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ORGANISATIONAL CULTURE, INDIVIDUAL VALUES AND RESEARCH PRODUCTIVITY

BY

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ABSTRACT

A South African university has obligations to societal stakeholders. One dimension of these obligations is research productivity. The extent to which these societal obligations can be met is a function of how innovative research outputs are, and of the extent to which constraints to research output, or productivity, are known, and can be managed. An extensive body of literature, including the Global Leadership and Organisational Behaviour Effectiveness (GLOBE) studies, have demonstrated the influence of organisational cultural values on organisational outcomes. Hofstede's cultural values research studies have also demonstrated the influence of societal cultural values on societal outcomes. However, despite this body of literature, there is a lack of knowledge of the influence of organisational culture on the research productivity of academic fields. This research attempts to address this lack of knowledge through a qualitative and a quantitative study of the relationships between organisational culture and research productivity. This analysis is undertaken at the level of the academic field, which is proxied in this study as the level of the academic school. A corresponding analysis is also undertaken at the individual level. The relationship between individual values and research productivity is also investigated, to provide a holistic perspective of the relationships between both organisational cultural, as well as individual values, and research productivity, differentiated by level of analysis. On the basis of the qualitative analysis, a model of context-specific individual-level factors is also derived, which are predicted to influence research productivity. A qualitative study of research-productive academics from the University of the Witwatersrand, the University of Cape Town, the University of Johannesburg, the University of South Africa and the University of KwaZulu-Natal was used to develop theory for testing quantitatively. The quantitative study, which sampled the University of the Witwatersrand, was used to test the theory and the propositions that were developed in the qualitative portion of the study. In the quantitative study, at the level of the academic school, relationships between organisational cultural values and research productivity predicted by GLOBE organisational cultural values theory were tested quantitatively. At the individual level, relationships between individual motivational values theory and research productivity that were predicted by Schwartz's values theory were also tested quantitatively. The model of factors that were predicted by the qualitative analysis to contribute to research productivity was also tested quantitatively. The

qualitative and quantitative results of the study are taken to support Kuhn's argument; that academic research outputs are not necessarily innovative, and do not necessarily represent innovative knowledge creation in this context. Findings also indicate that particular values configurations may constrain research productivity. Specifically, configurations of values associated with lower levels of innovativeness might constrain specific non-peer reviewed forms of research productivity. The results reveal a context dominated by a conflict between two societal needs, one associated with increasing enrolments of students that are not necessarily matched by infrastructure increases, or a process of massification, and the other associated with the need for more research productivity. The conflict between these two needs was found to correspond with differences between individuals that relate to the extent to which they derive their primary job satisfaction from research versus teaching. Teacher-satisfied individuals were found to be signficantly less research productive. On the basis of the research findings, recommendations are made to improve research productivity in this context. On the basis of these and other findings discussed in the main text of the thesis, recommendations for practice and for futher research are made. It is concluded that specific value configurations appear to constrain research productivity in this context and that individuals and the academic institutions for which they work need to take the potential effect of such value configurations into account in their management of research productivity.

CONTENT OVERVIEW

In order to guide the reader through the thesis, a content overview is provided here. Chapter 1, titled '*Introduction*', provides a background to the study, the research problem and the research questions. An overview of the theoretical framework of the study is provided, and certain theoretical tensions are fore-grounded in this chapter. The importance of differentiating the levels of analysis between the individual level and the level of the academic school is discussed. A justification for the choice of phenomena under study is provided. A background to, and a justification for, the methodological approach taken in the study is also provided. The research problem and research questions are outlined, together with the hypotheses. The rationale that relates to how the literature review is approached is also spelled out, following research precedent in this field. Linkages between the research topic, the literature review and the research questions and hypotheses are made explicit. A model of the research process is provided. The chapter concludes with an outline of the chapter sequence in the form of a breakdown of the content of the chapters of the thesis.

Chapter 2, titled '*Literature Review*', provides a review of the literature that relates to the relationships under study. In order to reconcile the two research traditions extended in this study (the qualitative and quantitative traditions of culture and values research), the work of Denison and other theorists is reviewed. Literature relating to the context of the study is reviewed. The literature review follows precedent in the field of cross-cultural research and culture research where literature is comprehensively reviewed because of the multitudinous, and multivariate, nature of the phenomena under investigation in this field. The development of the literature in the field is acknowledged; from Hofstede's societal cultural studies to the Global Leadership and Organisational Behaviour Effectiveness (GLOBE) studies that extended cultural values research to the organisational level of analysis. Similarly, Schwartz's values theory is also introduced as the dominant theoretical framework that relates to the individual-level relationships around values and research productivity as a form of job performance. Literature is also reviewed that relates to the individual-level factors predicted to be associated with research productivity as a form of job performance. The objective of the literature review is to locate the phenomena under study in relation to

previous research and extant theory and to explicitly identify the rationale behind the theoretical frameworks used and tested in this study.

Chapter 3, titled '*Research Methodology*', introduces methodological literature in order to justify the use of the methods applied in this study. The research is placed relative to the different research paradigms. The rationale behind the methods applied in the research is made explicit, with reference to the literature. The different analyses applied in the study are discussed, and are presented in table form. Issues relating to verification in qualitative research are discussed, particularly as they relate to truth value, applicability, consistency and neutrality. The qualitative and quantitative research designs are discussed. Issues relating to data collection and data analysis are considered. The specific statistical tests applied to test each of the hypotheses are explained, and the use of specific scale items is made explicit and justified in terms of previous research precedent.

Chapter 4, titled '*Grounded Research Findings'*, reports the findings that relate to the inductive grounded research process. Three different grounded analysis are considered in this chapter; relating to (i) the relationships between organisational culture of academic fields, or schools, and research productivity; (ii) the relationships between individual values of academics and research productivity; and (iii) the individual-level context-specific factors (termed 'performance factors') that contribute to research productivity of academics. The latter analysis provides a model that forms the rationale for the inclusion of variables to be tested in the quantitative portion of the research. Propositions derived from this analysis form the basis for the development of quantitative hypotheses.

Chapter 5, titled '*Quantitative Findings*', reports the results of the quantitative testing process. The results of the univariate, bivariate and multivariate testing processes are reported. The results of the testing of hypotheses are reported that relate to (i) the testing of predictions of GLOBE theory with regard to the relationships between organisational culture and research productivity, (ii) the testing of predictions of Schwartz's values theory with regard to the relationships between individual values and research productivity; and (iii) the testing of the relationships between individual-level factors and research productivity. Tables are provided that report the outcome of the testing of the hypotheses.

Chapter 6, titled '*Discussion of the Findings*', provides a discussion of the results of the study that relates to (i) the relationships between organisational culture at the level of the academic

field, or school, and research productivity; (ii) the relationships between individual values and individual research productivity; and (iii) the relationships between individual-level factors and individual research productivity. These findings are brought into focus in this chapter and this analysis provides the basis for the summary and recommendations offered in the final chapter.

Chapter 7 is titled '*Conclusions and Recommendations*'. In this chapter, a summary of the research is threaded together. The objectives of this chapter are to (i) summarise the research reported and discussed; (ii) offer a discussion of the implications of the research findings for theory and practice; and (iii) to make recommendations. The research questions and the hypotheses of the research are revisited in this chapter. The research questions are answered in summary, and conclusions are derived. The thesis is concluded with the presentation of five primary conclusions that represent the outcome of the research process.

DECLARATION

I hereby declare that this thesis is my own, unaided work. It is being submitted in fulfilment of the requirements for the degree of Doctor of Philosophy in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree of examination in any other university.

_____

CHRISTIAN WILLIAM CALLAGHAN

Signed on this the _____ day of _____, 2013

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LIST OF ACRONYMS

GLOBE	Global Leadership and Organisational Behaviour Effectiveness Studies
IBSS	International Bibliography of the Social Sciences
ISI	Institute for Scientific Information
NA	Negative Affectivity
NRF	National Research Foundation
PA	Positive Affectivity

ALPHA INDEX TABLE

The brief definitions of certain concepts/theories are provided as follows.

ACTIVATION THEORY

Scott (1966:11) defines activation as "the degree of excitation of the brain stem reticular formation". The "degree of activation of an organism is a major variable in a wide range of behaviour processes" according to Scott (1966:11). Activation theory is a theory that predicts that task performance is related to the degree of activation an individual experiences while engaged in a task (Scott, 1996).

CONVERGENCE THEORY

Convergence theory is a theory that predicts that, over time, practices and values will converge, or become the same across different contexts (Kerr, Dunlop, Harbison & Myers, 1960).

CULTURE

This study defines culture as "shared understandings made manifest in act and artefact" as acknowledged by Triandis (2004:xv). This is "consistent with the definition used by the GLOBE research project, which examines culture as practices and values", where practices "are acts or 'the way things are done in this culture', and values are artefacts because they are human made and, in this specific case, are judgements about 'the way things should be done'" (Triandis, 2004:xv).

CULTURE THEORY

Culture theory is taken to represent Hofstede's (1980) culture theory, which predicts that cultural values will be expected to differ between groups; and that the context-specific nature of culture is antithetical to convergence. This theory is also taken to represent the culmination of changes in cultural research, which used to be entirely qualitative, that have resulted in the incorporation of quantitative methods to also study aspects of the influence of culture.

GLOBE THEORY

Global Leadership and Organisational Behaviour Effectiveness (GLOBE) theory is a body of theory that predicts relationships differences in (i) societal-level outcomes that are related to differences in societal cultural values and practices and in (ii) organisational-level outcomes that are related to differences in organisational cultural values and practices (House, Hanges, Javidan, Dorfman, & Gupta, 2004).

GROUNDED THEORY

Grounded theory, originally conceived of by Glaser and Strauss (1967), is a theory that is based on the principles of inductive analysis of qualitative data; where patterns and theory emerge 'from the data' with no theoretical framework 'imposed' on the data. Two forms of grounded theory are generally acknowledged to exist; (i) a relatively fixed and prescriptive form associated with Strauss and Corbin (1990), and (ii) a relatively more flexible approach associated with Glaser (1992). Grounded theory needs to be differentiated from grounded research, which is taken in this study to mean research that allows patterns and theory to emerge from the data in the same way as in grounded theory, but typically applies thematic content analysis and does not subscribe to the methods and prescriptions of grounded theory.

INDIVIDUAL VALUES

In this study, following Schwartz (1992), individual values are taken to represent the relative sense of an individual for what 'should be'; a subjective and normative standard. Values are defined as "desirable, trans-situational goals that vary in importance as guiding principles in people's lives", which can be differentiated according to the motivational goals that they express (Ross, Schwarz & Surkiss, 1999: 51).

ORGANISATIONAL CULTURE

As indicated above, this study defines culture as "shared understandings made manifest in act and artefact" as acknowledged by Triandis (2004:xv). The GLOBE studies measure culture as practices and values. Organisational culture relates to culture at the organisational level. This contrasts with societal culture, which relates to the the level of the society. GLOBE theory extends psychological culture research from the societal level, which was the focus of Hofstede's (1980) work, to the organisational level.

RESEARCH PRODUCTIVITY

Research productivity is defined as the outputs of academic studies. Although these outputs can take many different forms, in this study the dominant forms of these outputs are considered: journal article publications, conference presentations, conference proceedings publications, book publications and book chapter publications.

SCHWARTZ'S VALUES THEORY

Schwartz's (1992) values theory offers a theory of values that incorporates biological, social and psychological motivational goals of individuals and relates these values to individual behaviour. Schwartz's (1992) values theory offers a theoretical structure of relative values. In this study, this theory provides the theoretical framework for the quantitative analysis of the relationships between individual-level values and research productivity.

CHAPTER 1

RESEARCH PROBLEM AND RESEARCH QUESTIONS

1 INTRODUCTION

1.1 BACKGROUND TO THE STUDY, RESEARCH PROBLEM AND RESEARCH QUESTIONS

Within an increasingly competitive global context, a South African university is tasked with meeting the needs of societal stakeholders. One dimension of these is the need for knowledge creation, or research outputs. Another is the need for higher numbers of enrolments. South Africa, according to the World Economic Forum Global Competitiveness report, is rated as 140th out of 144 countries, or 5th lowest in the world, for the quality of its education system (World Economic Forum, 2012). The criterion for this report is how well the education system in a country meets the needs of a competitive economy (World Economic Forum, 2012).

In stark contrast, according to the same survey, the country is ranked 15th best in the world for the quality of its business schools; 41st for its capacity for innovation; 34th for the quality of its research institutions; 30th for university-industry collaboration in R&D; and 37th for patent applications weighted per population size (World Economic Forum, 2012). In a globalised context, "knowledge has replaced the traditional assets of land, capital, labour, and entrepreneurship" as a basis for competitive advantage (Huang, 2009:1). The role of the South African university as an institution of knowledge creation is therefore increasingly salient in such a context; as innovative knowledge creation, or research productivity, is required in order to offer solutions to societal problems.

However, the extent to which these societal obligations can be met is a function of how innovative research is, and of the extent to which constraints to its research output, or research productivity, can be managed. However, in order to manage these constraints, knowledge is needed of what these constraints are, and the extent to which this context differs from other global contexts.

An extensive body of literature, including the Global Leadership and Organisational Behaviour Effectiveness (GLOBE) studies (House, Hanges, Javidan, Dorfman, & Gupta, 2004), have established the link between organisational cultural values and organisational outcomes. The GLOBE studies sought to extend Hofstede's (1980) work on culture to the

organisational level as well as the societal level of analysis (House *et al*., 2004). Similarly, these studies have also demonstrated the strong linkages between societal-level culture and organisational-level culture (House *et al*., 2004). Hofstede's (1980a) research has also established relationships between societal-level cultural values and societal-level outcomes. However, despite this body of literature, absent is knowledge of the relationships between the organisational cultural values of different academic fields and the research productivity of these fields. If South Africa has a certain configuration of societal cultural values, then according to the GLOBE studies its organisations will share aspects of this perhaps unique configuration of values. In the absence of knowledge of the relationship between the organisational cultural endowments of academic fields and their research productivity, this research attempts to address this deficiency. Also absent from the literature is knowledge of the influence of individual-level values on research productivity, which correspond at the individual level to the cultural values of groups. A holistic perspective of the influence of both cultural values and individual values on research productivity is also absent from the literature. The set of, or model of, factors that are associated with research productivity in this context that exist within the influence of these organisational cultural, and individual, values is also not known. It is argued that a holistic analysis of these influences, and of the factors that are derived from this specific context, may provide insight that can contribute to more effective and efficient research output. Such research output is considered to be particularly important in the South African context, which faces significant societal challenges. Before providing a background to the theoretical context and framework of the research, a brief outline of what the research attempts to achieve is now provided.

In order to provide a holistic perspective of these relationships, this research follows a certain path. First, a qualitative study is undertaken. The qualitative analysis is in three parts. First, the relationships between organisational culture and research productivity are investigated. Second, the relationships between individual values and research productivity are analysed. Third, a model of certain factors predicted to be related to research productivity, termed 'performance factors', is derived qualitatively from this specific context. The theory and propositions developed through the qualitative analysis are then tested quantitatively. The quantitative analysis is also in three parts. First, GLOBE theory (House *et al*., 2004) is tested for its predicted relationships between the organisational cultural endowments of academic fields, proxied by academic schools, and research productivity. Second, Schwartz's (2007) individual motivational values theory is tested for predicted associations between the values

endowments of individuals and research productivity. Third, the model of performance factors derived in the qualitative analysis is tested quantitatively. These analyses are related to each other, and recommendations are derived. Having provided a brief overview of the research, the theoretical framework of the study is now introduced.

According to the global literature, the production of research outputs, or research productivity, for such institutions is a function of a complex array of individual-level effects (Dundar & Lewis, 1998; Erdogan & Bauer, 2005; Hara, Solomon, Kim & Sonnenwald, 2003; Morton & Beard, 2005; Laursen & Foss, 2003; Lucas, 2006; Rachal, Shelley & David, 2008; Ramsden, 1994; Rothausen-Vange, Marler & Wright, 2005; Rynes, Bartunek & Daft, 2001). The ultimate outcome of such research is considered to represent globalised 'best practice'. However, the extent to which this body of findings extends to the South African university context is unclear.

In this increasingly globalised context, the dissemination of innovative 'best practice', in the form of benchmarking (Camp, 1989), and other forms of knowledge sharing, has been found to be associated with higher levels of organisational productivity (Vos, Ahlstrom & Blackmon, 1997). Innovative benchmarking, in the form of High Performance Work Practices, results in reduced employee turnover and increased financial firm performance (Huselid, 1995). The benchmarking of High Performance Work Practices reflects the "best practices viewpoint" (Huselid, 1995:643). According to Convergence theory, the continuous application of innovative best practices that are discovered in other contexts drive performance improvements in organisations (Kerr, Dunlop, Harbison & Myers, 1960). The identification and implementation of appropriate new practices that are related to superior performance in other contexts are, over time, are expected to result in an increasing similarity, or homogeneity, in practices, termed 'convergence', as best practices spread globally (Kerr *et al*., 1960). According to Convergence theory, innovativeness is the fundamental mechanism through which best practices become identified and implemented in organisations (Kerr *et al*., 1960). Innovativeness is expected to be associated with improved performance over time in contexts that are under competitive pressures (Kerr *et al*., 1960). In a similar process, Convergence theory predicts that cultural differences are also predicted to lessen over time (Williamson & Flemming, 1977).

However, despite evidence of the importance of innovatively identifying and implementing practices that result in superior performance in other contexts, the influence of values systems has been identified as accounting for the significant gap between 'universal' best practices and the actual practices found in organisations (Rowley & Benson, 2002). Resistance to 'external ideas' has even been identified in research and development (R&D) environments; the 'Not-Invented-Here Syndrome', which is a cultural 'trap' to performance (Foster, 1985). Culture theory argues that the influence of cultural values will constrain convergence because cultural values influence practices (Hofstede, 1980a). Although evidence of the gap between organisational values and practices has been extensively documented (House *et al*., 2004), as indicated, absent from the literature in the South African context is evidence of the extent to which such value systems may constrain research productivity.

In addition to qualitatively developing a model of the effects that are related to research productivity and testing it quantitatively, this study, therefore, also seeks to investigate the extent to which values systems constrain research productivity in this context. It is considered important to know the extent to which such a model can be expected to represent the influence of convergence, or represents an extension of best practices in other contexts. As discussed, this research therefore applies (i) a qualitative 'grounded' approach, to firstly derive a model of the relationships around research productivity and to explore the relationships of organisational cultural values and individual motivational values with research productivity; and (ii) a quantitative test of the model developed qualitatively, as well as a test of GLOBE organisational culture theory and Schwarz individual values theory. Theory that relates potential value constraints to research productivity is also tested at two levels: at the level of the academic field, or academic school, and also at the level of the individual academic. The theoretical tension that gives rise to the need to test such theory in this context is the presence of the gaps found in practice between global best practices and the practices of organisations (Rowley & Benson, 2002). More specifically; the gaps between the application of best practice that have been found to be caused by value systems that constrain innovation, and result in organisations prioritising less effective and efficient practices instead (Rowley & Benson, 2002). According to the predictions of Convergence theory, competitive pressures will ensure that organisations innovatively benchmark practices that are more effective or efficient (Kerr, *et al*., 1960; Kabasakal & Bodur, 2004). It is argued in this thesis that a tension exists; between the seminal predictions of Convergence theory (Kerr *et al*., 1960) and Culture theory (Hofstede, 1980a).

Convergence theory posits that competitive pressures will result in a convergence in organisational practices, most notably those associated with liberal market systems (Kerr *et al*., 1960). According to this theory, these economic pressures will result in increasing similarity in business systems, and eventually a global state of structurally identical business practices and systems will occur (Kerr *et al*., 1960). The Convergence thesis also postulates that industrialisation has a global effect on all organisations and that, as a result, economic development and technological progress will tend to produce a homogenous global organisational culture that is unrelated to societal culture (Kabasakal & Bodur, 2004). Evidence has been found to support a convergence of cultural values in developing countries towards the values of developed countries that is dependent on the speed of economic growth (Munusamy, Valdez, Lo, Budde-Sung, Suarez & Doktor, 2009). The South African academic context is not expected to be independent of such changes.

However, although convergence has been found to occur in more routine aspects of organisational systems, such convergence has been significantly constrained by culturally different "structures of meaning" that underlie economic behaviour (Kerr, 1983:87). Differing collective mental frameworks or cultural value systems, therefore, pose a fundamental block to convergence past a certain point (Kerr, 1983). Thus, value systems are typically expected to constrain convergence, notwithstanding empirical evidence of the effectiveness of certain organisational practices in other contexts. For Kerr (1983:87), the "most impenetrable barriers to convergence" also include the ingrained normative beliefs of people, which influence the choice of practices and systems in organisations - a choice that is potentially robust to empirical evidence of best practice in other contexts. Similarly, at the individual level, the extent to which individual behaviour adopts new or innovative practices is also constrained by individual motivational values (Schwartz, 1992). The processes that facilitate university research productivity are not expected to be isolated from these effects, both at the level of the academic field (substituted here as the academic school) and at the level of the individual researcher.

