute to success, since practically all these institutions according to, inter alia, self-reports used the system to steer research in those institutions.
- Classification of being historically disadvantaged is not for all institutions a barrier to competition with historically advantaged institutions as the fifth position of the University of Western Cape indicates.
Not reported in Table 6.2 is the fact that four historically disadvantaged universities occupied the last five positions with a total of 30 rated researchers of the pre-merged universities.

The foregoing analysis does not deny the fact that the number of black rated researchers has grown over the past few years from 8% of all rated researchers in 2002 to 12.8% in 2006; in absolute terms, the numbers have doubled over the same period, from 101 to 205. (The following may serve as a comparison without implying that established universities have not drawn a considerable number of strong black researchers: the university with the largest number of rated researchers has 262 rated researchers on their staff, which represents 32% of its instruction/research professionals). The relatively small proportion of black NRF-rated researchers as a percentage of the total number, however, shows that the road to becoming a research university is long.

2 EXTERNAL IMPACT

The forms and levels of external impact that are briefly dealt with in the following paragraphs relate to the relationships between institutions in the national system of innovation, inter-institutional and international networking, and perceptions of the NRF itself.

2.1 Inter-institutional relationships

The external impact of the NRF Rating System is evident from the fact that ratings are one of the inputs for determining the relative standing of an institution within the higher education landscape. The number of rated researchers at a specific institution identifies the research environments where South African research competency is strengthening or weakening. Also, the results of recent direct or indirect rankings of South African universities correlate strongly with a simple ranking of universities in terms of the number of NRF-rated researchers. The ‘impact’ of the rating system at institutional level already manifests itself to the extent that the ratings can serve as a proxy for the research performance of an institution. This point does not require elaboration here, since it has already been addressed several times in this review.

2.2 Networking

In the group discussions, a number of researchers mentioned that serving on a panel or assisting the NRF in a related way was a value-adding experience, affording insight into the system and its operation, and introduced one to new colleagues and the staff of the NRF. The impression was that many researchers that had become involved in this way benefited from expanding their understanding of this environment, including the people and systems involved in its
administration. However, the negative aspect of the process is the amount of extra *pro bono* work involved. The management of this process requires the attention of the NRF.

Another ‘impact’ that should be mentioned here, although it could also be described as a community effect, is the exposure of South African science to referees abroad. From time to time reviewers, not on the original list of the applicant, would comment on the ‘discovery’ of research they were not aware of previously and that they would in future refer to in their own research.

### 2.3 Image of the NRF

An aspect that was raised in several meetings and that deserves attention in this section is the issue of perceptions of the NRF as organisation itself. Comments and discussion such as: “over-bureaucratising”, “ineffective and inappropriate communication from middle management staff” “they direct the orchestra”, “rapid expansion of (relatively inexperienced) staff”, and the like conveyed negative perceptions. However, it should also be noted that there were voices of high appreciation for the NRF and its senior staff. It seemed that these perceptions and opinions of the NRF correlated modestly and positively with the experiences of respondents, with satisfactory ratings being associated with mild to strong appreciation and disappointing outcomes with modest to relatively strong criticism. The conclusion, however, is that the rating system had not left the NRF and its image untouched, and that this aspect would have to be accounted for in future.

### 3 Research community

At a social systemic level, the *NRF Rating System* influences the research community in a variety of ways, one of which is briefly discussed below, namely, the composition of the research community.

An analysis of the demographic profiles of rated researchers suggests that it is a self-perpetuating system favouring white males. Statistics have already been presented on the race profile, namely that white researchers represent some 87% of the rated cohort and black researchers a mere 12.8%. The gender distribution is less skewed than the racial distribution, since approximately 25% of the rated researchers are women, most of whom are white. This figure is not surprising if it is remembered that the distribution of women in academia is distorted in that they are well represented at teaching levels but under-represented in institutional management (NACI 2005).