Other theory supports the predictions of Culture theory. Contingency theory, for example, predicts that there is no one best way of organising and that one "way of organising" will not be equally effective in different contexts (Gailbraith, 1973:2). Even among industrialised countries, at the "cultural level, fundamental views of the desirable shape of the economy

remain radically different even in countries whose business systems are often seen as similar" (Redding & Witt, 2009:16). For Ralston, Holt, Terpstra & Yu (1997:183), "an individual incorporates both national culture influences and economic ideology influences synergistically to form a unique value system that is different from the value set supported by either national culture or economic ideology". Although the GLOBE studies (House *et al*, 2004) have reported the societal values configurations for South African society, no work to date has done this at the organisational level for academic fields. Convergence will also not necessarily occur between business systems of different countries, according to Redding and Witt (2009:17); a "distinct variety of capitalism will emerge, not convergence on any existing variety". The influence of the 'local', in the form of local national or organisational effects, is predicted to exert a counterbalance to the global forces of convergence through a range of effects including unique cultural value systems (Rowley & Benson, 2000; Salamon, 1997). However, notwithstanding the tension between Convergence theory and Contingency theory that relates to the future homogeneity of values or practices, it is argued here that even Contingency theory (Gailbraith, 1973) predicts that performance, and hence research productivity as a dimension of such performance, is dependent on *an innovative and continuous updating of a contingent mix of practices*, and that an individual's value-related constraints to the adoption of new and more effective best practices within such a mix are, similarly, a potential restriction to research productivity. For both Contingency theory (Gailbraith, 1973) and Convergence theory (Kerr *et al*., 1960), it is innovativeness, and the innovative incorporation of best practice from other contexts that drives the performance of organisations. Culture theory, in contrast, predicts that values constrain innovativeness (Hofstede, 1980a). It is possible that Convergence theory might be expected to better predict relationships in such organisational contexts where organisational practices could converge on a global scale over time (Kerr *et al*., 1960), but Contingency theory (Gailbraith, 1973) might dominate at the level of the individual academic because of the individual differences between people reflected in individual motivations that are based on biological, psychological and social goals (Schwartz, 2007). Research into the potential constraints of such values systems on research productivity, therefore, may need to test such theory at both the individual and the organisational level.

In the specific academic context, best practice in research might be resistant to the uptake of innovative practices, and research productivity might not be inherently innovative, according to the arguments of Kuhn (1970). Following Kuhn (1970: 2), "science does not develop

through the accumulation of individual discoveries and inventions", and research productivity is constrained by the incommensurable ways academics have of viewing the world, termed paradigms. If research productivity is indeed constrained by the subjective values of groups, as Kuhn (1970) suggests, then it may be important to test the extent to which these forces, in the form of organisational cultural values, may constrain research productivity. Kuhn's (1970) predictions, which relate to the specific context of research productivity, therefore fundamentally contest the predictions of Convergence theory in the context of academic research. This study extends Convergence theory and Culture theory into this context for testing.

In addition to developing theory, this research therefore also extends theories relating to organisational culture values (House *et al*., 2004) and to individual motivational values (Schwartz, 1992) into this context for testing. This research therefore fits in with the organisational culture and individual motivational values literature, and contributes to the research productivity literature by offering a holistic perspective of the relationships around research productivity in this context. The testing of GLOBE and Schwartz theory, which represent the influence of the 'local', at different levels of analysis, was also expected to offer insight into the extent to which the context-specific model of relationships developed and tested in this study might truly represent a 'global' model at this point in time. According to Convergence theory, this model is expected to be 'global' because organisational cultural value systems are expected to have become relatively homogenous, and values systems are not expected to constrain performance. If local organisational culture differences were found to dominate the relationships between academic fields, then such a model would need to be qualified as being subject to the influence of the 'local'. The generalisability of the model to the global context, or homogeneity with the global context, was expected to be a function of the extent to which organisational cultural differences, which have been found to be strongly associated with societal culture differences (House *et al*., 2004), were found to dominate the relationships between academic fields. This seems to be the first study of its nature; that uses a test of organisational culture theory to qualify the generalisability of a model of performance relationships developed in a context. This research also attempts to provide knowledge of the extent to which the measured dimensions of research outputs indeed might represent innovative knowledge creation, or research that is helpful in solving societal research problems. In a context where South Africa faces serious societal challenges, it is

argued that if constraints to research productivity can be identified, then research productivity can be improved. In addition, if the extent to which such research is indeed innovative, and therefore helpful, can be tested through tests of values theories, then a holistic perspective of research productivity in this context would be enabled. Such a holistic perspective of the relationships around research productivity may enable recommendations to be made on how to improve research productivity, and, by implication, improve the contribution of academic research to solving societal problems.

It is also argued that this research offers a new methodological perspective on the study of research productivity by including an analysis of values systems at two different levels that includes both qualitative and quantitative approaches. The Southern African context is also taken to be particularly important for such research that explores the tension between the 'local' and the 'global' because of the relatively high levels of diversity in South African institutions; the relative lack of homogeneity in such organisations. Lessons that offer insight into how research productivity can be managed in such a context of diversity might offer insight that is valuable to others in the global context. The insights developed are considered to potentially be especially important for other developing countries. Certain aspects introduced in this section will be considered in more detail in the literature review. The theoretical framework of the research is now introduced further.

1.2 THEORETICAL FRAMEWORK: SOCIETAL, ORGANISATIONAL AND INDIVIDUAL LEVELS OF ANALYSIS

In the values literature, three levels of analysis are typically used to differentiate research in this field: (i) the societal, or national level of cultural values; (ii) the organisational level of organisational culture values; and (iii) the individual level of individual values research (House *et al*., 2004). Convergence theory predicts that practices and values will converge over time in organisations (Kerr *et al*., 1960), due to competitive pressures. However, societal differences in cultural values have been found to dominate organisational cultural values within organisations (House *et a*l., 2004). The organisational cultures of academic fields in the South African context are expected to reflect some degree of the unique configuration of societal culture of the country. At the organisational level of analysis, differences in organisational cultural value dimensions have been found to influence organisational performance (House *et al*., 2004). Further, at the level of the individual academic, the

influence of individual biological, social and psychological differences are expected to influence behaviour and have an influence on individual work outcomes (Schwartz, 1992). The theoretical framework that relates to these two levels of analysis is now introduced.

1.2.1 The aggregated level of analysis

Convergence theory posits "a world-wide tendency for political, socio-economic, and technological forces to push national systems, including HRM [Human Resources Management], towards uniformity" (Rowley & Benson, 2002:92). These changes toward convergence are driven by the dominance of "global communications, travel and consumer products, regional economic integration [...] and internationalisation" (Rowley & Benson, 2002:92). According to Brodbeck, Hanges, Dickson & Dorfman (2004), global changes might ultimately result in shared cultural values between organisations in the way predicted by Convergence theory because of (i) coercive isomorphism, or the influence of political and legal factors; (ii) mimetic isomorphism, or the benchmarking or modelling of other successful organisations; and (iii) normative isomorphism, or the influence of rules and norms. Industrial cultures, for example, emerge "because of the similarity in practices by organisations within a given industry" and "in global industries, one would expect a shared industry-wide practice to emerge as a result of benchmarking, and of common and converging technical imperatives, needs of customers, and regulatory standards" (Brodbeck *et al*. 2004: 657). The predictions of Convergence theory therefore relate to the societal or national level, the organisational level, and the individual level of work performance.

As briefly discussed earlier, Convergence theory is, however, contested by Hofstede's (1980a) Culture theory which posits instead that organisations are 'culture bound' and that values will constrain performance and will result in a gap between practices that a group choose to use and those outside practices that might be more effective or efficient (Rowley & Benson 2002:92). Indeed, the GLOBE research programmes have reported evidence of significant differences between measures of organisational values and practices across the world (House *et al*., 2004). As indicated, this research seeks to investigate the influence of values systems as constraints to organisational and individual performance along the dimension of research productivity in the context of a large South African research university. It is argued that knowledge of the factors associated with research productivity would not be complete without knowledge of how organisational cultural values and

individual motivational values might constrain research productivity. Culture theory is, for the purposes of this work, considered to be represented by contemporary GLOBE theory (House *et al.*, 2004). GLOBE theory has been developed on the basis of a synthesis of theories and research findings, and is generally accepted as the dominant theoretical framework in contemporary culture research (House *et al*., 2004).

For Rowley and Benson (2000), the HRM paradigm of a specific context also reflects the state of cultural practices convergence of a particular organisation. The HRM paradigm reflects an HRM system's deep structure, or network of fundamental assumptions and principles underlying its basic configuration (Rowley & Benson, 2000). Rowley and Benson (2000:9) stress that:

> [w]hen seeking to identify a possible HRM paradigm for a particular country we need to consider all the complex, interacting factors it contains. The framework has two dimensions: unit of analysis (organisational versus national) and focal point (systems versus culture).

For Rowley and Benson (2000:11), Convergence theory faces two fundamental constraints: (i) the gap between 'universalism' and national culture or 'cultural distance', which is associated with cultural and structural inertia; and (ii) the gap between "newly adopted HRM practices versus the shared mindset of people in organisations", which can result from a lack of infusion of practices with values. According to Rowley and Benson (2000:15), their research in the Asian context found that, notwithstanding certain exceptions, these countries "have made little attempt to move beyond 'custom and practice' as the major determinant of organisational behaviour". For Rowley and Benson (2000:15), this "indicates that the architecture of deep structure of enterprise HRM in these countries has not changed to any substantial degree". This "lack of change at this level suggests culture and shared mindsets have been important constraints on convergence" (Rowley & Benson, 2000:15). Similarly, for Salamon (1997), convergence is not likely to occur due to a range of factors, including culture and unique value systems. On a societal level, constraints to convergence can also exist. The influence of colonisation, or other historical confrontations between different cultural groups, for example, might cause certain cultures to reject the values of other cultures, and therefore to adopt cultural orientations that are opposed to, to other cultures (Hagan, 1962). To a significant extent, it might be plausible that a degree of resistance to a dominant global culture might be expected (on the part of other cultures). This cultural effect could also extend to the acceptance of a different ideology by cultural groups, the effects of

which can manifest even at the academic level (Schumpeter, 1949). This reference is old but still valid. Such ideology can also be associated with practices, including academic practices, which can deviate from more effective processes and practices because of a commitment to such ideology (Schumpeter, 1949). Ideologies, including academic ideologies, typically persist in the face of evidence that contests them; yet such ideologies are a subjective and inherent aspect of human nature (Schumpeter, 1949). Values, therefore, are expected to influence organisational and individual outcomes. Research productivity outcomes are not expected to be independent of their influence.

The GLOBE research programmes have found evidence of significant associative relationships between national and organisational cultural values and practices, in studies undertaken in more than 60 countries (House *et al*., 2004). Whereas Hofstede (1980a) researched culture primarily as values, the GLOBE studies developed Hofstede's theoretical framework further and differentiated between cultural values and cultural practices, and also between the national and the organisational levels of analysis (House *et al.*, 2004). This body of theory and empirical research; of Hofstede (1980a) and of House *et al*., (2004), from research in over 60 countries, is taken to represent seminal work in the field of values theory in organisational contexts. As value systems have been identified as posing a dominant constraint on the convergence of practices across contexts (Kerr, 1983; Rowley & Benson, 2000), this research recognises the differentiation of values between (i) the levels of the nation state or society (Hofstede, 1980a); (ii) the organisational level (House *et al*., 2004); and (iii) the level of the individual (Schwartz, 1992). According to Hofstede (1980a) and the GLOBE theorists (House *et al*., 2004), the aggregated level of analysis needs to be separated from the individual level of analysis to avoid the ecological fallacy or fallacy of atomisation. Values theory, at the individual level, has also been tested in more than 60 countries, with the seminal work by Schwartz (1992; 1999) demonstrating a replicated structure of individual values across societies yet also demonstrating the salience of individual motivational values in predicting different individual behaviours.

1.2.2 The individual level of analysis

As already stressed, it is necessary to analyse the potential effects of values at two different levels when investigating the potential constraints on research productivity posed to organisational and individual performance. Whereas aggregated values effects operate at the

level of the organisational unit, an individual's motivational values orientation is also dependent on physiological or biological influences (Schwartz, 1992). Schwartz (1992) offers a theory that incorporates biological, social and psychological values of motivation. According to his individual motivational values theory, values are "desirable, trans-situational goals that vary in importance as guiding principles in people's lives", which can be differentiated according to the motivational goals that they express (Ross, Schwarz & Surkiss, 1999: 51). The GLOBE organisational culture values theory is a 'comprehensive' theory of values, which has been validated using factor analytic techniques. *The comprehensive universe of cultural values has been found to load onto nine core underlying factors, or organisational cultural dimension, which make up the GLOBE dimensions of organisational and societal culture* (House *et al*., 2004). These dimensions are: Uncertainty Avoidance, Power Distance, In-Group Collectivism, Institutional Collectivism, Gender Egalitarianism, Assertiveness, Future Orientation, Performance Orientation and Humane Orientation (House *et al*., 2004). The derivation of Hypothesis A (Section 1.5.3), that there is a significant association between levels of the GLOBE dimensions of organisational culture and levels of research productivity at the level of the academic school, is therefore based on the rationale that GLOBE theory is the dominant theoretical framework in contemporary quantitative culture research, and that it is a 'comprehensive' theory.

Similarly, the Schwartz (1996) values theory is the corresponding 'comprehensive' theory of individual values that has also been validated through empirical findings that demonstrate that a certain structure of ten motivational values typically exists across societies. These are: Self-Direction, Stimulation, Hedonism, Achievement, Power, Security, Conformity, Tradition, Universalism and Benevolence values (Schwartz, 1994). According to Schwartz (1994:22/23), "*it is possible to classify virtually all the items found in lists of specific values from different cultures" into ten motivational types of goals, which form a structure of individual values found to replicate across* societies. The derivation of Hypothesis B (Section 1.5.3), that there is a significant association between levels of Schwartz individual motivational values and levels of individual research productivity, is therefore also based on the rationale that Schwartz's (1992) theory is the dominant theoretical framework in contemporary values research at the individual level. This theoretical framework is also considered to be justified for this research because of its focus on values; and the GLOBE theory also has its focus on values (as separate from practices. These theories are also level-specific, and can only be tested at their appropriate levels. Hence the testing of GLOBE

theory allows for testing of relationships around values at the aggregated level and Schwartz theory allows for the testing of relationships around values at the individual level. The empirical portion of the research therefore allows for a counterpoint to the qualitative research.

Both of these bodies of theory have been tested worldwide. At the individual level of analysis, it is argued that the use of the Schwartz (1994) values theory is more appropriate because this theory incorporates biological, psychological and social dimensions of values into a comprehensive structure of human values. In this research, therefore, the individual level and the level of the academic field (academic school) are treated as fundamentally different levels of analysis.

At the nexus of the literatures that relate to individual motivational values is the issue of which values are prioritised. Schwartz's (1994) motivational values theory argues that there are two oppositional dimensions that form a structure of 'higher order' values across societies; (i) a tension between Self-Enhancement and Self-Transcendence values, and (ii) a similar tension between Openness to Change and Conservation values. In terms of the tension between the higher order values orientations of Self-Enhancement and Self-Transcendence, the association of selfishness versus altruism with individual performance is taken to be an important dimension of values systems. It is argued this dimension is particularly important because of the need for individuals to work together in order to achieve personal and organisational outcomes. Research productivity then, defined as the generation of research outputs by an academic, as an individual and an organisational outcome, is expected to be no different. The theoretical tension between Self-Enhancement and Self-Transcendence will be considered in the next section. After which, the tension between Openness to Change and Conservation values will be introduced.

1.2.2.1 Self-Enhancement versus Self-Transcendence

A fundamental argument made in this research is that human organisational and individual outcomes are, to a significant extent, a function of the 'nurture' aspects of human life, and that values, which can be learned, account for a significant degree of such organisational and individual performance. One perspective of the mechanism by which values transmit themselves is offered by Dawkins (1989) who argues that the tension between selfishness and

altruism, and how these are managed within an individual, is a fundamental aspect of the achievement of objectives in social contexts. Dawkins (1989:3) defines altruistic behaviour to be present when an individual entity "behaves in such a way as to increase another such entity's welfare at the expense of its own", and he defines selfish behaviour as the converse of this. Dawkins (1989) offers a Darwinian perspective on the development of values. According to Dawkins (1989), natural selection is a process of the survival of relatively more 'stable' entities over time in a context of competition. However, whereas an individual species might replicate over years, values (or ideas in any form) can replicate at the speed at which they are communicated, although these can face a contestation with other values (or ideas).

Values can evolve through a process of "vicarious trial and error" according to Dawkins (1989:15). In nature, examples abound of different species that apply mutual altruism (Dawkins, 1989). However, Dawkins (1989:18) acknowledges that in practice "it may be difficult to distinguish cases of genuine two-way mutual benefit from cases of one-sided exploitation". In reciprocity relationships between individuals, there is typically a delay between the granting of favours and the repayment of such favours, and the tension between selfishness and altruism is reflected in the incentives that individuals have to cheat and not to repay the favour (Dawkins, 1989).

According to Dawkins (1989), evidence of such reciprocal altruism is abundant in nature, and humans are no different. Dawkins (1989) stresses the importance of the literature that suggests many psychological characteristics such as envy, guilt, gratitude and sympathy, for example, serve a function in detecting cheats, or cheating in human relationships. Dawkins (1989:23) extends this analysis to an analysis of culture, and to the development of a construct, termed a 'meme', which is taken to be a replicator of culture that reproduces in much the same way as biological gene reproduction occurs. For Dawkins (1989:23), a meme is therefore a cultural replicator, a "unit of cultural transmission". According to Dawkins (1989:23), memes "propagate themselves in the meme pool by leaping from brain to brain via a process which, in a broad sense, can be called imitation", and exist therefore as a structure in the nervous systems of groups of individuals. For Dawkins (1989:23), "co-adapted meme-complexes evolve in the same way as co-adapted gene-complexes", where selection:

> favours memes which exploit the cultural environment to their own advantage. This cultural environment consists of other memes which are also being selected. The

> meme pool therefore comes to have the attributes of an evolutionary stable set, which new memes find it hard to invade.

Dawkins's (1989) analogy of how values operate is one theoretical example of how mechanisms underlying the operation of cultural values relate primarily to the organisational level. However, it is argued that this theory also has implications for the individual in terms of the tension between Self-Enhancement and Self-Transcendence because it predicts that an individual's relative endowment of either of these values will be associated with a higher or a lower person-organisation fit (Erdogan & Bauer, 2005) with the specific selfish or altruistic culture of the organisational group.

For Dawkins (1989:2), "[s]ome would say that culture is so important that genes [...] are virtually irrelevant to the understanding of human nature" yet "[o]thers would disagree". This tension, according to Dawkins (1989:2), between different literatures that relate to the influence of so-called 'nature versus nurture' as "determinants of human attributes" is not resolved. However, Dawkins (1989:2) acknowledges that "there are special circumstances in which a gene can achieve its own selfish goals best by fostering a limited form of altruism at the level of individual animals". The tension between the *prioritisation of individual goals and the needs of the group*, in terms of organisational requirements, has been at the heart of much HRM literature that relates this tension to potential performance (Guest, 1997; Huselid, 1995; Huselid, Jackson & Schuler, 1997; Rousseau & Parks, 1993; Ulrich, Brockbank, Yeung & Lake, 1995).

The misalignment of individual incentives and organisational objectives can be a constraint to organisational performance; the management of this misalignment is an important feature of HRM reward systems (Dutta & Manzoni, 1999). Agency theory, in particular, predicts that misalignment between individual goals and organisational goals can significantly constrain performance due to misaligned incentives (Jensen & Meckling, 1976; Rousseau & Parks, 1993). According to Equity theory, when they differ, the prioritisation of the organisation's goals over an individual's goals can also be related to an evaluation of equity in the social exchange between the individual and the organisation (Adams, 1963; Adams, 1965). To some extent, Organisational Citizenship behaviour, or uncompensated extra-role and voluntary behaviour supplied by an individual to an organisation (Organ, 1988; Organ, 1997) might reflect some aspect of Self-Transcendence (the subordination of the self to other goals). When certain individual values are prioritised over other values, an individual's personal

infrastructure, or configuration, of motivational values is expected to differentiate individuals both in terms of their values and in terms of the behaviours associated with these values (Schwartz, 1992). The theory that relates Openness to Change values systems to the knowledge creation context of the research university will be considered next.

1.2.2.2 Openness to Change versus Conservation

The fundamental nature of knowledge creation is inherently innovative (Kobayashi, Nakamori & Wierzbicki, 2007), and dependent on personal creativity and involvement of the individual (Polanyi, 1973). By definition, knowledge creation is the development of *new* knowledge. The research process, however, is dependent on precedent, and institutional academic systems which are bureaucratic in nature (Becher, 1989). Within the potential constraints of bureaucratic systems, Conservation values, which represent motivational goals associated with a preference for the status quo and a rejection of innovation, are also expected to be a fundamental constraint to the adoption of new processes and practices (Schwartz, 2007). Conservation, at the individual level, is also taken to act as a constraint to the implementation of best practices or new practices that require an innovative mind-set, and therefore also to constrain convergence to more effective or efficient practices at the individual level (Kerr, 1983; Rowley & Benson, 2000:15; Salamon, 1997). Openness to Change values are associated with innovativeness, creativity and autonomy (Schwartz, 2007). Openness to Change values are expected to dominate in an academic context of knowledge creation. The tension between Openness to Change values and Conservation values, as one of the two fundamental higher order values tensions (Schwartz, 1994), was expected to reflect significant differences in research productivity between individuals.