The age distribution of rated researchers is also skewed, as can be seen in Figure 6.2, which highlights several strategically important dimensions, two of which are touched on here.
The age cohort of 30-39 year olds represents less than 12% of the total rated population, while the 60+ group represents slightly less than 20%. This is yet another confirmation of the accusation that the system promotes whites (mostly male, as already noted) and that there is very conservative provision for succession at a systemic level. The point of gravity lies between 40 and 59 years.

**Figure 6.2: Age distribution of rated researchers (2006)**

- The L, P and Y categories represent 262 rated researchers (or approximately 15% of all rated researchers). While the main focus of the NRF Rating System is the peer-evaluation of research outputs, it would preclude young researchers and researchers that had interrupted their research careers were it not for the introduction of the Y- and the L-rating categories. This seems to be a valid way of utilising the rating system for capacity building.

- The largest number of A-rated researchers, namely 29, can be found in the age cohort of 60+. (This is very often the group that becomes the victims of the rationalisation of institutions.) In contrast, there are only seven A-rated researchers in the age group 40-49. It might be worth pursuing the relationship between what Rauber and Ursprung (2006) in their study of German academic economists, called career age and vintage further.

The foregoing scan of selected demographic characteristics of the research community is contextualised by bearing in mind that rated researchers represent approximately 10% of the academic staff in the country, as shown in Chapter 4. In that chapter, it was further concluded that this group accounted for a disproportionate percentage of the most productive section of the productive output component of the research community. The NRF may consider this situation to
require effort to create better balance in the research community by developing appropriate and dedicated instruments.

3.1 Discussion

More aspects could have been dealt with under the heading of research community, such as the position of professional associations with regard to the ‘impact’ of the NRF Rating System. However, this was not the primary focus of the brief and it was decided to focus on the composition of the research community only with respect to showing the contribution that the NRF Rating System has made to its composition. Statistics such as the above confront the observer with the realisation that an important systemic intervention such as the rating system can influence even structural aspects of the environment in which it operates. This is not to say that the rating system has been the sole, or even main, contributor to the general shape of the research community, but it is clear that it has at least reinforced certain characteristics of that community.

The NRF and its stakeholders have the responsibility for considering influences such as this one. In the meantime, effects such as the demographic shape of the research community confront the NRF with a real dilemma, namely, the extent to which it should modify the nature and dynamics of an instrument, such as the rating system, to attain ends other than research excellence, such as capacity building and corrective action. One of the recurring themes of this investigation has been that the ways in which the NRF Rating System has been amended over time so as to focus not only on the promotion and reward of research excellence, but also to act as instrument for capacity development may ultimately have been counterproductive. The implications of this observation, coming from different quarters as they have been, should be factored into future planning.

4 Conclusions

The following high level conclusions flow from this chapter:

- The NRF Rating System has become a frame of reference for institutions in developing their internal policies and structures around research development; this is a significant ‘impact’ in its own right. There is reason to expect that institutions would adopt changes to the current system with the same pragmatic approach.

- It is further clear that the ‘impacts’ at institutional level are not necessarily all functional. In this regard, the unintended contribution of the NRF Rating System to widening the knowledge production divide is a case in point. While it should be added that this
observation does not invalidate the original intention of the system – there is agreement that it has done much to strengthen the research performance of the country – it does follow that the NRF should have a clear picture of the entire research system when assessing current needs and planning future courses of action.

- On balance, the ‘impact’ of the NRF Rating System has been positive, although researchers have experienced certain dysfunctions. Such dysfunctions that developed within the rating system over time could perhaps be attributed, on the one hand, to misunderstanding on the part of policy makers, administrators and researchers of the context and underlying rationale for an instrument such as the rating system, and on the other hand, to insufficient consideration of the requirements for meeting the needs of imperatives such as capacity building.
CHAPTER 7

SYNTHESIS, RECOMMENDATIONS AND PRINCIPLES

This chapter offers, firstly, a review of the main findings of this evaluation of the ‘impact’ of the NRF Rating System primarily at the levels of the attitudes of individual researchers, their output and disciplines and, at a secondary level, also at the institutional and community levels – in short, a review of chapters 3-6. The findings should obviously be seen within the context of the design of the study, and the relevant qualifying conditions are briefly alluded to next. Thirdly, a provisional synthesis of the findings is offered. Fourthly, a limited set of recommendations is developed, but not extensively motivated, on the basis of the above conclusions. The chapter concludes with a set of fundamental principles that are aligned with the findings and recommendations and that are offered as principles that should ideally be observed in considering any changes to the research promotion and support strategy of the NRF.