According to Schwartz's (1992) theory, differences in values configurations between individuals are considered to potentially be associated with differences in individual work behaviour, and with differences in research productivity. The match between an individual's values configuration is also expected to relate to a fit between the individual and the academic career. For Schein (2007:27), his longitudinal research on careers reveals that individuals typically develop a "strong self-concept which holds their internal career together even as they experience dramatic changes in their external career"; termed a "career anchor". An internal career relates to the "subjective sense of where one is going in one's working life, s contrasted with the 'external career', the formal stages and roles that are defined by organisational concepts of what an individual can expect in the occupational structure"

(Schein, 2007:27). An individual's career anchor, however, according to Schein (2007:27), consists of (i) self-perceived talents and abilities; (ii) basic values; and (iii) an evolved sense of "motives and needs as they pertain to the career"; it "can be thought of as the values and motives that the person would not give up if forced to make a choice". The alignment of the individual values of an individual with the work they do is therefore considered to contribute to the long-term performance of an individual in a career. According to Gottfredson (1996), a process of goal compromise occurs over time as an individual adjusts his or her goals to the reality inherent in different career paths. In an academic career, values are therefore considered to contribute to research productivity to the extent that an individual is a good match, or fit, with this dimension of an academic career.

A brief background to the academic research context of this study is now provided to introduce the third dimension of the research: the influence of individual level factors on research productivity.

1.2.2.3 Individual performance

To the extent that knowledge creation is a personal process (Polanyi, 1973), the values held by individuals are considered proximal, or closest, to knowledge creation as an individual work process. However, the individual might be considered to be nested within a context, and within groups, where university knowledge creation or research productivity might also be influenced by organisational culture, and also societal culture (House *et al*., 2002). Knowledge creation that manifests as university research productivity is further expected to be influenced by a host of other factors that operate at the individual level. Research productivity is defined as the research outputs of academics, measured in this study as journal articles, conference presentations and proceedings publication, and book and book chapter publication.

Evidence indicates that research productivity is differently associated with a wide range of biographical and other factors, for example: gender (Rachal, Shelley & David, 2008; Rothausen-Vange, Marler and Wright, 2005); academic rank (Rachal *et al*. 2008); age and work satisfaction (Ramsden, 1994); different levels of research collaboration (Hara *et al*., 2003; Rachal *et al*., 2008; Rynes *et al*., 2001); financial incentives (Hales, Shahrokh & Servis, 2005); differences in the accreditation levels of higher education institutions (Morton

& Beard, 2005); person-job fit and person-organisation fit (Erdogan & Bauer, 2005); programme size (Dundar & Lewis, 1998); the influence of state intervention (Lucas, 2006); HRM practices (Laursen & Foss, 2003); and the influence of culture (Becher, 1989; Bland & Ruffin, 1992).

However, the literature does not give a clear indication of the sub-set of individual level factors that might account for the most variance in research outcomes in this specific context. This study attempts to address this deficiency.

To increase the validity of the research and to focus - or delimit - the scope of the investigation, the inclusion of certain individual-level factors into the study is justified on the basis of a qualitative 'grounded' application. This 'grounded' application draws on the principle underlying 'grounded theory'; that patterns and relationships are derived from qualitative data in an inductive process (Glaser & Strauss, 1967). Based on previous seminal precedents in the research of academic fields (Becher, 1989), the quantitative design of the three dimensions of analysis that form the structure of this research is based on the analysis of the relationships between: (i) GLOBE organisational cultural values and academic school-level research productivity; (ii) Schwartz motivational values and individual-level research productivity; and (iii) individual level factors (termed 'performance' factors) and individual-level research productivity. The overarching context of research productivity, however, is expected to be significantly influenced by the cultural values within such a context. Although the GLOBE body of cultural values theory has already been introduced in the above sections, other culture theory that proposes a 'functional' perspective of culture is introduced next to provide a further understanding of the context of academic research productivity.

1.3 THE THEORETICAL BASIS FOR THE ROLE OF CULTURE IN ORGANISATIONAL PRODUCTIVITY

According to Schein (1996), the influence of culture is typically under-appreciated in the complex interplay of factors in organisational productivity; group level effects are expected to significantly influence research productivity. According to Coase (1937), an organisation can be viewed as encompassing the sum total of the implementation of economic, social, political, and psychological mechanisms to achieve coordination between the individuals in the organisational unit. According to Schein's (1985) conception, culture acts as an

integrative force to facilitate organisational outcomes. For Schein (1985: 6), culture is taken to represent the shared "basic assumptions and beliefs" that operate unconsciously, and in organisations they "define in a basic 'taken for granted' fashion an organisation's view of itself and its environment", where "these assumptions and beliefs are learned responses to a group's problems of survival in its external environment and its problems of internal integration". Internal integration is the achievement of outcomes within an organisational unit, where culture provides a 'common', or accepted, way of solving problems (Schein, 1985). Since different academic fields might be associated with different professional fields, and also with different research and practitioner norms and values, for Schein (1985) therefore, the adaptive forces of culture associated with these fields are expected to differ.

Hofstede (1980b:43) states there are differences in perceptions between people that "have been conditioned by different education and life experience". Hofstede (1980b:43) then defines culture as not being a characteristic of individuals, but of a number of people "conditioned by the same education and life experience"; a collective "mental programming" that people have in common. Culture, according to Hofstede (1980b:43), exists in the minds of people, but also becomes crystallised in institutions that people have built such as:

> family structures, educational structures, religious organisations, associations, forms of government, work organisations, law, literature, settlement patterns, buildings and even….scientific theories. All of these reflect common beliefs that derive from the common culture.

Following Schein's (1985) theoretical perspective, if organisational culture does indeed provide an integrative function in an organisation, it does not act in a unidirectional manner. Instead, according to Schein (1985), culture is a learned response in response to integrative challenges. It is expected, therefore, that as predicted by this theory, the integrative effect of culture on organisational outcomes at the university school level will be associated with differences in research productivity. The different organisational units (academic schools) considered in this research also might have certain integrative needs in common, and the extent to which organisational culture values have been learned in response to integrative challenges is expected to reflect in differences between the cultural endowments of such units, which might be reflected in tested differences in research productivity.

This research, therefore, attempts to address these deficiencies in the literature by investigating the relationships of organisational culture, individual motivational values and individual performance factors with seven measures of research productivity (a composite

measure of research output - termed gross research productivity - and six subordinate measures). These seven measures are: (i) South African Department of Higher Education accredited journal publications, termed department of education (DOE) or local journal article publication; (ii) Thompson Reuters Institute for Scientific Information (ISI) and ProQuest International Bibliography of the Social Sciences (IBSS) accredited journal article publications, termed international journal article publication; (iii) conference proceedings publications; (iv) conference paper presentations; (v) book chapter publications; (vi) book publications and (vii) gross research productivity, which, as indicated, is a composite variable, comprising (i); (ii); (iv) and (v); a composite of 'same size' outputs that specifically reflected quantity of research output. On the basis of the findings, recommendations are made for theory and practice, with the aim of providing insight into how knowledge creation might be better enabled in such a context. A brief overview of the methodological traditions of culture research is provided next, after which the research questions are introduced.

1.4 BACKGROUND TO THE METHODOLOGICAL APPROACH

At the group or aggregated level of analysis, the literature has, historically, developed broadly from two different streams which have each been associated with methodological and epistemological differences: (i) the culture literature and (ii) the organisational climate literature (Denison, 1996). 'Culture' research has typically been associated with qualitative research methods and unique contexts, and 'organisational climate' research has typically been associated with quantitative research methods - the goal of which is the generalization of findings (Denison, 1996). This research seeks to extend the conventions and methodologies associated with the latter, which have been the theoretical and methodological underpinnings of primarily 'psychological' (rather than anthropological) quantitative organisational culture research; such as the seminal theory developed by the GLOBE research studies (House *et al*., 2004).

GLOBE theory represents the broad synthesis and further development of theory offered by Hofstede (1980a), McClelland (1961) and other theorists; it is primarily directed at the analysis of measured differences between cultural orientations and phenomena measured both at the organisational level (organisational culture) and the societal level (societal culture). GLOBE theory draws heavily on the research of Hofstede (1980a), which essentially is a theory of cultural values and their associations with sociatel, or national outcomes. GLOBE

theory, however, extends Hoftsede's (1980a) theory into investigations that include organisational or group level cultural effects (House *et al*., 2002). Therefore, GLOBE theory, as the seminal contemporary work investigating group level cultural values effects on organisational outcomes (House *et al*., 2004), is tested in this context as a counterpoint to the motivational values investigations at the individual level. The model of the relationships tested in this study is shown in Figure 1. A summary of the research problem, in which certain of the conceptions introduced above are repeated and summarised, is now offered, after which the research questions are introduced.

1.5 RESEARCH PROBLEM AND RESEARCH QUESTIONS

In view of a fundamental tension between the predictions of Convergence theory (Kerr *et al.*, 1960) versus those of Culture theory (Hofstede, 1980a), it is argued that ignorance of the extent to which values systems (Rowley & Benson, 2000) constrain research productivity is associated with a cost. Without knowledge of how research productivity can be constrained, such constraints cannot be managed. If research outputs are not inherently innovative, then a lack of knowledge relating to this might also entail a cost, as stakeholders in the research process might not realise that innovativeness needs to be proactively instigated for it to occur. The research problem addressed in this study is therefore the lack of knowledge as to the potential constraints posed by values systems to research productivity. It is argued that this study is the first to investigate the potential influence of organisational culture on the research outputs of academic fields in this context. Similarly, this study might be the first to provide a holistic perspective of research productivity that includes the influence of values at the organisational and individual levels. The study also provides a methodological 'triangulation' of sorts, providing an analysis across levels and using qualitatively and quantitative methods of analysis.

The absence of such research in the South African context might represent an unnecessary cost to be borne by individual researchers, academic fields, academic institutions and, ultimately, societal stakeholders that are reliant on the innovative research outputs of academic institutions. This knowledge, or a 'proof of concept' of whether such values systems might in fact constrain research output also offers a platform for further research to develop and test theory relating to the causes that underpin these relationships.

This study tests GLOBE and Schwartz theory together with theory developed qualitatively; that is grounded in this context. Culture would be expected to influence research productivity, in a direct manner, since culture acts as an integrative agent, or provide a mechanism for internal regulation (Schein, 1985). If organisational culture does indeed provide an integrative function in organisations, it is not, however, expected to act in a unidirectional manner (Schein, 1985). Culture therefore influences an organisation or organisational unit in different ways, which can have a positive or negative influence on performance (Schein, 1996). According to Schein (1985), culture is also a learned response that develops from integrative challenges. Therefore culture, as a manifested and learned response (Schein, 1985), is also shaped by the integrative needs of organisational units. Each academic field will be expected to have a unique cultural 'personality', following Schein's (1985) conception. The cultural changes in such organisations which are driven by integrative needs might not necessarily be driven by the need of these units to learn from other units, and to implement best practices that are continually evolving on a global basis. This study also provides a model of the factors related to research productivity that is derived from the context itself, and also develops theory and tests theory that predicts boundary conditions that relate to the model. In other words, the model that is developed and tested within this context is related to the cultural and values context in which it exists. It is argued that this study attempts to provide exploratory 'proof of concept' of the potential influence of values on research productivity. For the purposes of further analysis, a further process of qualitative analysis is also followed, where GLOBE and Schwartz theory are 'imposed' on the data. This is done in order to provide a holistic perspective of the relationships under study. The aim of the research, research objective, research questions and hypotheses are now introduced.

1.5.1 Aim of the Research

The aim of the research is to investigate the interrelationships around cultural values, individual motivational values, individual performance factors and university research productivity; in order to generate insight into how improvements in research productivity may be made. The overarching aim of the research was to help reduce the costs imposed on societal stakeholders that are typically associated with inefficient or ineffective research. This was taken to be particularly important in the South African context, which faces a range of serious societal challenges that innovative research could help to address.

1.5.2 Research Objective

The objective of this research is to develop and test theory that relates cultural values, individual values, and individual-level performance factors to research productivity. The overarching objective was therefore to generate insight via this testing process to provide recommendations for management or HRM practice that are tailored to increasing the effectiveness and efficiency of research, while reducing the human costs associated with the process. The research questions derived from this objective are now introduced.

1.5.3 Research Questions and Derived Hypotheses

The theoretical rationale that underlies the research questions has been discussed above. A brief summary of the three bodies of theory tested in this research are outlined below. After this summary, the research questions are introduced. The three bodies of theory, in summary, are outlined as follows:

- If, according to Polanyi (1973), knowing is active, requiring skill and the personal participation of the knower, then there is a significant aspect of knowledge and knowledge creation that is subjective, or personally tied to the individual, that is not necessarily entirely objective. At the level of the academic field or the academic school, organisational cultural values and the work-related behaviour of groups of individuals are typically associated with group-level typologies of organisational culture values sets (House *et al*., 2004). Such different typologies have been found to influence organisational performance in different ways (House *et al*., 2004). Research Question 1 is derived from this theoretical framework.

- At the level of the individual, individual values (Schwartz & Boehnke, 2004) are associated with differences in individual workplace behaviour which are expected to conform to an individual's typology of motivational values and which can influence individual work performance. Research Question 2 is derived from this theory.

- Similarly, differences in a range of individual-level effects, or performance factors, have been found to associated with differences in university research productivity in other contexts (Becher, 1989; Bland & Ruffin, 1992; Dundar & Lewis, 1998; Erdogan & Bauer, 2005; Hales *et al*., 2005; Hara *et al*., 2003; Lucas, 2006; Laursen & Foss,

2003; Morton & Beard, 2005; Rachal *et al*., 2008; Ramsden, 1994; Rothausen-Vange *et al*., 2005; Rynes *et al*., 2001). In contrast to the analysis of the values dimensions, which extends theory and methodology validated internationally as well as in southern Africa, theory that relates to the relative relationships between individual level factors and research productivity is also developed in this research using a grounded study, which provides the inputs for the quantitative analysis. Research Question three is derived from this discussion.

The core research question of this research is therefore "*What is the relationship between organisational cultural values, individual motivational values, individual performance factors and research productivity?"* From this core research question, specific sub-ordinate research questions are derived. The hypotheses derived from these subordinate research questions (where appropriate) are identified as follows:

1. *What is the relationship between organisational cultural values and research productivity at the level of the academic field, or academic school? (The qualitative analysis that addresses this research question follows a grounded analysis (Analysis 1). For the purposes of comparative insight, a second qualitative analysis is applied, where theory is 'imposed' on the analysis (Analysis 4). A quantitative analysis is applied to test Hypothesis A: There is a significant association between levels of the GLOBE dimensions of organisational culture and levels of research productivity at the level of the academic School. The quantitative testing of this hypothesis represents Analysis 7.).*
2. *What is the relationship between individual motivational values and research productivity? (The qualitative analysis that addresses this research question follows a grounded analysis (Analysis 2). For the purposes of comparative insight, a second qualitative analysis is applied, where theory is 'imposed' on the analysis (Analysis 5). A quantitative analysis (Analysis8) is applied to test Hypothesis B: There is a significant association between levels of Schwartz individual motivational values and levels of individual research productivity).*
3. *What is the relationship between individual performance factors and research productivity? (The qualitative analysis that addresses this research question follows a grounded analysis (Analysis 6). On the basis of this qualitative analysis, propositions are developed, scales are created, and Factor Analysis is applied (Analysis 6). A*

quantitative analysis is then applied (Analysis 9) to test Hypothesis C: There is a significant association between measures of individual performance factors and measured levels of research productivity).

On the basis of the results of the qualitative analysis, a framework for the quantitative analysis was applied. This process is discussed further in Chapter Three, which considers the methodology applied in this study. This framework was applied according to the categories that emerged from a factor analysis (Analysis 6): the core component categories that made up the range of individual level factors. These four core groups of factors are termed 'Performance Factors', as their derivation within the qualitative research process was premised on their influence on research productivity, which was framed as a facet of job performance. The four core hypotheses derived from this general structure for quantitative testing (Analysis 9) are as follows:

- *Hypothesis C.A. Biographical Factors are significantly associated with Research Productivity.*
- *Hypothesis C.B. Personal Orientation Factors are significantly associated with Research Productivity.*
- *Hypothesis C.C. Work Role Satisfaction is significantly associated with Research Productivity.*
- *Hypothesis C.D. There is a significant association between Supervisory Experience and research productivity.*

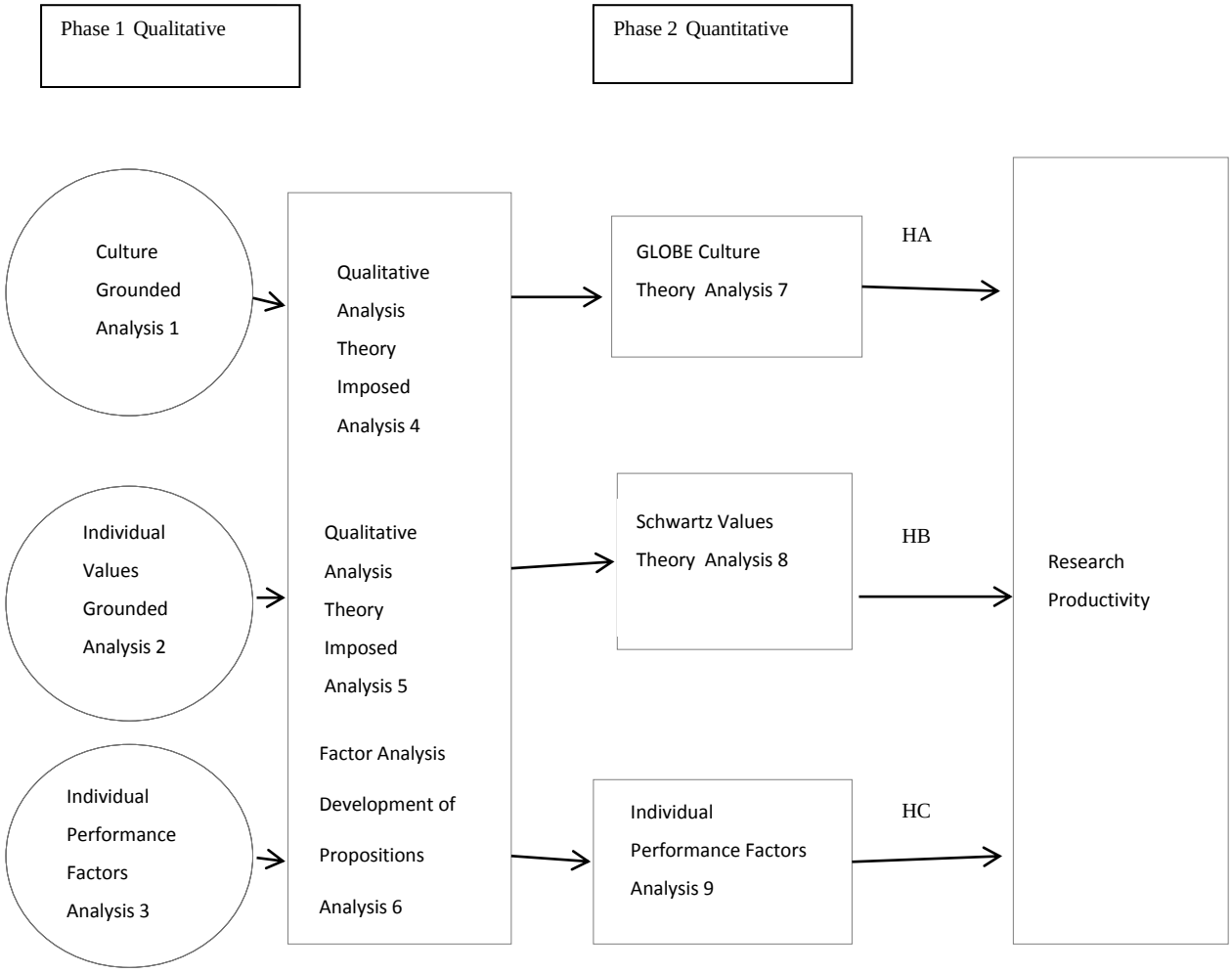
In the above sections, the aim of the research, the research objective, the research questions, and the derived hypotheses were introduced. An overview of the research process is provided as follows.

The Linkages between the Research Topic, Literature Review and Hypotheses

The research topic of this research is the potential contributions of (i) organisational culture, (ii) individual values and (iii) individual performance factors to research productivity. The literature that spans this topic is vast. The rationale for the approach to the literature review undertaken in this study derives from Gelfand, Raver and Ehrhart (2004). For Gelfand *et al*. (2004), cross-cultural organisational research faces a dominant challenge; the multiplicity of different factors, termed '*k'* factors that influence culture. Hence, the postpositivist (Cresswell, 2003) reductionist approach undertaken in this study has been carefully designed

to supplement the qualitative research components and to provide an overall research design that is faithful to the notion that addresses the 'k' factor problem. By testing the two 'comprehensive' theories of values, at both individual and organisational-unit level, the multiplicity of *k*-factor influences upon, and of, cultural and individual values were studied in a way that provided a holistic perspective of these relationships. *K*-factor approaches, which attempt to provide a holistic perspective of cultural, or values, relationships, necessitate a comprehensive approach to literature reviews. A reader or fellow researcher seeking to build on this research therefore requires an acknowledgement in the literature of the k-factor universe of culture and values studies that relate to the relationships under study. Following Gelfand et al. (2004), the literature review is therefore comprehensive, and reports studies and theory in this area despite the fact that empirical research cannot, or cannot as yet, provide evidence of empirical relationships underlying many of these values relationships. However, it is argued here that such a comprehensive approach to the literature review is necessary in order to do justice to the multitudinous, or multiplicity, of k-factors in the culture and individual values universe. Further, it is argued that only the GLOBE and Schwartz theories explicitly cater for the k-factor influence, in that they are comprehensive theories that provide a theoretical solution to this methodological problem. Similarly, by applying a grounded analysis, a justification for the focus on a few of the k-factors is enabled; in other words, a justification for focusing on core relationships that arise inductively is enabled. By offering a comprehensive literature review that is as holistic as possible it is hoped that the k-factor problem is best addressed whilst also not succumbing to the shortfalls associated with the empirical component of the research; where reductionist testing is supported by a non-reductionist but holistic literature review.

Figure 1. The qualitative and quantitative research process



Source: Self

The research process and the relationships tested are outlined above (Figure 1). In this diagram, Hypothesis A is represented in the diagram as HA, Hypothesis B as HB and Hypothesis C as HC.

Phase One of the research is conducted in the form of a grounded qualitative study, which was used to (i) investigate the relationships between organisational culture and the research productivity of different academic fields (Analysis 1 and Analysis 4); (ii) investigate the relationships between individual values and research productivity (Analysis 2 and Analysis 5)

; (iii) develop theory that relates to the influence of individual performance factors on individual research productivity (Analysis 3); and to provide a rationale for the inclusion of factors in the quantitative analysis (Analysis 6). In Phase 1 of the research, therefore, the qualitative analysis was used to develop theory at two different levels of analysis: (i) at the level of the academic field, proxied as the academic school; and (ii) at the level of the individual academic. Chapter 4 reports the results of the grounded analysis, in which no theoretical framework is applied to the analysis of the qualitative data (Analyses 1, 2 and 3). The results of a different qualitative analysis are discussed in Chapter 6, where the analysis of the qualitative data is undertaken with the GLOBE and Schwartz theoretical frameworks imposed on the data (Analyses 4 and 5); this allowed for a direct analysis of the qualitative and quantitative findings as these were related to each other. In this way, a holistic perspective of these relationships was enabled.

Phase two of the study quantitatively tested GLOBE organisational culture theory at the level of the academic school (Analysis 7), and tested Schwartz individual motivational values theory at the individual level (Analysis 8). As explained previously, these are both *comprehensive* theories of values; the GLOBE studies claim that all organisational cultural values load onto nine core component factors (House *et al*., 2004). Similarly, Schwartz's (2007) values theory considers all cultural values to reduce to a circumplex structure of ten values within four higher order values types. Being comprehensive, they are considered to include the universe of potential values at these two levels, and have a volume of empirical evidence that supports their claims to be comprehensive. The justification for the testing of these two bodies of theory at the corresponding levels of analysis (academic school and individual level) is that they are the dominant two theories in the field. Further, these two bodies of theory provide a counterpoint to a qualitative analysis that provides an inductive perspective of localised contextual relationships. As the dominant theories at the forefront of the contemporary values literature at present, they were extended into this context for testing. By definition, culture research is contextual (House *et al*., 2004) and it was deemed necessary to include all nine analyses in order to be able to present a holistic perspective of the relationships in order to answer the research questions. The results were contrasted with those of the qualitative analysis.

Phase two also entailed a quantitative analysis which used the inputs from the qualitative analysis to tests the associations between the 'performance' variables in the analysis and

research productivity. A paradigmatic triangulation of sorts was applied, and a holistic analysis was enabled. Nine different analyses were therefore applied in this study in order to achieve a holistic research design.

These five different analyses were performed separately. The first analysis (reported in Chapter 4) was qualitative, and considered the influence of organisational culture, and more specifically the influence of differences in organisational cultural values related to academic fields, on research productivity. In this analysis no theoretical framework was imposed; a grounded qualitative analysis was used. The second analysis (reported in Chapter 4) considered the influence of differences in individual values on individual research productivity. The third analysis (reported in Chapter 4) was performed with the objective of deriving a justification for the inclusion of the range of individual performance factors in the research process. The universe of performance factors was delimited through the qualitative analysis. A grounded analysis was therefore applied to derive the factors for inclusion. The fourth analysis (discussed in Chapter 6, in relation to the quantitative findings) applied a modified grounded approach that imposed the GLOBE theoretical framework on the qualitative data. The fifth analysis (discussed in Chapter 6, in relation to the quantitative findings) imposed the Schwartz theoretical framework on the qualitative data. The sixth analysis entailed the derivation of the factor structure of model of 'performance' factors considered to influence research productivity in this context. These factors were categorised into four component categories of factors that are most strongly related to research productivity in this context. This analysis is reported in Chapter 3. The seventh analysis entailed the testing of GLOBE values theory (House *et al*., 2004) at the level of the academic school (to proxy the differences between academic fields). These results are reported in Chapter 5 and are discussed in Chapter 6, where they are related to the qualitative findings. In a similar process, Schwartz values theory was also tested quantitatively and the results are also reported in Chapter 5 and discussed in Chapter 6. The eighth analysis involved the testing of Schwartz's (2007) values theory, and the relationships between its values dimensions and individual research productivity. The results of this analysis are reported in Chapter 5 and discussed in Chapter 6. The ninth analysis entails the testing of the model comprised of the four component categories of 'performance factors' for their direct relationships with research productivity. A breakdown of the content of the chapters of the thesis and their sequence is now offered.

1.6 CHAPTER SEQUENCE

A breakdown of the chapters for the thesis is as follows.

1.6.1 Chapter 1: Background to the study, research problem and research question

In this chapter, the background to the study is outlined, and the theoretical framework of the research is introduced. The lack of knowledge of the potential influence of organisational culture and individual values on research productivity is highlighted as a core aspect of the problem addressed by this research. The predictions of Convergence theory (Kerr *et al*., 1960), and the tensions between best-practice convergence and the constraints posed by values systems are introduced in relation to theory at the societal, organisational and individual levels of analysis. Global Leadership and Organisational Behaviour Effectiveness (GLOBE) programme theory and Schwartz (2007) values theory are introduced as the theoretical framework of the study, and also in relation to the different levels of analysis associated with the research. The core rationale behind the testing of GLOBE organisational culture theory and Schwartz individual motivational values theory in relation to university research productivity is provided. The theoretical basis for the integrative role of culture in academic units is briefly discussed. An overview of methodological precedent applied in culture research is then considered, in order to place the methodology of the study in relation to previous research. After this, the research problem, research questions, the aim of the research, the research objectives, the research questions and the derived hypotheses are introduced. A diagrammatic representation of the research process is also provided, together with an outline of the research process undertaken in the study. The chapter concludes with a summary of the chapters.

1.6.2 Chapter 2: Literature Review

In this chapter, the overarching academic context of knowledge creation is first introduced at the level of the academic field. Next, literature that relates to the southern African organisational and societal context is introduced and the global and societal contexts of knowledge creation are discussed. The literature that relates research productivity to knowledge creation is then considered, after which, the literature that relates theory and previous research findings of the GLOBE studies to research productivity is assessed in relation to culture theory. Literature is then reviewed that relates to the nine dimensions of GLOBE organisational culture: (i) Uncertainty Avoidance; (ii) Power Distance; (iii) In-group

Collectivism; (iv) Institutional Collectivism; (v) Gender Egalitarianism; (vi) Assertiveness; (vii) Future Orientation; (viii) Performance Orientation; (ix) Humane Orientation; and (x) Gender Egalitarianism. Next, the literature that relates to Schwartz's (1992) individual motivational values and the ten values dimensions of this theory is evaluated: (i) Power, (ii) Achievement, (iii) Hedonism, (iv) Stimulation, (v) Self-Direction, (vi) Universalism, (vii) Benevolence, (viii) Tradition, (ix) Conformity, and (x) Security values. A review of the literature that relates individual performance factors to research productivity is then offered. An overview of the chapter then then concludes it.

1.6.3 Chapter 3: Research Methodology

This chapter introduces the research methodology used in this research. The first section of the chapter discusses the two different methods applied: the qualitative and the quantitative approaches. The research is then placed in relation to ontological and epistemological perspectives of research paradigms, and a justification is provided for the stance taken in this study. Grounded theory as a research method is then introduced, in order to explain and justify the use of grounded qualitative analysis in this research. Issues relating to the verification of the trustworthiness of the qualitative process (Guba, 1981) are then discussed. After this, the coding and analysis processes are outlined. Other aspects of the qualitative analysis process are also described and discussed. The second portion of the chapter introduces and discusses the quantitative process applied in the research. The research design is outlined, and then the population and sample of the study are discussed. An explanation of the data analysis process in terms of sampling processes, sample size calculation, and confidence level issues then follows. Issues relating to the sampling protocol, reliability and validity are discussed. At this nexus, each of the hypotheses is introduced, and the measures, the scale development process and the statistical methods used to test each hypothesis are discussed. The chapter then concludes with a consideration of the ethical procedures followed in the research and with a discussion of the limitations associated with the research.

1.6.4 Chapter 4: Grounded Research- Qualitative Findings

This chapter reports and discusses the qualitative research undertaken in this study. The qualitative analysis in this chapter is aimed at developing testable propositions, which in turn form the basis of the hypotheses tested in the quantitative portion of the research. Using a modified form of grounded research, and thematic content analysis, certain relationships

around research productivity were analysed, and propositions were derived for quantitative testing. The responses suggest that a differentiation does exist within the South African higher education context; between a research-oriented organisational culture and a teaching-oriented organisational culture. Differences are also found to exist between academic fields, particularly in relation to the dichotomy between the practitioner fields versus their academic counterparts. The academic debate around the issues of quantity versus quality in the research milieu is also reported and analysed. The influence of geographical location and distance from global centres of research is also considered. The mechanisms that underlie the transmission of organisational culture in these contexts are explored. The organisational culture analysis is followed by an evaluation of the influence of individual values on research productivity. The influence of individual performance factors on research productivity is then considered. A range of propositions are derived from the qualitative analysis. After the propositions have been derived from the qualitative analysis, the sixteen different contextual 'cases' are summarised in relation to the most salient relationships around research productivity for each context. The cases show an outline of the contextual structure of the relationships around research productivity for different researchers within the contexts of the University of the Witwatersrand, University of Cape Town, University of Johannesburg, University of KwaZulu-Natal and the University of South Africa.

1.6.5 Chapter 5: Quantitative Results

In this chapter the results of the quantitative portion of the research are reported. This chapter reports the results of the testing of the hypotheses derived from the propositions obtained in the qualitative portion of the research that were used as the inputs into the quantitative testing process. In this chapter, the univariate results are first reported. After this, the bivariate and multivariate results are reported in relation to each of the tested hypotheses. The results relating to the GLOBE organisational culture dimensions are then reported, followed by the results of the testing of hypotheses that relate to the Schwarz values orientations. The chapter concludes with a report of the results of the hypotheses tests that relate to the four categories of individual performance factors and their relationships with research productivity.

1.6.6 Chapter 6: Discussion of the Findings

In this chapter, the qualitative analysis reported in Chapter 4 and the quantitative results reported in Chapter 5 are discussed in relation to each other. These results are also discussed

in relation to the qualititative analysis that was framed by the GLOBE and Schwartz values theories. In this chapter, the results that relate the hypotheses of the GLOBE dimensions to research productivity are discussed first. This is followed by a discussion of the results that relate the hypotheses of the Schwartz values dimensions to research productivity. Finally, the results of the hypotheses that relate the four categories of individual performance factors to research productivity are assessed. A holistic perspective of the findings is then offered.

1.6.7 Chapter 7: Conclusions and Recommendations

The objectives of this chapter are to summarise the research as reported and discussed; to offer a summary of the research and to make recommendations based on the research findings. Therefore, in this chapter a summary of: (i) the research; (ii) the research objectives; and (iii) the qualitative and quantitative findings, is provided. Recommendations are made for practice and for further research.

1.7 CONCLUSION

In this chapter, the background to the study, research problem and research questions were presented. An introduction was offered, to the theoretical tension between the predictions of Convergence theory and theory that predicts the influence of values systems that constrain the convergence of values and practices toward best practice convergence. An explanation was provided of the role of this research in investigating such values constraints to research productivity as a form of organisational and individual work productivity. The theoretical framework of the study was introduced. Theory relating to the different levels of analysis was discussed in order to contextualise the study in relation to theory from the literature. GLOBE values theory and Schwartz values theory were discussed in relation to the two levels of analysis applied in this research; the level of the academic field (or school) and the level of the individual academic. At the individual level of analysis, the theoretical tension of Schwartz values theory; between Self-Enhancement values and Self-Transcendence values and between Openness to Change values and Conservation values was also introduced. An overview of methodological precedent was offered, and the rationale for the use of the methods in this research was discussed. An introduction of the research problem, the aim of the research, the research objective and the research questions was provided. Hypotheses were formulated and the research process applied in the research was explained with

reference to a diagram. The chapter was concluded with an outline of the contents of the thesis based on a breakdown of the chapter sequence.

CHAPTER 2

LITERATURE REVIEW

2 LITERATURE REVIEW

2.1 INTRODUCTION AND STRUCTURE OF THE LITERATURE REVIEW

In this chapter, literature that relates to research productivity is reviewed. South African organisational and societal context of research productivity is first introduced. The global and societal context of knowledge creation is then discussed. Literature relating to culture theory that existed prior to the GLOBE research projects is then reviewed. The two streams of prior research are acknowledged: the organisational culture literature and the organisational climate literature. Denison's (1996) synthesis between these two literatures is explained, and discussed. The theoretical antecedents to GLOBE theory are then considered, particularly in relation to the work of Hofstede. A justification is also provided for the importance of organisational culture theory in terms of its potential influence on research productivity, which is conceived of as a dimension of organisational performance. Literature that relates to each of the following GLOBE dimensions of organisational culture is reviewed: (i) Uncertainty Avoidance; (ii) Power Distance; (iii) In-group Collectivism; (iv) Institutional Collectivism; (v) Gender Egalitarianism; (vi) Assertiveness; (vii) Future Orientation; (viii) Performance Orientation; and (ix) Humane Orientation. GLOBE findings that relate to specific industry-specific relationships are also considered. The literature that relates to Schwartz's motivational values and their potential influence on research productivity is then reviewed.

Schwartz values theory is discussed, and the importance of this body of theory at the individual level of analysis is explained. For Schwartz (1994), all the types of values from different cultures can be classified into one of ten dimensions of individual values. Schwartz's (1994) circumplex structure of motivational values is explained. Literature that relates to the following ten Schwartz values dimensions is reviewed: (i) Stimulation values; (ii) Self-direction values; (iii) Universalism values; (iv) Benevolence values; (v) Conformity values; (vi) Tradition values; (vii) Security values; (viii) Power values; and (ix) Achievement values. The overarching tensions between the four higher order values types; (i) Openness to Change; (ii) Conservation; (iii) Self-enhancement and (iv) Self-transcendence.

The chapter concludes with a review of the literature that relates to the four categories of individual-level performance factors, in terms of their predicted relationships with research

productivity. The Southern African organisational and societal context is introduced as follows.

2.2 THE SOUTH AFRICAN ORGANISATIONAL AND SOCIETAL CONTEXT OF RESEARCH PRODUCTIVITY

The University of the Witwatersrand was founded in 1896, initially as the South African School of Mines, and was granted full university status in 1922 (Wits, 2012). Located in Johannesburg, South Africa, the university has been ranked in the top one percent in the world in seven areas of research according to the ISI international rankings of 2007 (Wits, 2012). It also boasts four Nobel Prize Laureates amongst its graduates (Wits, 2012). With about 28000 students, the University is organised around five Faculties: (i) the Faculty of Commerce, Law and Management; (ii) the Faculty of Health Sciences; (iii) the Faculty of Humanities; (iv) the Faculty of Science; and (v) the Faculty of Engineering and the Built Environment (Wits, 2012). These five Faculties comprise thirty-five Schools (Wits, 2012). The strategic plan of the university is to grow its portion of postgraduate students from about twenty-eight percent to fifty percent of its enrolments by 2015; an increase in research productivity is therefore an important aspect of this strategy (Wits, 2012). Transformation has been relatively successful in terms of student numbers, with 53% of the almost 30000 students being female and 72% of black origin by 2009 (Wits, 2012). The University is a relatively large University within the broader continental University context.

An example of the state of South African research productivity in relation to the continent is the case of biomedical publications. Within the African context of research productivity, South Africa, Egypt and Nigeria contribute about sixty percent of the continent's research productivity in the field of biomedical publications (Uthman & Uthman, 2007). However, when controlling for the population size of countries, The Gambia, Gabon and Botswana were found to have higher research productivity than Nigeria (Uthman & Uthman, 2007). Between the years 1996 to 2005 Africa's research productivity has been relatively low yet also correlated with population size ($r = 0.75$; $p<0.001$) (Uthman & Uthman, 2007). With the size of the population controlled for, South Africa has the highest research productivity output of the continent (Uthman & Uthman, 2007). A significant and positive relationship has also been found between GDP and research productivity ($r = 0.70$; $p<0.001$), yet when adjusted for GDP, The Gambia, Eritrea, and Zimbabwe were found to be the most productive

on the continent, with South Africa and Nigeria having a lower research productivity in the biomedical field in relation to their GDP (Uthman & Uthman, 2007). Increasing levels of research productivity are a trend in African research, with the exception of Zimbabwe, where first author publications were found to have dropped from 123 in 1996 to only 58 in 2005 (Uthman and Uthman, 2007). South African publications were found to increase from 2442 to 4699 over this period, although its relative share of the continent's research productivity decreased from thirty four percent to about twenty eight percent over this same period (Uthman and Uthman, 2007). Research productivity in Africa is skewed, with South Africa contributing about a third of the continent's research output, and Egypt together with Nigeria contributing about another third (Uthman and Uthman, 2007). According to Uthman and Uthman (2007) much research productivity in Africa might not be measurable due to the lack of smaller African journals to listings and international citation databases.

2.3 KNOWLEDGE CREATION: GLOBAL AND SOCIETAL CONTEXTS

Knowledge creation in the university context has been differentiated on the basis of pure and applied knowledge and also on the basis of the social features of knowledge communities (Becher, 1989). Becher (1989) researched differences between academic disciplines in the United Kingdom and the United States of America, interviewing more than 220 academics from twelve disciplines and eighteen institutions. Becher (1989) offers a differentiation of knowledge creation according to a spectrum of social features of knowledge communities. One extreme of this spectrum represents "convergent, tightly knit disciplinary configurations" another extreme represents more divergent and loosely knit disciplinary configurations (Becher, 1989:5). For Becher (1989:6), research into the differences between academic fields "straddles the little-explored border zone between the sociology of knowledge and social studies of science on the one hand, and the study of higher education on the other". Such research therefore follows a process of "mapping this relatively unchartered territory…by recognising the diversity and range of its topology and attempting to bring some order into the apparently chaotic configuration of features which constitute the landscape of academic knowledge" (Becher, 1989:6). For Becher (1989:7):

> Knowledge has many metaphors. The image of a landscape is only one: another favoured candidate is a seamless cloak. That, however, has implications of continuity and coherence which bear poor comparison with the current state of human understanding. From the perspective of those engaged in its creation, knowledge would appear more closely comparable with a badly made patchwork quilt, some of whose constituent scraps of material are only loosely tacked together, while others untidily overlap, and yet others seem

> inadvertently to have been omitted, leaving large and shapeless gaps in the fabric of the whole.

The metaphor offered by Becher (1989) is taken to indicate that a study of research productivity as envisioned in this work would need to respect the complexity inherent in such an exercise. An implication of this conception is that further research may contribute to such a 'mapping of this relatively unchartered territory'. According to Becher (1989), such a 'mapping' of the academic topology might not reveal homogeneity, but heterogeneity.

Differences in academic fields also relate to the extent to which generalisability is a feature of the research of a particular field. For Becher (1989), biology as a field of academic research is associated with a very low level of generalisability, because the material researched is inherently heterogeneous, and preconceived theory is often challenged by new findings. Mechanical engineering is typically associated with externally defined problems, and is also a heterogeneous field, a professional discipline relating to the application of principles to technical devices (Becher, 1989). Sociology, for example, is primarily associated with the investigation of social forces and the principles of societal change (*ibid*.) It is also concerned with generalisable research, causality as an aspect of investigation, and with theory development (Becher, 1989). In contrast, law as an academic field is typically associated with a relatively descriptive ordering of a body of rules, which is a relatively value free process based on a shared criteria of judgement (Becher, 1989). These differences between academic fields are expected to be associated with differences in research productivity.

Research productivity might be an atypical form of performance if the research productivity of academic departments is a function of a relatively small number of researchers. Using data from publications in 254 journals over the period 1985-2004, using the Herfindahl-Hirschman index, Grijalva and Nowell (2008) analysed research productivity in the field of economics in American universities. Certain university departments were found, in certain instances, to be highly ranked according along a range of measures due to one particular individual within such a department (Grijalva & Nowell, 2008). Owing to the presence of such outliers in populations of university academics, the use of an analysis at the individual level that corresponds with an analysis at the group, or aggregated level of analysis might be necessary. According to Ramsden (1994:209), a review of the literature on research output indicates the following consistencies:

> most publications are produced by a small number of academics and that many faculty produce little or nothing. In other words, the distribution of publications is heavily and negatively skewed. The study of this phenomenon was pioneered by Lotka (1926) and the regularity known as 'Lotka's Law' (the number of people producing n papers is approximately proportional to 1/n[n]).

The productivity of individuals has also been found to be influenced by the HRM processes in organisations. Innovations and knowledge creation have been found to be associated with the use of certain HRM processes in organisations (Laursen & Foss, 2003; 248). The University of the Witwatersrand is taken to represent an organisational context within the HRM regime was, to some extent, similar across academic fields, and therefore effectively controlled for.

Academic research might differ from 'private' research. Multinational corporations are responsible for most of the world's research and development (R&D), as knowledge is passed from parent corporations to localised affiliates (Gao, Xu & Yang, 2008). Managerial ties between local and foreign corporations also influence innovation (Gao *et al*., 2008). However, business ties have been found, in certain contexts, to play a greater role than university based ties in innovation for shared learning, knowledge transfer, and information exchange (Gao *et al*., 2008). If academic research is less associated with shared learning, knowledge transfer and information exchange then it might be less innovative than private research.