1 DESIGN OF THE EVALUATION STUDY

The design of this evaluation study was based on deliberately chosen respondents and information sources in a way that would ensure reliable, valid and balanced information to allow a fair evaluation of the NRF Rating System. The engagement with the sources of information was also done in a way that would generate fair representation of all perspectives. This essentially qualitative approach led to findings that the author believes to be representative of the effects of the rating system to date, although technically the results cannot claim to be generalisable, in a statistical sense, to the research sector in its entirety. Since the study was not designed to prove any causal relationships implied by the concept of ‘impact’, that term was loosely used to denote effect, influence, association, co-variance and the like.

2 MAIN FINDINGS

A summary of a small set of high level main findings is offered in this section. These findings represent the summaries – without elaborating on the motivation for these findings – of triangulated results (i.e. those that were corroborated from more than one source of information, including interviews, group discussions, data analysis, reports and publications). There may not always be a clear link between the findings reported here and any particular result reported in chapters 3-6.

2.1 Cross-cutting findings

2.1.1 The NRF Rating System was developed and implemented during a period when the primary approach to knowledge production – certainly in South Africa and largely
elsewhere – still complied with Mode 1 as described by Gibbons. As will be recalled, Mode 1 was characterised by fundamental (rather than strategic and applied) research, monodisciplinarity (rather than multi- and interdisciplinarity), scientific (rather than socio-economic) relevance, knowledge production (rather than development), intra-institutional (rather than inter-institutional), individual-centred (rather than collaborative) expertise. Since 1984, when the NRF Rating System was developed and introduced, South Africa has settled firmly into Mode 2 knowledge production and in a certain sense re-interpreted the characteristics of this mode even further from Mode 1 to what might perhaps be called Mode 3, namely, socio-economic relevance at all costs. The key question is whether the NRF Rating System has remained fully synchronised with these paradigm shifts – or indeed whether other NRF instruments should have fulfilled that need. The conclusion is that the NRF Rating System has not quite done so, but that other instruments such as the Focus Area Programmes and the Innovation Fund were actually developed to fulfil those needs.

2.1.2 There seems to be a duality in the perceptions of the NRF Rating System, more particularly distinctions between publicly expressed and privately held attitudes towards the system. This duality manifests itself at the public level of support for the NRF Rating System, ranging from cautious approval and appreciation, to strong acceptance and promotion. At the private level, opinions ranging from neutral to very negative are often encountered. This duality can often be observed between individuals and sometimes even within an individual. Interpreting this finding obviously requires ‘informed perceptiveness’ in decoding communication on the NRF Rating System, not least in reading the present report and its set of high-level findings.

2.2 ‘Impact’ of the NRF Rating System on the researcher as individual

2.2.1 Most researchers still publicly support the NRF Rating System, although a small but growing proportion of the research community is shifting its position. The views of those that are positive about the system range from strong support for the system (mostly from highly rated researchers) to mild agreement with it. The views of those that are negative about the system range from moderate scepticism about the value of the system to what one respondent called ‘intense’ disillusionment. The negative side of the scale is populated by a varied set of researchers, including those who received ratings significantly lower than they thought they deserved, as well as researchers that are satisfied with their ratings but who are not dependent on what some described as the ‘negligible’ funding provided by the NRF. An amber light – if it has not already turned red – is the growing number of rated researchers that have allowed their ratings to lapse over the past year or two.
2.2.2 An ambivalent ‘impact’ of the *NRF Rating System* is the mediating function played by an institution’s strategic position *vis-à-vis* the NRF in general and the rating system in particular. In certain respects, continued support for the *NRF Rating System* seems to be a function of the corporate policy position of the employer institution, in the sense that alignment between the institution’s policies and the *NRF Rating System* tends to reinforce researchers’ support for the system. An implication of this finding is that, at least to a certain extent, the NRF is dependent upon institutional support for the continuation of its rating system in its current form.

2.2.3 The qualitative information gathered in this study indicates that the rating system mostly has a positive influence on the researcher’s self-image and orientation towards research, which is known as the social comparison process in social psychology. This process manifests itself at three levels at least. Firstly, the ‘confrontation’ with self-assessment often seems to have both a sobering and stimulating affect in helping the researcher to see himself/herself as others would see him/her. Secondly, most researchers reported that going through the rating process – from application to feedback on the outcome – was instrumental in mapping a career path by assisting them to choose between essential and peripheral options along the road of development. Thirdly, and closely related to the above, is the observation that participation in the rating system has increased mobility options for researchers by broadening the career options for many. The obverse would, of course, also hold true for unsuccessful researchers, especially when the feedback has been of the ‘return to sender’ type, although the latter type of feedback tends to be minimal, as feedback to unsuccessful applicants is generally constructive.

2.2.4 One of the most problematic challenges of this evaluation project has been to determine ‘impacts’ on research output and outcomes. (It could, for instance, be argued that individuals received their ratings in recognition of their output records, rather than that the ratings themselves ‘caused’ the quantity and quality of outputs.) Acknowledging reciprocal causation as inseparable from this problem, the following higher order finding are justified by the objective and subjective information generated in this study: The information offered in earlier chapters indicates that quantity and quality of research outputs are positively related to participation in the *NRF Rating System*. Nevertheless, the association (both objective and subjective) between participation in the *NRF Rating System* and outputs serves as confirmation of the value of the system whereby individual researchers are rated – given that the system has been in use in South Africa for almost the last quarter century.
2.3 ‘Impact’ of the *NRF Rating System* at the level of disciplines

2.3.1 Qualitative information indicates that the *NRF Rating System* has ‘impacted’ positively on promoting the commonalities between science cultures and research traditions, without denying the real differences between them. Notwithstanding scepticism and even resistance from several individuals and sections of a number of disciplines, almost all disciplines are represented in the pool of applications and approved applications. Engineering researchers are particularly prominent in the more recent quantitative information, despite their resistance to participate during the early years of the system. In this study, researchers in the Social Sciences and Humanities showed qualitative and quantitative signs of relative openness to availing themselves of the potential opportunities offered by the *NRF Rating System*.

2.3.2 The above cautiously stated positive finding should, however, be qualified by the challenge posed by certain multi- and interdisciplinary fields of knowledge production. In this regard, researchers in knowledge fields and research programmes characterised by attributes such as accelerated and comprehensive development of the stock of knowledge, dependence on sophisticated measurement technology, strategic orientation, and a track record of national and international collaborative research – in other words, closely approximating Mode 2 knowledge production – seem ‘frustrated’, ‘disillusioned’ and ‘no longer supportive of the system’. It would not be far-fetched to expect that this attitude might also surface in other research fields with similar characteristics. (It should be noted that researchers in such fields argue that their ratings are lower than what they merit, but this argument says nothing about output patterns.)

2.3.3 Mobility between disciplines straddles the individual and disciplinary levels of analysis, depending on one’s perspective. The qualitative information suggested fairly strongly that the *NRF Rating System* inhibits mobility between disciplines, on the one hand, and the promotion of new fields of knowledge production, on the other. This is not surprising, given the definitions and criteria of the different rating categories listed in Chapter 2. The common denominator in those criteria is specialisation and accumulated achievement in a particular discipline. Transfer to another discipline usually implies that the individual has to build a new research career in that field, with all the associated consequences. Related to this point is the often-reported perception that the system discriminates against researchers from abroad who want to establish themselves in South Africa. Some reviewers and panel members apparently believe that foreign researchers should first prove themselves in the local context.
2.4 'Impact’ of the *NRF Rating System* on institutions

This aspect of the study has not been fully explored, since it forms the central focus of another project in the evaluation programme, but the following three variants of the same finding represented a recurring theme in most of the interviews and group discussions:

2.4.1 Most universities, at least those with an established research record, have adopted the underlying rationale for, and in many case the criteria of, the *NRF Rating System* in their own policies and strategies for capacity development, career path building, and research, development and innovation. This represents a significant impact of the rating system.