Research is fundamentally innovative, if its goal is to produce new knowledge (Young, 2005). According to Young (2005:323), research is "a systematic inquiry to address questions and produce new knowledge". Young (2005) conceives enhancing research productivity to include both the quality and quantity of research published. Quality of research entails a process of building on the strengths of previous work and also bridging gaps in knowledge (Young, 2005).

Different fields, and different sub-fields within academic fields, have been found to differ in their research output. In economics, for example, as an academic field, specialist areas such as history, urban/regional economics, and industrial organisation are found to have fewer articles published ($p<0.05$) than in other areas (Barbezat, 2006). Academic sub-fields were therefore found by Barbezat (2006) to play a significant role in differences in research

productivity. Boundaries between academic units are therefore not limited to those associated with the academic field, and can exist between sub-fields.

The global context of research productivity has seen the dominance of knowledge economies (Sandow & Rhodes, 1996). Organisational performance "in the knowledge-based economy requires a greater focus on human systems, just as the industrial-based economy required a greater emphasis on physical systems" (Sandow & Rhodes, 1996:186). According to Sandow and Rhodes (1996), it is therefore the individuals in organisations that contribute the most to organisational performance in a knowledge economy. Individual performance as well as the performance of academic schools is an important aspect of research performance, or productivity. The increasing importance of the human component of performance needs to be reflected in HRM systems; "changing our study of human systems requires a change in our way of thinking", this needing "a new human resource epistemology" (Sandow & Rhodes, 1996:186).

Academic knowledge creation has been likened to a 'flow' of knowledge. Academic knowledge creation is a flow of knowledge; research production can be viewed as a transformation model, consisting of raw material in the form of information and knowledge that is further transformed into new knowledge (Huang, 2009).

A flow of knowledge in the academic context entails the movement of knowledge across boundaries. University knowledge creation, or research productivity, can be viewed as building on, and contributing to, a stream of knowledge creation; an 'open' innovation process. According to Chesbrough (2005), outsourced knowledge creation, or R&D, increasingly occurs as manufacturing functions are outsourced. Capturing spill-overs from industrial R&D has traditionally been considered as a cost according to the 'pre-open source' paradigm (Chesbrough, 2005). In contrast, the open source paradigm regards these spill-overs as business model enhancements or as technology spin off opportunities (Chesbrough, 2005). Open innovation is defined by Chesbrough (2005:4) as a "paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology". The open innovation processes therefore "combine[s] internal and external ideas into architectures and systems" (Chesbrough, 2005:4). The open innovation paradigm assumes knowledge to be abundant; unlike the previous paradigm, where knowledge was deemed "scarce, hard to find, and hazardous to

rely on (a root cause of the 'Not Invented Here' syndrome)"(Chesbrough, 2005:4). In open innovation, "useful knowledge is generally believed to be widely distributed, and of generally high quality" (Chesbrough, 2005:11). If technology has enabled the availability of information then radical change in knowledge creation might be associated with changes in the technologies that underpin the management of information, and the management of knowledge. Although private knowledge creation, or R&D, might have embraced the open innovation paradigm, the extent to which academic research productivity has done so is not clear from the literature.

Other changes have occurred in the way information and knowledge is processed, and used. According to Malhotra (2000), the typical information-processing view of knowledge management is no longer valid; radical change in the business environment is increasingly manifested as dynamically discontinuous change. Private firms are perhaps more vulnerable to dynamically discontinuous change than academic universities. Malhotra (2000) argues that knowledge management needs to be reconceptualised independently of the paradigm of optimisation and efficiencies-based thinking that drives objectives such as consensus, convergence and compliance. For Malhotra (2000), routine-based knowledge management paradigm is more suited to stable environments. If the context of university research productivity is a more stable context than the private R&D context, then the academic research context might be less innovative.

An interest in radical innovations in the private R&D environment is evident from the knowledge creation literature. Dismukes (2005:19) argues that by:

> combining advanced information and telecommunications technology tools and innovation management techniques in a real-time decision making environment, the ARI [Accelerated Radical Innovation] paradigm has the potential to overcome technological, organisational and societal challenges and hurdles, thereby achieving a factor of 10X improvement in radical innovation effectiveness.

Dismukes (2005:19) suggests a process where the "further development of this proposed new paradigm is envisioned through a collaborative multi-university program of research and teaching, in collaboration with selected industrial partners to identify methodology variants appropriate for diverse companies and industries". Dismukes (2005:21) argues that in "today's geographically and virtually connected society, the widespread availability of education and knowledge, and access to exponentially increasing power of information technology for real time interaction makes possible the development of a practical

breakthrough innovation process with a sound theoretical basis". For Dismukes (2005), universities are important partners in this process. Constraints to university knowledge creation may act as a constraint to the innovativeness of the system that includes universities as a part of it. The overarching trend toward accelerated knowledge creation (Dismukes, 2005) is inextricably bound up in the progress of technology.

The flow of knowledge can also be constrained, or blocked, if new knowledge is not used. According to Kobayashi *et al*. (2007:367), "deep woods", or "a lack of ideas for how to solve a problem", and "death valley", or "having a solution but lacking ideas about how to implement it practically and commercially" are frequently used metaphors applied in the management of technology (MOT). In the context of knowledge creation, the term "death valley" also refers to "the fact that many results of academic research remain unused, they lie forgotten on academic shelves" (Kobayashi *et al*., 2007:358). These and similar issues fall within the scope of 'management of technology' research.

The management of technology can be generically defined as the "formulation, adoption and implementation of technological strategies by corporations and organisations which conduct technology-based business" (Kobayashi *et al*., 2007: 354). These strategies are typically developed to identify the potential of technologies, to link these to business opportunity and to create sustainable development and economic value (Kobayashi *et al*., 2007: 354). The concept 'management of technology' has also been termed 'technology management', 'engineering management', and 'information technology management', all "with similar definitions" (Kobayashi *et al*, 2007: 354). Since the mid-1990s, management collaborations with engineering have increased, as business schools have responded positively to the development of MOT as a field (Kobayashi *et al*, 2007: 354). According to this body of literature, academic fields that are more aligned with these innovative changes in the knowledge creation process will be expected to be more research productive. Convergence theory predicts that best practices that increase performance in other contexts will be implemented (Kerr *et al*., 1960). Best practices in private R&D are therefore expected to be benchmarked and implemented in academic research. However, this process of innovative benchmarking and implementation is caused by the pressures of increasing competitiveness (Kerr *et al*., 1960). Universities might exist within more stable environments that are less subject to these pressures for innovativeness.

Individuals who are more innovative might produce more research output in a context that requires innovativeness. However, if innovativeness is not 'rewarded' by a specific work context, then more innovative individuals might not be expected to be more research productive. The academic system can also be considered to represent a component in the 'flow' of knowledge (Kobayashi *et al*., 2007). Lambe and Spekman (1997) argue that the literature relating to "a new paradigm, a radical innovation, the next killer application- the terms differ, but they all point to the same thing: a major change in the technology base for a mature industry". A question that arises at this juncture is what is the role of a university in terms of the industries it serves? Unquestionably, the university is part of the 'training' industry, as it provides skilled human capital as the inputs to other industries. In terms of the 'research industry', universities are also participants in a 'research industry'. With two different 'industry' orientations, the university might be vulnerable to the changes in technology and knowledge management in different ways according to these two different industry orientations. Further literature is reviewed here in order to complete a broad overview of the literature that relates to the knowledge context of this research. It is argued that the tension between these two 'industry' functions, or roles, of the university does influence the research productivity of such institutions. The way in which learning and the incorporation of technology contribute to research productivity is considered to be a function of the innovativeness of institutions and individuals.

Learning is core to the process where organisations accumulate technology to become more competitive (Dodgson, 1993). Productivity is the focus of different theoretical fields; the "major focus" of industrial economists is productivity, where the efficiency of learning is associated with productivity (Dodgson, 1993). However, the learning-productivity relationship is not a passive, automatic, or costless process (Dodgson, 1993). Contexts are becoming increasingly discontinuous. Anderson and Tushman (1991) offer examples of the increasingly discontinuous enterprise environment, such as shifts in technology ranging from changes in vacuum tube technology to the technology inherent in newer cement manufacturing techniques. On the basis of these changes, Anderson and Tushman (1991) argue discontinuous innovations are reflected in patterns of innovation, with predictable consequences. Each time a new technology becomes dominant in an industry, there is typically a change in industry leadership, and "few companies, it seems, are able to make a successful transition to a profitable new technology" (Foster, 1985:127). The trajectories of

the ‘training’ industry and the ‘research industry’ that a university competes in might be different for these two industries, with implications for research productivity.

With regard to technological limits, Foster (1985:128) argues that technological “improvement in any field is ultimately limited by the laws of nature”. However, limits exist well within these barriers in the form of practical limits such as those existing for the inputs to a process or a product (Foster, 1985). The reality of technical limits cannot be avoided; the technology S-curve reflects the constraints an industry faces (Foster, 1985). The S-curve reflects the performance obtained from a technology over the engineering effort that is invested in the process (Foster, 1985). Foster (1985:130) defines R&D productivity as “the ratio of the change in output to the change in input”, or the “improvement in the performance of the product or process divided by the incremental effort required”: the relationship between “technical progress and R&D investment at various stages of development”. However, research, or R&D, productivity is not the only variable that influences decisions on technology, as yield, or profitability, is equally important (*ibid*.). Yield is dependent on factors driven by changes in the market and the effect of competitors and their strategies (Foster, 1985). It is argued here that the university is relatively more independent of competitive pressures than private firms, if state and other funding provides this independence from market forces. Academic research productivity might not, therefore, be expected to reflect the same relationships around research productivity as those found in the private R&D context.

Rapidly changing technology and shorter product life-cycles make competitive advantage more elusive, and alliances are becoming more attractive for firms; a more open way of generating knowledge (Lambe & Spekman, 1997). According to Ravesteyn and Silvius (2008), further research is needed on cultural differences and the use of open systems in research. For Swan (2007:198), open “access can advance science” by “accelerating the speed at which science moves”. Over the years, physicists have used a system where preprints of research papers are posed early to gain immediate access to results: this open access system is producing shortened research cycles, accelerated progress and increased efficiency (Swan, 2007). Changes toward open source journals might reflect the engagement of university research with these changes and trends. However, how the university defines its industry participation might have implications for research productivity.

According to Levitt (1960), defining an industry according to a product orientation fails to take a customer orientation into account, and this might cause the decline of entire industries. An industry should define its ambit as the creation of customer-satisfying uses for its activities, or it will suffer from marketing myopia, which can lead to the failure of industries and firms (Levitt, 1960). Levitt's (1960) perspective; that each industry will face substitutes if it does not effectively address the needs of customers, or indeed stakeholders, implies that an increase in the efficiency and effectiveness of academic research is needed, lest substitutes develop, and universities might be forced to become participants in the market process. An increasing customer-centric focus by academic institutions might be fuelling a drive in academic schools toward a teaching orientation in order to better meet the needs of customer stakeholders. With regard to the 'research' industry, however, such trends are perhaps less evident. Levitt (1960) argues that there is no such industry as a growth industry, and that the evidence of fallen industries reveals a common picture: that of self-deceiving cyclical expansion and undetected decay. Levitt (1960) also argues against R&D at the expense of the market, and the marketing function; firms exist primarily to 'buy' customers. The research industry is also considered to have 'customers', or stakeholders that it needs to provide value to, or its stakeholders may turn to other industries.

The value that universities provide as research is in the form of knowledge. The tension between two fundamental aspects of knowledge creation (information generation versus 'true' knowledge creation) is reflected in the tension between two types of knowledge: explicit knowledge, and tacit knowledge, respectively (Nonaka, 1994). How academic research meets the needs of different stakeholders is also dependent on how tacit and explicit knowledge conversion occurs. Nonaka (1994:15) proposes a 'spiral' model of knowledge creation:

> which shows the relationship between the epistemological and ontological dimensions of knowledge creation. This spiral illustrates the creation of a new concept in terms of a continual dialogue between tacit and explicit knowledge. As the concept resonates around an expanding community of individuals, it is developed and clarified. Gradually, concepts which are thought to be of value obtain a wider currency and become crystallised.

Nonaka (1994) defines knowledge as 'justified true belief', and distinguishes between traditional views of knowledge and the theory of knowledge creation. Nonaka (1994:15) stresses that the former stresses the "absolute, static, and nonhuman" nature of knowledge, yet the latter views knowledge as a "dynamic human process of justifying personal beliefs as part of an aspiration for the 'truth'". Nonaka (1994:15) also draws a distinction between the

terms ‘information’ and ‘knowledge’; information is a flow of messages which shapes knowledge. Knowledge is also “anchored on the commitment and beliefs” of the individual (Nonaka, 1994:15). For Nonaka (1994:15), knowledge is seen to be related to human action, and attention “should be focused on the active, subjective nature of knowledge represented by such terms as ‘belief’ and ‘commitment’ that are deeply rooted in the value systems of individuals”. According to this conception, organisational cultural values and individual motivational values are considered to be at the heart of this fundamentally subjective process of knowledge creation.

For Nonaka (1994), knowledge is created by individuals and the organisation provides a context to support this process. The organisation also ‘amplifies’ this process and ‘crystalises’ this knowledge as part of a knowledge network (Nonaka, 1994). Different levels of social interaction then transform and legitimise this knowledge that has already been created by the individual (Nonaka, 1994). Firstly, an informal community of social interaction, that might span organisational boundaries, may allow the knowledge to gain “a broader currency within the organisation” (Nonaka, 1994:17). Secondly, formal provisions can build knowledge using a more formalised form of communities of interaction, as may occur in the case of alliances or outsourcing (Nonaka, 1994). Organisational cultural values are expected to exist at an informal level yet are also expected to be reflected, over time, in formal aspects of the organisation. In order to produce research, however, an individual needs to be engaged with the knowledge creation process. An individual is expected to bring his or her values into the process.

The underlying assumptions and values of individuals have been found to influence certain academically embedded economic disagreements (Mayer, 2001). For example, economic history itself is ‘reconstructed’, in that “all texts of the past need to be reconstructed because they do not speak with one voice and are never unambiguous: even the authors of these texts are never in complete control of their own meaning” (Blaug, 2001:151). Theorists therefore are not independent of their subjective interaction with the world (Blaug, 2001).

According to Kuhn (1970: 2), “science does not develop through the accumulation of individual discoveries and inventions”; historians of scientific progress experience “growing difficulties in distinguishing the ‘scientific’ component of past observation and belief from what their predecessors had readily labelled ‘error’ and ‘superstition’”. Kuhn (1970:2)

therefore stresses that the more carefully historians of science study the different manifestations of scientific enquiry;

> the more certain they feel that those once current views of nature were, as a whole, neither less scientific nor more the product of human idiosyncrasy than those current today. If these out-of-date beliefs are to be called myths, then myths can be produced by the same sorts of methods and held for the same sorts of reasons that now lead to scientific knowledge. If, on the other hand, they are to be called science, then science has included bodies of belief quite incompatible with the ones we hold today.

Kuhn (1970) offers a perspective of the development of academic inquiry that might suggest that cultural group values effects might indeed play a part in the development of the traditions of academic pursuits. For Kuhn (1970:3):

> The result of all these doubts and difficulties is a historical revolution in the study of science, though one that is still in its early stages. Gradually, and often without entirely realising they are doing so, historians of science have begun to ask new sorts of questions and to trace different, and often less than cumulative, developmental lines for the sciences. Rather than seeking the permanent contributions of an older science to our present vantage, they attempt to display the historical integrity of that science in its own time. They ask, for example, not about the relation of Galileo's views to those of modern science, but rather about the relationship between his views and those of his group, i.e., his teachers, contemporaries, and immediate successors in the sciences. Furthermore, they insist on studying the opinions of that group and other similar ones from the viewpoint- usually very different from that of modern science- that gives those opinions the maximum internal coherence and the closest possible fit to nature.

For Kuhn (1970), the beliefs, assumptions and values of an individual researcher and groups of researchers are brought to the investigation of phenomena. The research system, therefore, of an individual researcher at a point in time is primarily dependent on the beliefs, assumptions and values of the group of researchers around him or her at such a point in time. According to this conception, research productivity is not independent of, or isolated from, the effects of social context. Kuhn (1970: 4) stresses that "the early developmental stages of most sciences have been characterised by continual competition between a number of distinct views of nature, each partially derived from, and all roughly compatible with, the dictates of scientific observation and method", where what differentiated these various schools was "not one or another failure of method- they were all 'scientific'-but what we shall come to call their incommensurable ways of seeing the world and of practicing science in it".

The existence of such incommensurable ways of viewing the world that may exist between academic fields (Kuhn, 1970), is in this research considered to be related to: (i) the individual's universe of underlying assumptions and values, derived from an interaction over time with the societal and organisational contexts, and (ii) the group-level universe of norms

or cultural values that are shared. Since evidence suggests that such a universe of shared group-level values does indeed reduce to nine fundamental values orientations (House *et al*., 2004), it is argued that the investigation of the influence of such values in the academic context will provide important insight into research productivity. Similarly, evidence suggests that the universe of individual motivational values can be represented by ten fundamental values orientations within a framework of four higher-order values types (Schwartz, 2007). Therefore it is argued that the investigation of the influence of these values will provide insight into relationships around research productivity if research productivity is indeed influenced by subjective human values.

The testing of these two bodies of values theory, at the level of the Academic School and at the level of the individual academic, over and above the investigation of individual-level effects, or biographical and contextual factors, is considered to be justified in terms of the above literature. At this juncture, literature that relates to organisational culture is reviewed, with specific reference to GLOBE theory. Schwartz values theory is then reviewed in the section that follows this. The literature review then concludes with a review of the relationships between performance factors and research productivity.

2.4 GLOBE ORGANISATIONAL CULTURE

This section offers literature that relates to cultural values and their predicted relationships with research productivity. The core rationale underlying the testing of GLOBE theory (House *et al.*, 2004) rests on evidence has been found that the universe of cultural group values load onto nine fundamental underlying values. The seminal work of House *et al*. (2004), which has been tested in over sixty countries, is therefore taken as a point of departure in this research. The definition of culture, according to the Global Leadership and Organisational Behaviour Effectiveness (GLOBE) research, is "shared motives, values, beliefs, identities, and interpretations or meanings of significant events that result from common experiences of members of collectives that are transmitted across generations" (House & Javidan, 2004:15). House and Javidan (2004: 15) stress that "these are psychological attributes" and that this definition can be applied "at both the societal and organisational level of analysis".

This definition is consistent with the perspective of Leavitt & Bass (1964), and of Schein (1996); where the psychological nature of the cultural dynamic is also recognised. The

definition of culture in this research corresponds to the GLOBE definition (House & Javidan, 2004).

Inextricable interconnections between "academic cultures and the nature of knowledge" exist, as culture is an important dimension of academia (Becher, 1989:1). Culture is an important aspect of managing human resources, and can be managed to influence productivity (Deal & Kennedy, 1982; Peters & Waterman, 1982). Similarly, HRM practices have been found to influence research productivity (Laursen & Foss, 2003; 248). If values constraints to research output do exist in this context, then knowledge of these may contribute to better management of research productivity.

Denison (1996) provides a review of the literatures relating to organisational culture and to organisational climate, and offers a theoretical synthesis of these two bodies of literature. In this research the term 'organisational climate' is considered to be synonymous to the term 'organisational culture', following Denison's (1996) synthesis of these two streams of research.

The theoretical development of cultural perspectives in the 'organizational studies' literature has occurred on the front lines of 'paradigm wars', as the study of culture within the functionalist or scientific paradigm has been criticised on ontological grounds by scholars in other paradigms (Denison, 1996). However, research that applies quantitative methods to measure and test 'dimensions' of culture has also emerged along a separate stream that initially appeared incommensurate with the dominant ideology of 'organizational studies' and the epistemological foundations associated with its study of culture (Denison, 1996). This stream, which used quantitative methods to investigate what is today considered to represent culture, was called climate research (Denison, 1996). Current empirical cultural research, therefore, extends the culture research stream of 'organisational climate' research, which is an "older and now neglected tradition" (Denison, 1996:620).

The historical culture literature, being contextualised and idiographic in its epistemological perspectives, contrasts with the climate literature, which is more comparative and nomothetically oriented (Denison, 1996: 625). The culture research typically used underlying values and assumptions as the level of analysis as opposed to the use of surface-level manifestations used by climate research (Denison, 1996). The fundamental theoretical

foundations also differed: culture research was built on social construction theory and critical theory and was typically associated with the disciplines of sociology and anthropology; whereas climate research drew from Lewinian field theory and was associated with psychology (*ibid*.).

The trend, however, has been toward a convergence between these literatures (Denison, 1996). According to Denison (1996:625), both climate and culture research now both investigate the "internal social psychological environment of organisations and the relationship of that environment to individual meaning and organisational adaptation". Denison (1996:626) argues that the definition of culture offered by Schein (1985) and the definition of climate offered by Tagiuri and Litwin (1968) offer similar conceptions of the phenomena under investigation: (i) that the collective "cognitive representation of patterns of social learning over time" is common to both bodies of theory; and (ii) that both "attempt to describe the holistic nature of social contexts in organisations, the durability of these organisational contexts over time, and the roots of these contexts in the organisation's system of beliefs, values and assumptions".