2.4.2 Most institutions accept an individual researcher’s rating as a reliable and valid indicator of his/her research ‘value’ and use it, directly or indirectly, in one or more of the following ways: promotions, once-off bonuses, appointments, and awarding of internal research and related grants.

2.4.3 The number and levels of rated researchers at an institution have strategic marketing advantage and are used in a range of strategic communications, ranging from recruiting students to raising third-stream funding.

These and related institutional functions for which the *NRF Rating System* is used have at least two important consequences, both intentional and unintentional. Institutions run the risk of losing sight of the original rationale for the *NRF Rating System*, namely, as a form of individual evaluation and public support for research. In this way, institutions may promote the rating system despite the negative view of the system among important sections of its research community.

2.5 Challenges facing the *NRF Rating System*

2.5.1 One of the key challenges facing the continuation of the rating system has been the delinking of rating-linked funding from the rating itself. After the final delinking in 1998, rated researchers were left with acknowledgement of their status by the South African peer group, varying benefits granted by their home institution and relatively smaller benefits, such as five-year funding cycles, from NRF programmes, which were dependent on success with separate applications from the application for a rating. Participation in the rating system comes at a bureaucratic cost that some researchers do not consider to be worth the effort. The institutions to which rated researchers are affiliated, however, benefit from the marketing value of rated researchers.
2.5.2 Apparent inconsistencies within the rating system, albeit at the anecdotal level (in which the researcher’s eventual rating was different from what he/she had expected), as well as between different NRF funding instruments (for example, the award of a research chair to a non A-rated scientist and vice versa) raise doubts about the integrity of the system. Another inconsistency experienced by some researchers is the return (in the form of the rating itself and financial benefits) on the investment (in the form of the risk of a disappointing rating, and the elaborate and time-consuming application procedures).

2.5.3 Questions were raised by supporters and opponents of the rating system alike about the credibility of some aspects of the NRF’s administration of funding programmes in general, although it was not always clear which programme reference was made. Nevertheless, comments ranged from the selection of reviewers and panels to vulnerable online systems. On the same topic, there was also specific and genuine appreciation for “sterling professional work” over the years by senior and management staff at the NRF.

3 Recommendations

3.1 The balance of evidence favours the continuation of the NRF Rating System, albeit in a revised form in which the following dimensions have to be accounted for:

3.1.1 Re-linking the rating to direct funding

3.1.2 Linking ratings to the approval of a satisfactory research plan

3.1.3 Revalidation of evaluation criteria, rationalisation of application procedures and reconsideration of the procedures for rating renewals.

3.2 Should the NRF decide in principle to retain the rating system, albeit in a revised form as recommended in 3.1 above, it should implement any revised system only after consultation with the full range of its stakeholders.

3.3 Upon approval of the outcomes of the present evaluation project and before implementing any strategy, it would be necessary to decide on an implementation monitoring plan and instrument(s), including the indicators to be used.

3.4 Conceptual and operational distinction should be made at a strategic level between the appropriate initiatives and incentives required to address the range of issues in the NRF mandate, ranging from research and institutional capacity development to promoting research excellence in a global environment.

3.5 The NRF should ensure that there is sufficient congruence, firstly, among its own initiatives and incentives (including the rating system), and secondly, with other national research and human capital development schemes.
3.6 The NRF, being at the nexus of diverse information and knowledge sources on research systems and performance, should establish a corporate objective to ensure the systematic and accessible storage of relevant information sets for strategic management (for example, on advanced human capital development, research output and interdisciplinarity of projects).

3.7 In the course of this study – and probably in the other studies of this evaluation programme – a number of important issues surfaced that require further probing and it is recommended that they be investigated.

4 PRINCIPLES

This study generated a wealth of facts and perceptions about the past, present and future of the NRF Rating System. A logical next step would be to distil from this and other information a small set of fundamental principles that could be applied in charting the road ahead in the strategic development of a research promotion and support strategy. Each principle in the following proposed set can be related to the high-level findings, and the recommendations are consequently presented here without further elaboration:

4.1 Research project evaluation should always consider the researcher’s track record and the research plan/project.

4.2 The researcher and research should form the central focus of funding programmes, and other elements such as the institution, sponsors and funders should receive secondary weighting.

4.3 Striving for excellence presupposes professionalism in all dimensions of the adjudication process.

4.4 Any evaluation approach should comply with the principles of clarity of and fitness for purpose.

4.5 A system of research evaluation should comply with the principles of consistency and integrity in and between approaches, and should be applied with flexibility.

4.6 Economy and efficiency should serve as criteria for the development of all evaluation procedures.
SELECTED REFERENCES


CREST 2006. Human capital and the SA knowledgebase (confidential commissioned report to NACI). Stellenbosch: CREST


Department of Arts, Culture, Science and Technology. 1998a. Agency review of the FRD and CSD. Pretoria: DACST.

Department of Arts, Culture, Science and Technology (DACST). 1998b. The system-wide review of public sector science, engineering and technology institutions. Pretoria: DACST.


Department of Science and Technology. 2002. South Africa’s national R&D strategy. Pretoria: DST.

Department of Science and Technology. 2006. National survey of research and experimental development (R&D) 2004/05 fiscal year. High-level key results. Pretoria: DST.


NACI. A profile of postgraduate higher education and the academic research community in South Africa. A discussion document. Pretoria: NACI.


NRF. 2005b. Institutional Review of the National Research Foundation (NRF) .Pretoria: NRF


NRF. 2007(c). *Rating brochure. The evaluation and rating of the research performance of researchers in South Africa through the National Research Foundation*. Pretoria: NRF.

NRF Evaluation Centre. 2007. Policy and procedural decisions regarding the evaluation and rating (1984-2006). (Confidential document)


APPENDIX A

LIST OF ACRONYMS

CSD Centre for Science Development
CREST Centre for Research on Science and Technology
CSIR Council for Scientific and Industrial Research
DoE Department of Education
DST Department of Science and Technology
FRD Foundation for Research Development
HE Higher Education
HEI Higher Education Institutions
HEMIS Higher Education Management Information System
HESA Higher Education South Africa
HSRC Human Sciences Research Council
IDRC International Development Research Council
IF Innovation Fund
MRC Medical Research Council
MSSA Marketing Surveys and Statistical Analysis
NRF National Research Foundation
R&D Research and Development
RSA Republic of South Africa
RU Rhodes University
SAPSE South African post-secondary education
THRIP Technology and Human Resources for Industry Programme
UCT University of Cape Town
UKZN University of KwaZulu Natal
UNW University of North-West
UP University of Pretoria
US University of Stellenbosch
UWits University of the Witwatersrand
UWC University of the Western Cape
## APPENDIX B