Denison (1996) also draws parallels between the organisational culture literature and the organisational climate literature with regard to methodology and epistemology. The influence of postmodernism was a formative force in the initial development of the culture literature in that it first emerged as an attack on positivist social science. According to Denison (1996:630) postmodernists "often are harshly critical of attempts to systematise, define, and impose rational comparative logics on the social and organisational world". The postmodernist literature has regarded comparison as a meaningless activity, due to the core tenet of postmodern epistemology: that is impossible to define "adequately the elements to be contrasted and likened" (Denison, 1996:630). Therefore, a comparative analysis of the sort undertaken by positivist or functionalist research between phenomena is not valid, from the postmodernist perspective, which effectively rendered the field of culture research undertaken by the climate researchers (where sets of cultural dimensions are developed to allow for comparative "generalisations regarding perceived social and psychological environments") incommensurate with postmodernist tenets (Denison, 1996: 632).

According to Kilduff and Mehra (1997), a theoretical and paradigmatic gulf exists: "between those empiricists distrustful of speculation in the absence of rigorously collected quantitative

data and those postmodernists dismissive of all attempts to use data to represent the world". Parker (1995:553), however, argues that "postmodernism is a dangerous, and potentially disabling set of ideas for critical organisation theorists to adopt", in that "any emancipatory project is not served by giving up entirely on notions of 'truth' and 'progress'". For Parker (1995:553), therefore, the postmodernist paradigm is associated with jettisoning notions that organisations can be improved, where "the postmodern epistemology" is a "distraction from an analysis and amelioration of the effects of global capitalism". Parker (1995:553) stresses that postmodern thinking offers useful insights into the provisional nature of all knowledge", yet "it is a set of ideas that should be treated as a grinding stone to sharpen critique and not as an excuse for avoiding it".

It would simply be impossible to study phenomena such as culture if the postmodernist perspective denied the fundamental existence of culture, according to Parker (1995). Due to the overarching intent of this work: to provide insights for the management of the research productivity, the ontological and epistemological perspectives of this research are not associated with the postmodernist perspective, but with the positivist and functionalist tradition. No attempt is made in this work to critique the different paradigmatic perspectives on research: such an exercise is beyond the scope of this work. However, the existence of such perspectives is recognised, and out of respect for the different academic traditions, this research is placed in relation to these other perspectives, and in the methodology section the epistemological and ontological assumptions associated with this are made explicit, and the methods used in this study are justified paradigmatically.

Notwithstanding the historical differences between organisational culture researchers and organisational climate researchers, a watershed was perhaps reached with the advent of Hofstede's work, which was met with acclaim by many culture scholars (Denison, 1996). According to Denison (1996:634), the trend towards convergence in the substance and content of these two literatures "also makes it more difficult to distinguish culture and climate research solely on the basis of epistemology or method". Denison (1996:634) stresses that perhaps "the most significant difference between the culture and climate literatures lies not in the nature of the phenomenon or the methods used to study it, but in the theoretical traditions that have been borrowed from other branches of the social sciences.

Denison (1996:645) concludes further that "these two research traditions should be viewed as differences in *interpretation* rather than differences in the *phenomenon*". On the basis of this, Denison (1996) argues that this perspective enables the integration of theory that relates to this common phenomenon. The following implications, therefore derive from such a perspective, according to Denison (1996), that: (i) both qualitative and quantitative research methods should be used to study culture; and (ii) that the exclusion of methods or frameworks from study based on demarcated restrictions by different fields should be ended in this area of research.

As already stressed, in terms of academic culture in particular, inextricable interconnections between "academic cultures and the nature of knowledge" exist, and culture is an important dimension of academia (Becher, 1989:1). Certain management theories and psychological theories may also be inextricably embedded in cultural foundations (Hofstede, 1980). According to Schein (1996:229), inattention "to social systems in organisations has led researchers to underestimate the importance of culture- shared norms, values and assumptions- in how organisations function". According to Schumpeter's (1949) conception, the subjective component of an individual's underlying assumptions and values, at the extreme, can manifest in ideologies which exist to some extent independent even of evidence. The seminal theory of Hofstede (1980) provides the core theoretical framework of GLOBE theory, which builds on this work.

A seminal argument offered by Hofstede (1980b) is that much academic theory of the social sciences has also been influenced, in its development, by values, and specifically by the cultural values of the area of the world in which these theories were developed. This view is taken to represent an extreme view, of cultural values determinism. On the basis of such a perpective, academic theory is itself cultural values-specific. In support of this argument, Hofstede (1980b:55) stresses, for example, that McClelland's (1961) "concept of the achievement motive presupposes two cultural choices- a willingness to accept risk (equivalent to a weak Uncertainty Avoidance)", and "a strong concern for performance (equivalent to strong Masculinity)". Hofstede (1980b:55) stresses that McClelland's theories are rooted in the culture of the Anglo-American world, illustrating this point with a reference to the fact that the word achievement itself "is hardly translatable into any language other than English". The implication of Hofestede's (1980b) argument is that knowledge of the influence of different cultural values in academic contexts is an important aspect of

investigation. Hofstede's (1980a) work has been associated with an increase in the volume of literature devoted to its influence, across different disciplines.

Hofstede's (1980a) research offers insights that are related to a period of time. McClelland's (1961) similar research into the aggregation of learned needs also relates to a certain period in time. Subsequent research has sought to establish what differences in culture have emerged over time. Fernandez, Carlson, Stepina & Nicholson (1997), for instance, found U.S.A. measures of Uncertainty Avoidance to reflect a shift from a position of weak Uncertainty Avoidance to strong Uncertainty Avoidance. Japan and Mexico were found to have changed positions in the opposite direction to those found by Hofstede (1980a) (Fernandez *et al*., 1997). Mexico was also found to have changed from Collectivism to Individualism; Germany from Masculine to Feminine, and the U.S.A. from Masculinity to Femininity (Fernandez *et al*., 1997). Fernandez *et al*. (1997) conclude from their findings that values do change over time, and that work-related values in organisations might also change over time. Convergence theory predicts that cultural differences will decrease over time, particularly in industrial nations (Williamson & Flemming, 2002).

Adler (1983) reviewed publications in twenty-four journals from 1971 to 1980, and found less than five percent of organisational behaviour articles to focus on cross-cultural issues at the time. Hofstede's (1980a) has contributed to an increasing interest in culture research (Søndergaard, 1994).

Søndergaard (1994) conducted an analysis of citations relating to research conducted on Hofstede's (1980a) work. Citations were analysed and a meta-analysis of the content was conducted in 1993 (Søndergaard, 1994). Søndergaard (1994) suggests that Hofstede's framework has been used as a paradigm, or an assumptive manner, where no testing of the concepts was undertaken. However, Hofstede's (1984a) typology of culture has been found to be widely popular and has been taken to be an important theory of cultural types, with 1036 citations up to September 1993 listed in the Social Science Citation Index (SSCI) (Søndergaard (1994). Notwithstanding the fact that many of these citations were perhaps made in order to acknowledge a framework that was 'in vogue' at the time, certain citations were substantively more meaningful, and the impact of this work is evident in the thirty-six book reviews conducted by 1993 (Søndergaard, 1994).

Content analyses of these reviews reveal two positive dimensions: 'relevance'; and 'rigour' (Søndergaard, 1994). According to Søndergaard (1994:454), a "vast number of researchers in different fields of psychology have also applied the four dimensions [of Hofstede's cultural value orientations] as a paradigm" particularly "in cross-cultural and social psychology where more than 10 percent of the recorded paradigmal applications are to be found". "The interdisciplinary nature of this application of Hofstede's dimensions is unique", argues Søndergaard (1994:454). The usefulness of Hofstede's (1980a) theory has been found to extend also to the management of organisations.

A change in the cultural environment of an organisation might render an organisation's policies ineffective (Hofstede, 1980a). Organisational culture is an attribute that can and should be influenced by management in order to improve performance (Sinclair, 1993). The predictions of cultural values theory also extend to other areas of human behaviour.

According to Lewin's (1936) conception, liberalism and totalitarianism as ideologies are a function of the different cultural dimensions of countries at a point in time. According to Schumpeter (1949:346), most researchers "bring into their work their individual schemes of values and all their policies and politics- the whole of their moral personalities up to their spiritual ambitions" yet "in itself scientific performance does not require us to divest ourselves of our value judgements". However, according to Schumpeter (1949:347), preconceptions exist "about the economic process that are much more dangerous to the cumulative growth of our knowledge and the scientific character of our analytic endeavours because they seem beyond our control in a sense in which value judgements and special pleadings are not". Schumpeter (1949) terms these 'dangerous preconceptions' ideologies. According to Schumpeter (1949:349), "*ideologies are not simply lies*; they are truthful statements about what a man thinks he sees" and "*[e]x hypothesi* we are not aware of our rationalisations- how is it possible to recognise and to guard against them?" Further, according to Schumpeter (1949:358), in the face of such ideologies, even:

> statistical inference loses the objectivity that should in good logic characterise it whenever ideologically relevant issues are at stake…[h]ad we time, we could everywhere observe the same phenomenon: that ideologies crystallise, that they become creeds which for the time being are impervious to argument; that they find defenders whose very souls go into the fight for them.

The influence of cultural values on research, and research productivity, is taken to represent an influence akin to that of the effect of ideologies, in that rational assumptions of utility-maximising behaviour oftentimes cannot account for certain of the variance in human behaviour, including that of research productivity.

For Schumpeter (1949:358), the "prescientific cognitive act which is the source of our ideologies is also the prerequisite of our scientific work", where "no scientific departure in any science is possible without it" and although "we proceed slowly because of our ideologies, we might not proceed at all without them". According to Schumpeter's (1949) conception, the subjective component of an individual's underlying assumptions and values, at the extreme, can manifest in ideologies which exist independent even of evidence. In contrast with the commercial sector, or 'practitioner fields', the expression of thought based on differences in values is to some extent 'protected' by academic freedom. The values dimensions in academic fields might be less shaped by market, or contextual, forces than in contexts outside of the university system.

Academic freedom is protected through tenure systems (Hunt, 2010). "At its best, academic freedom allows faculty experts to speak up, even if their message is seen as inconvenient truth…or more likely, just inconvenient…in influential quarters", yet "there is another side to academic freedom": it "leaves an opening for the academic consultant to say something interesting and possibly influential, but that goes beyond what is scientifically justifiable" (Hunt, 2010:265). Such protection of academic freedom has its roots in responses to the historical persecution of researchers (Hunt, 2010). Examples of these include the censure of researchers such as Galileo for his research that challenged the earth-centric view of the universe; and the persecution of scientists by the Soviet Union who challenged Lysenko's evolutionary theories; freedom of speech and inquiry, therefore, "are essential to avoid such intellectual abominations" (Hunt, 2010:266).

Such freedom of speech, however, does not extend to where it incites someone to a clear and present danger "either to people or significant injury to property" (Hunt, 2010:266). In Germany, for example, it "is illegal to give the Nazi salute" (Hunt, 2010:266). Nevertheless, ample evidence continues to be found of academic statements that are not supported by evidence (Hunt, 2010), which might also contribute to such dangers. Professional societies and the peer review process can work to address this problem, but, still, book chapters and

books are outside of the peer review process (Hunt, 2010). Subjective values play a role in academic practice. The statement that "all research should be carried out to the highest standards" is a values statement, which is "irrelevant in the world we live in", as "research is not done in a vacuum" (Hunt, 2010:270). Such standards are, necessarily, values-based; as early statisticians, for example, regarded a one-in-a-thousand chance of a false positive as the minimum requirement for the reporting of results, whereas the contemporary requirement is one-in-twenty, because without such a compromise science would simply not progress (Hunt, 2010). For Hunt (2010:271), then:

> There is no way out of these competing pressures. Scientists who deal with topics of social importance have to walk a path between irresponsibility, on the one hand, and self-censorship for fear of offending people on the other. Even silence can be misinterpreted. People who say (as I do) that "we do not know the cause" on [contested topics] will find that people with stronger opinions, on both their right and left, will damn them for cowardice.

According to Mayer (2001), fields such as economics have been accused of promoting ideology masquerading as science; economic disagreements in some cases can be related to the underlying differences in the values of individuals. According to Mayer (2001), ideology or value judgements can bias the development of theory or the interpretations of empirical results. For Mayer (2001), examples of values differences include the importance of freedom from government control or the impact of 'justice' on economic growth. The influences of underlying values are therefore at odds with a purely rational process of cost benefit analysis; even dimensions of liberal versus conservative orientations reflect ideological bias (*ibid*).

According to Blaug (2001), economic history itself is 'reconstructed' and is, by definition, never unambiguous, as meaning is contexted. Theorists, therefore, are not independent of their subjective interaction with the world (*ibid*). Blaug (2001), therefore, argues that there "is nothing predetermined about our current theories and if years ago, economics had taken another turn at a critical nodal point, we would today be advocating a different theory". Consequently, according to Blaug (2001:157), "even great thinkers never fully grasp their own innovations", and "the full potential of great ideas is only exploited by disciples and critics over what may be years or even decades".

The individual behaviour of academics and the collective behaviour of groups of academics in academic fields is not independent, therefore, of the human factor, and the inherently subjective nature of values. The influence of values extends also to the relationships of

people, which can account for differences in industrial structures of societies and also the structure of organisations.

Fukuyama (1995) argues that industrial structural differences between the Asian economic powers and the Western economic powers exist, in that large organisations are more easily dominant in the Western sense. For Fukuyama (1995), the industrial structure associated with relatively smaller organisations in the Eastern context might have necessitated state involvement in the support of these economies. Fukuyama (1995:90) argues that the "reasons for these differences in industry structure have less to do with level of development than with a key cultural characteristic, what the sociologist James Coleman [1988] has labelled social capital- that is, the component of human capital that allows members of a given society to trust one another and cooperate in the formation of new groups and associations". It is argued that trust and cooperation are forces of the same order as values orientations. Having provided an argument in the above sections that research productivity can be influenced by intangible effects such as values systems, GLOBE theory, which predicts certain relationships between organisational cultural values and research productivity, is now reviewed.

2.5 GLOBE THEORY

The GLOBE definition of culture is "shared motives, values, beliefs, identities, and interpretations or meanings of significant events that result from common experiences of members of collectives that are transmitted across generations", which are psychological attributes, according to House and Javidan (2004:15). GLOBE research measured culture as modal practices and modal values (House & Javidan, 2004). Modal practices, according to House and Javidan (2004:16), reflect the common practices of an organisation; the "common behaviours, institutional practices, proscriptions and prescriptions". The GLOBE studies follow a psychological and behavioural tradition that fundamentally views shared values as being carried out in behaviour, policies and practices: the "what is" or "what are" dimensions House and Javidan (2004:16). Modal values, in turn, are associated with "what should be"; the judgements that reflect the values of respondents, which are contextualised values, and not abstract values (House & Javidan, 2004:16). This emphasis on values has its roots in the anthropological research tradition (House & Javidan, 2004). The GLOBE research study posits GLOBE theory as a theory of motivation resulting from cultural forces, which

contrasts with McClelland's (1961) theoretical orientation, which typically is an individual theory of both nonconscious and conscious motivation (House & Javidan, 2004). The corresponding theory of motivational values that is tested at the individual level is Schwartz's (2007) values theory.

The GLOBE theoretical structure is derived from, amongst others; the value/belief theory of culture offered by Hofstede (1980a); implicit motivation theory offered by McClelland (1987). These, together with other theory, form the basis for the nine theoretical dimensions of cultural values that comprise the core of GLOBE culture theory (House *et al*., 2002). These nine theoretical dimensions are considered as follows.

2.5.1 Uncertainty Avoidance

Uncertainty Avoidance is the "extent to which members of collectives seek orderliness, consistency, structure, formalised procedures, and laws to cover situations in their daily lives" (De Luque & Javidan, 2004:603). Uncertainty avoidance, for Hofstede (1980a:45), indicates "the extent to which a society feels threatened by uncertain and ambiguous situations and tries to avoid these situations by providing greater career stability, establishing more formal rules, not tolerating deviant ideas and behaviours, and believing in absolute truths and the attainment of expertise." For Hofstede (1980:45), societies in which Uncertainty Avoidance is strong "are also characterized by a higher level of anxiety and aggressiveness that creates, among other things, a strong inner urge in people to work hard".

The GLOBE theory of Uncertainty Avoidance is derived from Hofstede's (1980a) theory of cultural values. However, whereas Hofstede (1980a) measured culture as values, the GLOBE studies measure cultural practices as well as values. Hofstede (1980a) measured values at the societal level only. GLOBE research is taken to represent a watershed in cultural research, where connections were established between societal level cultural dimensions and organisation level cultural dimensions which relate to both cultural values and cultural practices (De Luque & Javidan, 2004).

This study seems to be the first time that the relationships between organisational culture and research productivity have been tested. For this reason, a gap in the literature is considered to exist. In the (seemingly total) absence of literature that relates the GLOBE dimensions to

university research productivity, literature that relates to the societal level and industry level associations of each of the GLOBE dimensions is now reviewed. *This literature is reviewed because the GLOBE researchers found significant associations between societal- and organisational-level values dimensions*. The predictions of GLOBE theory that relate to research productivity therefore need to be derived from these relationships. This might be a difficult and tenuous process, but it is nonetheless attempted as follows.

The GLOBE research studies found societal Uncertainty Avoidance values to be negatively correlated with success in basic science (-0.58; $p < 0.01$) (De Luque & Javidan, 2004: 632/633). On the basis of these findings, De Luque and Javidan (2004: 632/633) stress that "in no other realm of human endeavour would we expect uncertainty avoidance, defined in terms of formalisation and structure, to be more influential than in the conduct and progress of science and technology". Because societal values and practices of Uncertainty Avoidance were found to predict organisational values and practices (De Luque & Javidan, 2004), this might predict that at the organisational level, or academic school level in the university context, Uncertainty Avoidance values would be expected to be negatively associated with research productivity.

Uncertainty Avoidance also involves the extent to which "ambiguous situations are threatening to individuals, to which rules and order are preferred, and to which uncertainty is tolerated in a society" (De Luque & Javidan, 2004: 602). According to Budner (1962), the development of rules is related to being intolerant to ambiguity. Planning in organisations is used to control uncertainty in organisations, and despite predictions, research has not conclusively found a positive relationship between planning and return on investment (De Luque & Javidan, 2004). Uncertainty Avoidance therefore overlaps theoretically with Future Orientation, which is related to planning and the process of ordering the future (House *et al*., 2004). Organisations use different means to cope with uncertainty, including technology, rules, policies, and rituals, and in societies, Uncertainty Avoidance has been found to be associated with intolerance (De Luque & Javidan, 2004). Uncertainty Avoidance is also theoretically similar to the conception provided by Pelto (1968) of 'tight' versus 'loose' cultures (De Luque & Javidan, 2004). Uncertainty Avoidance therefore also overlaps theoretically with Collectivism (House *et al*., 2004). The dominant influence of Uncertainty Avoidance is in its constraints to innovativeness (De Luque & Javidan, 2004). The theoretical

overlap between Uncertainty Avoidance, Future Orientation and Collectivism is expected to reflect the same constraint to innovativeness (House *et al*., 2004).

According to Nakata and Sivakumar (1996: 66), planning, or project management techniques, associated with high Uncertainty Avoidance have often failed to be effective in the product development, or 'initiation' processes. However, in the 'implementation' stage of new product development, high Uncertainty Avoidance can be helpful, in that its "emphasis on controls helps ensure that the many intertwined details of developing a prototype, testing alternatives, manufacturing the product, and introducing it to the marketplace come together well" (Nakata & Sivakumar, 1996:66). Planning therefore reduces the variability associated with errors (Nakata & Sivakumar, 1996:66). A high level of Uncertainty Avoidance can, therefore, result in more "tightly organised implementation tasks", which has a strong effect where short life cycles "and first-to-market" stresses dominate (Nakata & Sivakumar, 1996:66). If research productivity, which should represent knowledge creation, is inherently a creative and innovative activity, then it is similar to 'initation', and Uncertainty Avoidance is expected to constrain it.

Nakata and Sivakumar (1996) argue that high Uncertainty Avoidance is associated with risk aversion, and that a low level of Uncertainty Avoidance is therefore associated with higher levels of innovative activity. Risk taking, however, is less suited to the implementation stage of new product development, as schedules and budgets are relied on to control processes and contain costs that might result from variability and mistakes (Nakata & Sivakumar, 1996). If research productivity was inherently not innovative, or if it was more associated with 'implementation', instead of 'initiation', then it would be expected to be positively associated with Uncertainty Avoidance. The 'initiation' and 'implementation' differentiation at the level of task performance can also extend to Hofstede's (1980a) societal level of analysis, according to Nakata and Sivakumar (1996). It might be important to place the South African context in relation to other societal contexts. Research findings from another societal context might reflect the influence of that society's culture, given that significant associations have been found between societal and organisational culture (House *et al*., 2004).

In terms of global regions, Sub-Saharan Africa, Southern Asia, the Middle East, Eastern Europe and Germanic Europe were associated with high societal Uncertainty Avoidance values (De Luque & Javidan, 2004: 635). Globally, Thailand, Nigeria, Albania, Iran and

Egypt scored highest in Uncertainty Avoidance values, with Switzerland, The Netherlands, Germany, Sweden and Austria scoring the lowest (De Luque & Javidan, 2004). South Africa scored 25th in this measure, a relatively high ranking (De Luque & Javidan, 2004).

Uncertainty Avoidance societal values have been found to be positively correlated with Future Orientation values (0.67; $p < 0.01$); Institutional Collectivism values (0.42; $p < 0.01$); In-Group Collectivism values (0.30; $p < 0.01$); and negatively correlated with Gender Egalitarian values (-0.29; $p < 0.05$) (De Luque & Javidan, 2004). If the influence of Uncertainty Avoidance is differentiated by its constraint to 'initiation', or innovative, creative and more risky task performance, then Future Orientation and Collectivism might also constrain this because of their similarity with Uncertainty Avoidance.

Uncertainty Avoidance is theoretically related to Collectivism in that collectivist behaviour is used to avoid uncertainty by groups (De Luque & Javidan, 2004). For De Luque and Javidan (2004:626), "individuals derive power and status partly from the uncertainty inherent in the environment". However, "the actual reduction of uncertainties in society is rarely achieved by any single individual, but through an organisation of forces and the creation of structure and systems"; once "these are in place, the perceived need for leadership may be diminished" (De Luque & Javidan, 2004).

Uncertainty Avoidance values have been found to be negatively associated with economic prosperity (-0.80; $p < 0.01$); government support for prosperity (-0.75; $p < 0.01$); and the World Competitiveness Index (-0.49; $p < 0.01$) (De Luque & Javidan, 2004). Uncertainty Avoidance societal values have also been found to be negatively correlated with societal health (-0.74; $p < 0.01$); life expectancy (-0.44; $p < 0.01$); general satisfaction (-0.66; $p < 0.05$); and the Human Development Index (-0.59; $p < 0.01$) (De Luque and Javidan, 2004: 632). Further, Uncertainty Avoidance societal values have been found to be positively correlated with a disdain for democracy (0.40; $p < 0.05$); passiveness (0.60; $p < 0.01$); lack of voice (0.75; $p < 0.01$), a dislike for democracy (0.38; $p < 0.05$); and a larger role of government (0.81; $p < 0.01$) (De Luque and Javidan, 2004: 632). Without literature on the direct tested relationships between research productivity and Uncertainty Avoidance, relationships at the societal level are reported here instead. With regard to Hofstede's (1980a) theoretical prediction that religion is used as a coping mechanism to deal with uncertainty avoidance, Uncertainty Avoidance values were found to be positively correlated with religious devotion

(0.43; p< 0.01); and religious dogma (0.48; p< 0.01), according to De Luque and Javidan (2004: 635). Having provided an overview of previous research on Uncertainty Avoidance at the societal level, literature is now reviewed of the relationships around Uncertainty Avoidance at the organisational level.

Within organisations, low reported Uncertainty Avoidance values are associated with human resources related practices such as flexitime, or HR regimes associated with the desire for flexibility and less structure (De Luque & Javidan, 2004: 622). According to the literature, HRM and other organisational practices that are more ordered and structured have been found to be associated with higher measured levels of Uncertainty Avoidance practices (De Luque & Javidan, 2004). The GLOBE research studies have also found that higher Uncertainty Avoidance values are typically associated with more team-oriented, humane-oriented, and self-protective leadership styles, and lower participative and charismatic/value oriented leadership (De Luque & Javidan (2004: 645). The South African HRM practices are relatively inflexible, and dominated by rules and regulations, such as those associated with Afirmative Action that are implenmented in order to address the inequalities caused by past state discrimination (Bendix, 2001). This conforms to the country's high levels of Uncertainty Avoidance (De Luque & Javidan, 2004: 635). If research productivity is influenced by South African societal levels of Uncertainty Avoidance, then it might be less innovative.

Shane (1995) studied the effects of Uncertainty Avoidance using 4405 respondents in 43 organisations from 68 different countries. Shane (1995:47) found that uncertainty-accepting societies are associated with higher levels of innovation than uncertainty-avoiding societies. According to Shane (1995:65) the knowledge of which cultures are Uncertainty Avoidance oriented is "important for managers who make decisions about where to locate innovation efforts". South African research output might be less innovative.

The tendency of members of an ingroup to tolerate behaviours that are not aligned with the norms and values of the group is related to the degree of tightness or collectivism of the group, according to Triandis (1989). Uncertainty Avoidance might be related to the degree to which groups tolerate behaviour that is uncertain or ambiguous (Triandis, 1989). Uncertainty Avoidance and Collectivism might both constrain innovativeness.

Hofstede's (1980a) cultural value orientations have been found to be significantly associated with differences in research and development (R&D) productivity (Kedia, Keller & Julian, 1992). Kedia *et al*. (1992) researched the relationship between Hofstede's (1980a) cultural value orientations in 301 industrial R&D units and 506 academic R&D units in Austria, Belgium, Finland, and Sweden. Despite finding that low Power Distance and high Masculinity predicted higher levels of research productivity, Kedia *et al*. (1992) found Uncertainty Avoidance unrelated to research productivity. Belgium, with a higher level of Uncertainty Avoidance than Finland, had higher research efficiency, but only for industrial research units, and not for academic research units (Kedia, *et al*., 1992).

In cultures that are associated with a high level of Uncertainty Avoidance, intellectual activity is concerned with certainties and fundamental truth, and in cultures with a low level of Uncertainty Avoidance, intellectual activity is aimed at usable knowledge, according to Hofstede (1980b). Therefore, theoreticians and philosophers might be expected to dominate in high Uncertainly Avoidance cultures, and empirical researchers might dominate research in low Uncertainly Avoidance cultures (Hofstede, 1980b). An emphasis on usability and practical applications of research is found in the case of industrial R&D, whereas academic R&D is concerned with theoretical aspects of the research process, or basic research, according to Kedia *et al*. (1992). Differences in endowments of Uncertainty Avoidance are therefore expected to reflect differences in academic fields to the extent that their research is more practitioner-oriented or not.

Organisations and cultures associated with a high Uncertainly Avoidance tend to structure activities and task-oriented management will be expected to dominate (Hofstede, 1980a). Individuals with a greater control over uncertainty in the management process will also have more power, according to Hofstede's (1980a) conception. Hierarchical power relationships reduce uncertainty (Hofstede, 1980a); it is expected that a high level of Uncertainty Avoidance will also be associated with a high level of Power Distance. Theory relating to the GLOBE cultural values orientation of Power Distance is considered as follows.

2.5.2 Power Distance

Power Distance reflects the extent to which a group "accepts and endorses authority, power differences, and status privileges" (Carl, Gupta and Javidan, 2004:513). The GLOBE

definition is “the degree to which members of an organisation or society expect and agree that power should be shared equally” (Carl *et al*., 2004:517), which is derived from Hofstede’s (1980b) theoretical construct. According to Hofstede (1980b:45), power distance is the:

> extent to which a society accepts the fact that power in institutions and organizations is distributed unequally. It’s reflected in the values of the less powerful members of society as well as in those of the more powerful ones.

According to Carl *et al*. (2004), democratic rights, free speech, freedom of association and political freedom are associated with lower levels of power stratification and centralisation in societies in general. Countries with the highest levels of power distance values were found to be South Africa (with the highest), New Zealand, Albania and Bolivia, with the lowest levels of societal power distance scores measured for Colombia, Finland, Spain and Venezuela (Carl *et al*., 2004). Investment and international trade between countries also reflects differences in Power Distance; “Confucian societies that have higher power distance are reluctant investors in the Nordic nations, which tend to be highly egalitarian” (Carl *et al*., 2004:534).

In the absence of literature that relates to the direct relationships between Power Distance and research productivity, literature is now reviewed that relates to Power Distance at the societal level. This literature is considered relevant because of the strong associations found between societal-level culture and organisational-level culture. Carl *et al*. (2004) argue that a review of the literature on power falls into two categories: (i) on the influence effects of power, and (ii) on the command-related effects of power, which are associated with power distance. The use of power can have positive or negative effects, and according to these different effects, power will be differently perceived (Carl *et al*., 2004). According to Carl *et al*. (2004:541), “some degree of power differentiation is functional in providing incentives to aspire to gain power positions through hard work and capability development”.

However, Power Distance organisational values have been found to correlate negatively with Performance Orientation values scores, Uncertainly Avoidance scores, and Gender Egalitarianism scores, which might indicate “that strong hierarchical power practices are associated with an environment in which self-interest is pursued without any emotional involvement in the group”, a low humanism characteristic of a “soulless organisation” (Carl *et al*., 2004: 545).

Power Distance has been found to differ across geographical regions of the world. Power Distance values were found to account for 28 percent of the variation in regional societal values; the highest region reported being the Middle East (Carl *et al*., 2004). The Germanic and Latin American regions were found to have the lowest; a broader power distribution is valued in these regions (Carl *et al*., 2004). Geographic region, as a tested variable, was found to contribute 51,4 percent ($p< 0.01$) of the variance in organisational Power Distance values. According to Carl *et al*. (2004:549), in 'Anglo' or historically English-world organisations, the "historical application of scientific management principles often resulted in a considerable gap in the skills, compensation, and power of those in higher positions, as compared with those in lower positions". However, managers in Northern Europe and Latin America "report practices emphasising subordinate participation, open expression of disagreement with those in authority, and emphasis on people's potential for the organisation" (Carl *et al*., 2004: 549).

Carl *et al*. (2004) suggest that the Latin American context might reflect recent trends towards greater teamwork in organisations, and argue that this conception is supported by findings that team-oriented leadership is most effective in the Latin American region (contrast = 0.25; $p< 0.01$). Middle Eastern organisations, however, have been found to measure highest on organisational Power Distance values, yet this highest mean score (4.04) was close to the midpoint value (4.00) which might represent a relative indifference versus the general aversion to Power Distance measured for the entire sample, and not a clear preference, according to Carl *et al*. (2004).

Power Distance societal values have been found to correlate with societal support for economic competitiveness (0.47; $p< 0.01$) and the competitiveness index (0.38; $p< 0.05$) (Carl *et al*., 2004). Power distance societal values, however, have not been found to correlate with measures of human health, yet have been found to predict higher levels of corruption ($r = 0.36$; $p = 0 < 0.01$), and lower levels of civil liberties ($r = 0.38$; $p< 0.01$). These associations might indicate that where Power Distance is valued, corruption might be legitimise (Carl *et al*., 2004). Societal Power Distance values were not found to be correlated with GNP per capita or global latitude (Carl *et al*., 2004).

High Power Distance is "clearly dysfunctional as it pre-empts the society from questioning, learning, and adapting, as there is little opportunity for debate and voicing of divergent views" (Carl *et al*., 2004: 559). In high Power Distance contexts, asking questions "may be interpreted or regarded as criticising and blaming, and therefore may be prohibited" (Carl *et al*., 2004: 559). In contrast to this, Carl *et al*. (2004: 559) suggest that in more Western-oriented cultures, their lower Power Distance is expected to "facilitate entrepreneurial innovation, to allow broader participation in education, and to constrain the abuse of power and corruption". Carl *et al*. (2004: 559) argue further that the "enhanced use of technology is likely to reduce the arbitrary use of authority and expedite the spread of democratic values, thereby empowering women and the underprivileged classes"; that technology will over time contribute to lower levels of Power Distance.

Two streams of literature relate to power distance: psychological research, which has explored needs, motives, and how power has been enacted; and cross-cultural research, which has typically explored the differences in Power Distance between different societies (Carl *et al*., 2004). According to Carl *et al*. (2004), theoretical differences in power have been a relatively enduring aspect of organisational and societal life; evidence has even been found of hierarchical systems in ancient cultures.

People in societies with higher levels of societal Power Distance values do not expect leaders to be participative, nor to be accountable for results (Carl *et al*., 2004). These leaders are typically treated with respect and deference, and are not expected to demonstrate a performance orientation or to be visionary in their leadership (Carl *et al*., 2004). Power also relates to class differences (Carl *et al*., 2004).

The middle class in a society is "a heterogeneous group" that tend to have higher levels of higher education, and "not only believe that they are responsible for their own lives, but also that they are in the position to make substantive choices concerning their futures, including their education, their careers, and where they live" (Carl *et al*., 2004:525). Furthermore, this group typically "do not accept a large power difference between themselves and their superiors" (Carl *et al*., 2004:525). Societies with a large middle class, therefore, "tend to be pluralist and embrace diversity and equal opportunity"; examples of these kind of societies are the historically capitalist societies of Australia, North America and Western Europe (Carl *et al*., 2004: 525). Countries with almost no middle class include many societies in Latin America, the Middle East and Africa; individuals in lower classes are relatively less able to

challenge power distance relationships in these societies, as the elite demand a high power distance, which they try to maintain (Carl *et al*., 2004). However, as "countries around the world become less agrarian, with a commensurate higher education level and access to global information, middle classes have emerged in most countries" and this new class "with its expectations of mobility and power sharing, is putting considerable pressure on the ruling regimes to change the distribution of power within their societies" (Carl *et al*., 2004:525). This change takes time, however, and these societal changes are slow in manifesting (Carl *et al*., 2004). These changes might reflect the predictions of Convergence theory; that over time cultures will become more and more similar (Williamson & Fleming, 1977). In the absence of evidence of direct associations between Power Distance and research productivity in the literature, the sections above reviewed societal associations, instead. At this point, the organisational-level relationships of Power Distance are reviewed.

The GLOBE studies, reported in 2004 (House *et al*., 2004) used middle management respondents, and it is reasonable to consider that the sampling frame reflected the middle class of each society. Generalisability to this research is expected to occur, as university researchers are also expected reflect 'middle class' South Africa.

Societal-level Power Distance values have been found to be strongly and positively associated with organisational-level values ($p < 0.01$) (Carl *et al*., 2004). The GLOBE research found their Power Distance values not to correlate with Hofstede's measures of Power Distance (Carl *et al*., 2004). According to Carl *et al*. (2004), this might indicate that Hofstede's power distance measure more accurately measures practices than values, although claiming to measure values.

Lower Power Distance societies such as Canada have been found to be associated with higher levels of organisational commitment; unlike societies with higher Power Distance such as Japan and South Korea which were found to score lower on organisational commitment (Randal, 1993). Because higher Power Distance is conceptually associated with centralisation (Hofstede, 1980a), it makes sense that lower Power Distance is associated with increased organisational commitment according to Randal (1993). Austria, a low Power Distance country, was found to have significantly higher levels of research productivity, measured as patents, algorithms, experimental prototypes, and output counts (Kedia *et al*., 1992). Evidence indicates that low Power Distance countries may have higher R&D productivity in

industrial, yet not academic, contexts (Kedia *et al*., 1992). Industrial contexts might face more competitive pressures, and be more likely than academic contexts to reflect Convergence in values and practices (Kerr *et al*., 1960).

For Carl *et al*. (2004:534), "power egalitarianism may be favoured in knowledge-intensive organisations, in which team-based systems and empowerment are of considerable interest". In the "contemporary learning- and knowledge-driven environment, the mantra in several Western cultures is that lower power distance is more effective in organisational settings"; therefore power sharing, "empowerment, and hence, lower power distance is the prescribed norm" (Carl *et al*., 2004:534). The team based approach is at the heart of HR Practices in the form of high-performance work systems (Carl *et al*., 2004:534), which have been found to be associated with higher returns to investment (Huselid, 1995). In modern organisations where knowledge sharing is important, power sharing, empowerment, and lower Power Distance are generally the norm, and these practices result in higher organisational performance (Carl *et al*., 2004).

Power Distance is related to hierarchy, coordination and control, yet organisational gains are expected to result from decreases in Power Distance, such as increased organisational flexibility, competence building and learning (Carl *et al*., 2004). University contexts are knowledge intensive contexts; Power Distance is therefore expected to be negatively associated with research productivity. Similarly, different academic units with higher levels of Power Distance are expected to be associated with lower levels of research productivity.

According to Nakata and Sivakumar (1996: 64), decentralisation "is possibly associated with low power distance because it signals trust and belief in the inherent capabilities of others"; by "encouraging active participation by many, decentralisation helps to equalise people by giving everyone a voice in the new product development process, as well as responsibility for the outcomes". In contrast, "centralisation can be associated with high power distance because it retains power, authority, and input among a chosen few" (Nakata and Sivakumar, 1996: 64).

Nakata and Sivakumar (1996: 64) argue that because "low power distance is based on a more egalitarian view of people, it may encourage idea proliferation by acknowledging the value of contributions regardless of a person's identity or position in the organisational hierarchy".

Low power distance may, therefore, "facilitate the initiation stage of new product development" yet "at the implementation stage, when control is needed to ensure that multiple and complex efforts unite to generate a new product on a timely and cost-effective basis, high power distance is perhaps a more positive force" (Nakata and Sivakumar, 1996: 64). Therefore, centralised control is necessary due to the cost implications of changes in the implementation phase, and also because the process needs to deliver to schedules (Nakata and Sivakumar, 1996). Academic disciplines with processes and tasks more aligned with 'implementation' are expected to be more productive with higher levels of Power Distance, and those more aligned with 'initiation' are expected to be more productive with lower levels of Power Distance.

A high Power Distance culture can constrain employee input and commitment to organisational goals (Carl *et al*., 2004). Technology and techniques need to be used to incrementally reduce the levels of Power Distance in organisations with high Power Distance cultures or dysfunctionality can be associated with the emergence of an egalitarian culture within the dominant high Power Distance culture around it (Carl *et al*., 2004). According to Carl *et al*. (2004), one of French and Raven's (1959) typology of forms of power; coercive power, is associated with an autocratic dominant leadership style which can be likened to high Power Distance. According to Podsakoff and Schriesheim (1985), certain field studies have operationalised the French and Raven framework, yet such research into their typology has not typically yielded satisfactory results.

Hofstede's (1980a) Power Distance construct was developed from Mulder's (1971) conceptions of power (House & Javidan, 2004). According to Mulder (1971), power struggles can exert a significant and negative influence on the attainment of organisational outcomes. Mulder (1971) also questioned the assumption that participative decision making processes necessarily reduce power differences in work situations. Organisations can suffer consequences as a result of tension between lower levels of an organisation that stress participation, and higher levels of an organisation that stress efficiency (Mulder, 1971). Therefore, according to Mulder (1971:34), the:

> greater expert power of managers and specialists…refers to potential power. Those with expertise must communicate with the less powerful to influence them effectively and to become powerful. Thus, when there are large differences in expert power, the introduction of greater participation provides the more powerful with an opportunity to exercise their influence over the less powerful, and thereby make their greater power a reality.

Power Distance may also influence the use of information in organisations. According to Davenport, Eccles, & Prusak (1992:64), "managing information politics requires a shift in organisational culture". Power relationships are also reflected in the way information is managed in organisations (Davenport *et al*., 1992). Power Distance might also create opportunites for individuals with a need for Power to rise in the organisational hierarchy.

According to Winter (1973), the position an individual holds in a hierarchy of power is not strictly associated with the power motive. Over time, and with all else being equal, however, it is expected that individuals with lower endowments of the power motive typically move out of positions of power that they might have come into by 'accident' or through some manner of 'inheritance', and those with a higher power motive will tend to occupy higher positions of power (Winter, 1973). In the absence of literature that relates Power Distance directly to research productivity, this section therefore reviewed relationships of Power Distance at the societal level and at the organisational level. On the basis of this review, a negative relationship is predicted between Power Distance and research productivity. Literature that relates to GLOBE In-Group Collectivism and Institutional Collectivism is now reviewed.

2.5.3 GLOBE In-Group Collectivism and Institutional Collectivism

Ancient legal and religious institutions have provided a historical context for the tension between individualism and collectivism (Gelfand, Bhawuk, Nishii & Bechtold, 2004). The GLOBE dimensions of collectivism are derived from Hofstede's (1980a) theory. Hofstede (1980b:45) considers individualism to imply a "loosely knit social framework in which people are supposed to take care of themselves and of their immediate families only, while collectivism is characterized by a tight social framework in which people distinguish between in-groups and out-groups; they expect their in-group (relatives, clan, organizations) to look after them, and in exchange for that they feel they owe absolute loyalty to it". The two GLOBE dimensions; Institutional Collectivism and In-Group Collectivism, were developed from Hofstede's (1980a) single construct (Gelfand *et al*., 2004).

According to Gelfand *et al*. (2004), organisational individualism and collectivism differs from societal individualism and collectivism, yet these levels are interrelated. As opposed to

"dimensions that differentiate national cultures, research at the individual level of analysis capitalises on intracultural variability and examines dimensions that are derived from individual differences" (Gelfand *et al*., 2004).

HRM practices "vary in individualistic and collectivist cultures, with an emphasis on independence and rationality" in individualistic cultures, as opposed to an emphasis on "interdependence and obligations" in collectivist cultures (Gelfand *et al*., 2004). HRM practices reflect individualist or collectivist shared assumptions, "of the need for systems that promote rational exchanges between members and the organisation" (Gelfand *et al*., 2004:453). For example, selection is undertaken through a process of rational calculation of potential employees' endowments of skills, knowledge and abilities in organisations with an individualistic culture (Gelfand *et al*., 2004). However, HRM practices in a collectivist organisational culture are more likely to be associated with less rational exchanges, and more of a long term relational approach, which will then guide behaviour (Gelfand *et al*., 2004). HRM practices, therefore, are not considered to be independent of the influence organisational cultural values. Differences in GLOBE values are therefore expected to result in differences in practices. Convergence of practices, or the implementation of practices benchmarked from other contexts will be expected to be influenced by GLOBE values.

Stakeholders will therefore influence a HRM process such as selection to a greater extent in a collectivistic organisation (Gelfand *et al*., 2004). According to Gelfand *et al*. (2004:455), "the relationship between individualism and collectivism and HRM has been found at multiple levels of analysis". The HRM regimes of universities are also expected, to some extent, to reflect the endowments of cultural values of its constituent members.