**DEFINITIONS OF RATING CATEGORIES**

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
<th>Sub-category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Researchers who are unequivocally recognised by their peers as leading international scholars in their field for the high quality and impact of their recent research outputs.</td>
<td>A1</td>
<td>A researcher in this group is recognised by all reviewers as a leading scholar in his/her field internationally for the high quality and wide impact (i.e. beyond a narrow field of specialisation) of his/her recent research outputs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A2</td>
<td>A researcher in this group is recognised by the over-riding majority of reviewers as a leading scholar in his/her field internationally for the high quality and impact (either wide or confined) of his/her recent research outputs.</td>
</tr>
<tr>
<td>B</td>
<td>Researchers who enjoy considerable international recognition by their peers for the high quality and impact of their recent research outputs.</td>
<td>B1</td>
<td>All reviewers concur that the applicant enjoys considerable international recognition for the high quality and impact of his/her recent research outputs, with some of them indicating that he/she is a leading international scholar in the field.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B2</td>
<td>All or the overriding majority of reviewers are firmly convinced that the applicant enjoys considerable international recognition for the high quality and impact of his/her recent research outputs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B3</td>
<td>Most of the reviewers are convinced that the applicant enjoys considerable international recognition for the high quality and impact of his/her recent research outputs.</td>
</tr>
<tr>
<td>C</td>
<td>Established researchers with a sustained recent record of productivity in the field who are recognised by their peers as having:</td>
<td>C1</td>
<td>While all reviewers concur that the applicant is an established researcher (as described), some of them indicate that he/she already enjoys considerable international recognition for his/her high quality recent research outputs.</td>
</tr>
<tr>
<td></td>
<td>• Produced a body of quality work, the core of which has coherence and attests to ongoing engagement with the field</td>
<td>C2</td>
<td>All or the overriding majority of reviewers are firmly convinced that the applicant is an established researcher (as described).</td>
</tr>
<tr>
<td></td>
<td>• Demonstrated the ability to conceptualise problems and apply research methods to investigating them.</td>
<td>C3</td>
<td>Most of the reviewers concur that the applicant is an established researcher (as described).</td>
</tr>
<tr>
<td>P</td>
<td>Young researchers (normally younger than 35 years of age), who have held the doctorate or equivalent qualification for less than five years at the time of application and who, on the basis of exceptional potential demonstrated in their published doctoral work and/or their research outputs in their early post-doctoral careers, are considered likely to become future leaders in their field.</td>
<td></td>
<td>Researchers in this group are recognised by all or the over-riding majority of reviewers as having demonstrated the potential of becoming future leaders in their field, on the basis of exceptional research performance and output from their d.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>333302</td>
<td>Doctoral and/or early post-doctoral research careers.</td>
</tr>
<tr>
<td>Category</td>
<td>Definition</td>
<td>Sub-category</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Y</td>
<td>Young researchers (normally younger than 35 years of age), who have held the doctorate or equivalent qualification for less than five years at the time of application, and who are recognised as having the potential to establish themselves as researchers within a five-year period after evaluation, based on their performance and productivity as researchers during their doctoral studies and/or early post-doctoral careers.</td>
<td>Y1</td>
<td>A researcher in this group is recognised by all reviewers as having the potential (demonstrated by research products) to establish him/herself as a researcher with some of them indicating that he/she has the potential to become a future leader in his/her field. (Applicants on the borderline between P and Y should be rated at this level.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Y2</td>
<td>A researcher in this group is recognised by all or the over-riding majority of reviewers as having the potential to establish him/herself as a researcher (demonstrated by recent research products).</td>
</tr>
<tr>
<td>L</td>
<td>Persons (normally younger than 55 years) who were previously established as researchers or who previously demonstrated potential through their own research products, and who are considered capable of fully establishing or re-establishing themselves as researchers within a five-year period after evaluation. Candidates should be South African citizens or foreign nationals who have been resident in South Africa for five years, during which time they have been unable for practical reasons to realise their potential as researchers.</td>
<td></td>
<td>This category was introduced to draw an increased number of researchers with potential from disadvantaged backgrounds as well as women into research. It also caters for persons previously established as researchers who have returned to a research environment after periods in industry or elsewhere. Applicants must demonstrate that they could not realise the potential or sustain their research ability by virtue of a lack of a research environment, or time spent in industry, or on maternity leave, or raising a family. For candidates to qualify for this category the employing institution must have demonstrated its financial commitment towards a development strategy for the staff member concerned.</td>
</tr>
</tbody>
</table>

Candidates who are eligible in this category include:

- Black researchers
- Female researchers
- Those employed in a higher education institution that lacked a research environment
- Those who were previously established as researchers and have returned to a research environment.