Theory and research across fields which derives from within the U.S.A. context has typically "focused on the importance of intrinsic motivation and the importance of personal choice and control" according to Gelfand *et al*. (2004:456) However, according to the culture literature, in-group choices, or choices made by in-groups, rather than the individual, have also been found to motivate individuals from different cultural backgrounds (Gelfand *et al*., 2004:456).

Commitment, an individual-level factor, underlies knowledge creation (Polyani, 1973). Nonaka (1994) extends this conception, and argues that three factors influence this commitment: intention, autonomy and environmental fluctuation. Intention, for Nonaka

(1994), has to do with how individuals approach their world, and also has to do with their sense-making of environments; a state that is not disengaged from an element of value-judgement. Nonaka (1994:18) conceives autonomy to be applicable to the individual, group, or organisational level, and argues that individual "autonomy widens the possibility that individuals will motivate themselves to form new knowledge". Further, Nonaka (1994:18) argues that:

> Self-motivation based on deep emotions, for example, in the poet's creation of new expressions, serves as a driving force for the creation of metaphors. A sense of purpose and autonomy becomes important as an organisational context. Purpose serves as the basis of conceptualisation. Autonomy gives individuals freedom to absorb knowledge.

According to these perspectives, individual factors such as autonomy and self-motivation underlie knowledge creation; research productivity is inherently individualistic. It is therefore argued that individualistic values will be associated with higher levels of research productivity.

The GLOBE research studies investigated individualism and collectivism at both the organisational level and at the societal level (Gelfand *et al*., 2004). They differentiated between Institutional Collectivism and In-Group Collectivism (Gelfand *et al*., 2004). In-Group Collectivism reflects the extent to which individuals express pride, loyalty and cohesiveness in relation to groups (House *et al*., 2004). The GLOBE studies measured In-Group Collectivism values through a measure of whether leaders should encourage group loyalty at the expense of individual goals (at the organisational level of analysis) and the perception of whether the economic system in the society should maximise individual interests or collective interests (a the societal level of analysis) (Gelfand *et al*., 2004). Societal In-Group Collectivism values were found to be positively associated with organisational level In-Group Collectivism values ($p<0.01$) (Gelfand *et al*., 2004). In the absence of literature that relates to the direct relationship between collectivism values and academic research productivity, literature is now reviewed that relates to the relationships of collectivism at the societal and organisation levels. Since significant associations have been found between societal GLOBE cultural values and organisational GLOBE values endowments, literature that relates to relationships at the societal level might be relevant to understanding organisational-level relationships.

The GLOBE research studies tested a measure of success in basic science, reflecting "the amount of technology transfer that occurs between corporations and universities, the ability

of research to enhance economic and technological development, as well as the ability of science and technology to arouse the interest of the youth" (Gelfand *et al*., 2004:455). Institutional Collectivism societal values were found to be negatively correlated (-0.53; $p<0.01$) with success in basic science (Gelfand *et al*., 2004). In-Group Collectivism societal values were also found to be negatively correlated with success in basic science (-0.44; $p<0.01$) (Gelfand *et al*., 2004). To the extent that this measure might reflect aspects of academic research productivity, it is tentatively suggested that both of these collectivism values dimensions are negatively associated with research productivity.

Institutional Collectivism reflects "the degree to which organisational and societal institutional practices encourage and reward collective distribution of resources and collective action" (House *et al*., 2002:5, 6). The GLOBE research studies measured societal level Institutional Collectivism values through a measure of group loyalty, and individual interests versus collective interests (Gelfand *et al*., 2004). Loyalty to organisations is also an aspect of Institutional Collectivism (House *et al*., 2004).

The GLOBE research studies found In-Group Collectivism values scores to generally be higher than Institutional Collectivism values scores (Gelfand *et al*., 2004). However, they were found to be correlated ($r = 0.29$; $p<0.05$) (Gelfand *et al*., 2004). El Salvador, Brazil, Iran and Ecuador were found to have the highest societal Institutional Collectivism values scores, with Georgia, Russia, Korea and Sweden having the lowest (Gelfand *et al*., 2004). El Salvador, Colombia, New Zealand and the Philippines were found to score highest in societal In-Group Collectivism, with Switzerland, South Africa, China and Hong Kong scoring the lowest (Gelfand *et al*., 2004).

On the basis of GLOBE findings, Gelfand *et al*. (2004) suggest that Institutional Collectivism values, representing collective interests, tend to be associated with stronger family ties, a shorter term focus, the dominance of males in society, few rules, and little structure; a similar cultural syndrome to that of societies manifesting a high level of In-Group Collectivism values. Societies with high In-Group Collectivism values scores were found to be associated with a respect for authority, few rules, little structure, a shorter term orientation, and lower levels of performance orientation (Gelfand *et al*., 2004). Certain Asian countries were found to have opposite values orientations to these, according to Gelfand *et al*. (2004:474), which

"is perhaps reflective of a decrease in emphasis on some forms of collectivism in Confucian Asian cultures".

The GLOBE findings were generally found to replicate the findings of Hofstede (1980a); almost the same cluster of societies were again identified as being most individualistic and collectivistic (Gelfand *et al*., 2004). This indicates that individualism/collectivism has remained reasonably steady across a thirty year period (Gelfand *et al*., 2004). However, societies such as Hong Kong were found to have become less collectivist, perhaps "due to the rapid economic growth within this country in the past 20 years, which may have led to increased social independence" (Gelfand *et al*., 2004:474).

In-Group societal Collectivism values have been found to be highly negatively correlated with gross national product (GNP) per capita ($r = 0.76$; $p<0.01$) (Gelfand *et al*., 2004). The GLOBE studies measured economic health according to economic prosperity, public support for prosperity, societal support for competitiveness, and the Global Competitiveness Index of the World Economic Forum (Gelfand *et al*., 2004). In-Group societal Collectivism values were found to be negatively and significantly correlated with economic prosperity (-0.29; $p<0.05$) (Gelfand *et al*., 2004).

Institutional Collectivism societal values were found to be negatively correlated with societal health, a measure of perceptions of justice, personal security, quality of life and alcohol and drug abuse within a particular society (-0.33; $p<0.05$) (Gelfand *et al*., 2004). In-Group Collectivism societal values were also found be negatively correlated with this measure of societal health (-0.39; $p<0.05$) (Gelfand *et al*., 2004).

Differences have also been found between endowments of collectivist values across industries. Institutional Collectivism values have been found to be lower for the financial industry than for both the telecommunications industry and the food industry ($p<0.05$ for both); of these the financial industry may be relatively more individualistic (Gelfand *et al*., 2004).

Using hierarchical linear regression models, both of the GLOBE societal-level Collectivism values endowments were found to be associated with organisational-level endowments (Gelfand *et al*., 2004). When collecting data for aggregation to different levels, a compositional model is typically developed, that outlines the relationships between variables

across the different levels of the analysis (Klein, Conn, Smith & Sorra, 2001). In the compositional model, agreement between individuals represents homogeneity (Klein *et al*., 2001). In this study two separate levels of analysis are used; two different compositional models. Academic schools with higher levels of collectivism might have stronger cultural associations with research productivity.

Attitudinal commitment has been found to be lower in more collectivist societies such as South Korea and Japan, and higher in more individualistic societies such as Canada; an unexpected finding (Randal, 1983). This finding is unexpected, according to Randal (1993), because collectivism is expected to be associated with affective attachment or loyalty to institutions, and individualism with a more calculative, or cost-benefit, approach to work.

According to a range of theorists, the self is shaped "in part, through the interaction with groups" (Triandis, 1989). Triandis (1989) investigated the way the self influences social behaviour in different cultural contexts. For Triandis (1989), statements overtly, or covertly, made concerning the "I", which represents the self, influence how individuals sample information, process information, and assess information. If such statemes are relevant to the self then these processes are performed more frequently, more quickly, and more positively (*ibid*.). Therefore, self-instructions, according to Triandis (1989), are accepted more positively and such self-instructions can lead to behaviour because the self as an active agent samples, processes and evaluates information from the environment in a way that results in differences in social behaviour between the individual and other individuals. For example, if peoples' self-concept is manipulated, then their behaviour can often be changed (Triandis, 1989).

Within a conception of the self, contradictions between its elements are tolerated differently according to cultural influences (Greenwald & Pratkanis, 1984). Greenwald and Pratkanis (1984) suggest a distinction between the self along the lines of the private, the public and the collective self: (i) the private self is associated with cognitions relating to traits, states or behaviours relating to the individual; (ii) the public self is associated with cognitions relating to the views of the generalised others of the self; and (iii) the collective self is associated with cognitions relating to a view of the self originating in a collective of some sorts. Triandis (1989:507) argues that "people sample these three kinds of selves with different probabilities, in different cultures" and that this "has specific consequences for social behaviour".

According to Triandis (1989:507), the private self is an "assessment of the self by the self"; the public self is an assessment of the self by the "generalised other"; and the collective self is the assessment of the self by "a specific reference group". Triandis (1989) argues that people do not choose their ingroups in order to maximise their positive social identity, because collectivist cultures do not provide a choice to individuals with regard to ingroups. According to Triandis (1989) there are two components, or elements, to sampling: the universe of units that can be sampled, and the probability of choice that an individual can make with regards to any unit chosen from this universe. For Triandis (1989) this universe is relatively more or less complex in terms of the volume of distinguishable elements, the differentiation between them (distinctions) that might differ, and the integration between them. Therefore, according to Triandis (1989:507), in:

> families in which children are urged to be themselves, in which 'finding yourself' is valued, or in which self-actualisation is emphasised, the private self is likely to be complex. In cultures in which families emphasise 'what other people will think about you,' the public self is likely to be complex. In cultures in which specific groups are emphasised during socialisation…collective self is likely to be complex, and the norms, roles, and values of that group acquire especially great emotional significance.

Triandis' (1989) concern with the formative stages and the influence of the external context, from which the complexity of the personal universe is created, suggests that the influences of culture or of values that influence the individual externally are of prime importance. An allocentric self is associated with the sampling of public and collective elements, and an idiocentric self is associated with the sampling of the private self, according to Triandis (1989). Triandis (1989) offers a mechanism that explains how different influences might shape an individual's individualistic versus collectivistic values orientation.

According to data, individuals from East Asia are associated with a greater sampling of the collective self than individuals from Europe or North America (Triandis, 1989). Cultural complexity is, however, a differentiating factor between cultures, and "the number of potential relationships between individuals is one measure of cultural complexity" (Triandis, 1989:508). The different domains of culture offer dimensions along which the complexity of a culture can be measured, such as "language, technology, economic, political, and educational systems, religious and aesthetic patterns, social structures" (Triandis, 1989:508).

The greater the cultural complexity, the greater the choice of ingroups for an individual because the prioritisation of personal goals is enabled, and the more affluent a society is, the more it is possible for financial independence to be directed toward social and emotional independence; this would explain the focus of individuals onto personal rather than intergroup goals (Triandis, 1989). Therefore, as societies increase in complexity and wealth, they can become more oriented toward individualism (Triandis, 1989). According to Triandis' (1989) theory, because South Africa is becoming wealthier, it might be becoming more individualistic. Increasing levels of individualism might therefore be expected to reduce the influence of social and organisational cultural effects over time.

According to Triandis (1989:509), "demographic attributes, activities, preferences, or institutions" can also be criteria that contribute to the boundary characteristics of ingroups. Factors associated with ingroups tend to influence social behaviour more strongly when ingroups are more stable and impermeable; where gaining access into an ingroup is more challenging and exiting the ingroup is also more difficult (Triandis, 1989). These conditions exist in more collectivist cultures (Triandis, 1989). In collectivistic cultures, communal relations are dominant, as opposed to in individualist cultures where the dominant mode is exchange relations (Triandis, 1989). Triandis (1989) predicts that a process of cultural evolution occurs, over time, which is toward individualism and exchange relations. This theory supports the predictions of Convergence theory, which predicts that cultural differences between groups will diminish over time (Williamson & Flemming, 1977). If organisational cultural values are strong and their influence constrains innovativeness, then the weakening of the strength of organisational cultural values might contribute to increased performance. More individualistic organisational cultural values are expected to be positively associated with research productivity.

The more costly it is to reject ingroup members who do not act according to group values or goals, the more individualism is tolerated by ingroups (Triandis, 1989). Where such an ecology is "thinly populated" the costs of rejecting individuals that do not act according to group values are high, yet in densely populated ecologies exclusion is associated with lower costs and the regulation of behaviour might even be necessary to overcome crowding problems, according to Triandis (1989:510). However, as the ingroups offer more incentives to individuals in terms of rewards such as "emotional security, status, income, information, services, willingness to spend time with the person" and other forms of payoffs, the more an

individual will tend to increase their commitment to the ingroup, and also to "the culture's collectivism" (Triandis, 1989:510). To the extent that an organisation offers rewards along these lines, as perceived by the individual, the individual will be expected to then take on the underlying values of the organisation, or the dominant academic cultural orientation associated with the ingroup, or department, discipline or institution.

Conformity is functional in simple, agricultural societies and working class jobs, yet is "dysfunctional in hunting cultures, in which one must be ingenious, and in professional jobs, in which one must be creative" Triandis (1989:510). The "greater the cultural complexity, the more is conformity to one ingroup dysfunctional, inasmuch as one cannot take advantage of new opportunities available in other parts of the society", according to Triandis (1989:510). If membership of academic ingroups constrains freedom to take advantage of other new opportunities, then research productivity might be constrained. If collectivistic influences can be dysfunctional in research work, which might require ingenuity, then collectivistic organisational culture is expected to be negatively associated with research productivity.

In collectivist cultures, "ingroups demand that individuals conform to ingroup norms, role definitions and values"; homogenous cultures can therefore be rigid, with little tolerance for "deviation from group norms", this representing a tight culture (Triandis, 1989:510). In so called 'tight' cultures, sanctions can be the result of deviations from cultural norms, whilst in 'loose' cultures norms might be unclear, and a certain degree of deviance away from the social norms is tolerated (Triandis, 1989). According to Triandis (1989), theocracies and certain countries such as Japan and Greece are examples of tight cultures. Certain academic fields may have tighter cultures than others. These differences might be associated with differences in research productivity.

According to Triandis (1989:511), culture "is to society what memory is to the person" because it "specifies designs for living that have proven effective in the past, ways of dealing with social situations, and ways to think about the self and social behaviour that have been reinforced in the past". Culture therefore can save time and resources, because it allows for action without thought (Triandis, 1989). Triandis (1989:512) offers the following conception of the dynamic nature of culture, in that over time:

> cultures become more complex, as new differentiations prove effective. However, once complexity reaches very high levels, moves toward simplification emerge as reactions to too

> much complexity…Similarly, excessive individualism may create a reaction toward collectivism, and excessive collectivism, a reaction toward individualism; or tightness may result from too much looseness, and looseness from too much tightness. Thus, culture is dynamic, ever changing.

Social class is expected to moderate the process where the individual samples from the three selves, the private, social or collective self (Triandis, 1989). Lower classes have generally been found to sample from the collective self more often (Triandis, 1989). Although prosocial behaviours are expected in collectivist cultures toward ingroup members, rudeness toward outgroup members, and hostility, exploitation, or avoidance can be considered acceptable if directed at outgroup members (Triandis, 1989). Collectivist cultures have been found to be more competitive with regard to outgroups than individualist cultures, in spite of such competition potentially being counterproductive (Triandis, 1989).

For Triandis (1989:517), ingroups are defined by "common goals, common fate, the presence of an external threat, and/or the need to distribute resources" for survival purposes; and outgroups consist of people "with whom one is in competition or whom one does not trust". Social behaviour is more strongly determined by the ingroup/outgroup distinction in collectivist cultures (Triandis, 1989). More collective academic fields might have a stronger influence on research productivity than more individualistic fields. For Triandis (1989:515), identity:

> is defined on the basis of different elements in individualistic and collectivist cultures. Individualist cultures tend to emphasise elements of identity that reflect possessions- what do I own, what experiences have I had, what are my accomplishments (for scientists, what is my list of publications). In collectivist cultures, identity is defined more in terms of relationships- I am the mother of X, I am a member of family Y, and I am a resident of Z.

Certain academic fields might have different identities, and might define their 'ingroups' versus theory 'outgroups' differently. More individualistic fields might be less inclinded to define other fields as 'outgroups', and may be more likely to share knowledge across fields. Kedia *et al*. (1992), in their research into research productivity, suggest that higher research productivity should be associated with cultures higher in individualism. However, in their research, Kedia *et al*. (1992) drew no conclusions as to this dimension because all of the cultures in which they studied research productivity were all high in individualism.

Nakata and Sivakumar (1996) also suggest that individualism is associated with innovativeness. However, when a process is not innovative, but is more control-focused and

resource-focused then collectivism might be expected to improve performance (Nakata & Sivakumar, 1996). Most work tasks can be differentiated into either 'initiation-oriented' or more 'implementation-oriented' processes according to Nakata and Sivakumar (1996). According to Nakata and Sivakumar (1996: 62), research on product champions "suggests that high degrees of individualism might be associated with successful product development", as "their nonconformity, self-confidence, and perseverance fuel the innovation process by generating possibilities and overcoming obstacles". However, collectivism, as demonstrated by the Japanese success in new product development related to the use of 'implementation-oriented' processes such as Quality Function Deployment and Quality Circle programmes are strongly associated with the use of teams, a manifestation of collectivism (Nakata and Sivakumar, 1996). Academic fields are expected to differ according to whether their research processes are creative and innovative: 'initiation-type', or are 'implementation-type' processes.

According to McClelland (1987), people "appear to have a basic need or desire to be with other people, just as most animals prefer to be with other members of their species". McClelland (1987:335) concedes, however, that we "know much less about the affiliative motives in the scientific sense than we do about the achievement motive, the power motive, or the avoidance motives". A need for Affiliation, therefore, is "the need to be with people" (McClelland, 1987:347). A high need for Affiliation energises individuals to act in a more affiliative manner, and sensitises an individual to affiliative cues (McClelland, 1987). A high need for Affiliation might therefore also facilitate collective behaviour, and collectivism. Having reviewed literature that relates to collectivism and individualism, the GLOBE dimension of Gender Egalitarianism is now introduced and discussed.

2.5.4 Gender Egalitarianism

The GLOBE researchers developed Gender Egalitarianism and Assertiveness from Hofstede's (1980) Masculinity dimension (Emrich, Denmark & Den Hartog, 2004). According to Emrich *et al*. (2004), these two dimensions relate to: (i) whether stereotypical masculine or feminine behaviours are rewarded, where a group can be more versus less assertive (Assertiveness); and (ii) how social roles are to be allocated between the genders, where a level of gender egalitarianism can be associated with a particular group (Gender Egalitarianism). Emrich *et al*. (2004:344) argue that Hofstede' (1980a) dimension of

Masculinity "confounds assertiveness, gender egalitarianism, humane orientation, and achievement orientation, thereby yielding findings that are difficult to interpret". Gender Egalitarianism, as a construct, has not been found to correlate with Hofstede's (1980a) dimension of masculinity/femininity; the differentiation of this construct may be appropriate (Emrich *et al*., 2004). In the absence of any studies that have tested the direct relationships between Gender Egalitarianism and research productivity, literature that relates to the societal-level relationships of Gender Egalitarianism is now reviewed.

The GLOBE research findings indicate that the maximum Gender Egalitarianism score for the 61 countries sampled was 4.08, which was not far from the midpoint (4.00), this indicating that no society is perceived of as being dominated by a female orientation (Emrich *et al*., 2004). At the societal level, Gender Egalitarianism values were found to correlate positively and significantly with economic prosperity (0.36; $p<0.01$) and with gross national product per capita (0.44; $p<0.01$) (Emrich *et al*., 2004). Economic progress may be offering more opportunities and new roles for women, and a cultural shift; yet Emrich *et al*. (2004) acknowledge that correlation is not an indicator of causality, and the direction in which the effect works: whether more egalitarian improvements lead to economic prosperity or whether prosperity is an antecedent of gender egalitarianism, is not indicated by these findings. Gender Egalitarianism values were not found to be associated with government support for competitiveness, societal support for competitiveness, nor the world competitiveness index (Emrich *et al*., 2004). Gender Egalitarianism values were, however, found to correlate positively and significantly with life expectancy (0.28; $p<0.05$); general satisfaction (0.59; $p<0.01$) and the society's level on the Human Development Index (0.43; $p<0.01$) (Emrich *et al*., 2004).

Gender Egalitarianism societal values were found to be negatively associated with a more extensive role of government (-0.60; $p<0.01$); political passiveness (-0.41; $p<0.05$); lack of voice (-0.62; $p<0.01$); and stability (-0.56; $p<0.01$), yet were not found to be correlated with a disdain or dislike for democracy (Emrich *et al*., 2004). These findings might indicate a higher level of gender empowerment for societies with higher levels of societal values of Gender Egalitarianism (Emrich *et al*., 2004). The negative correlation found between societal Gender Egalitarian values and the stability measure might indicate that change is accepted in such societies and therefore "societies that seek to minimise gender-role differences enable both women and men to engage in activities that were once prohibited to them" (Emrich *et al*.,

2004:370). "[T]his greater personal freedom, accompanied by greater economic health, may account for the greater activity, voice, and openness-to-change among members of societies that espouse more gender-egalitarian values" (Emrich *et al*., 2004:370). The GLOBE research findings, therefore, indicate that the "more egalitarian a society's values, the more favourable member's stereotypes of females relative to their stereotypes of males" are (Emrich *et al*., 2004:378).

Gender Egalitarianism societal value scores were highest in Germanic Europe and the Anglo countries, with the lowest scores obtained in the Middle East (Emrich *et al*., 2004). Gender Egalitarianism societal values were also found to be positively correlated with percentages of women in government (0.37; $p<0.01$) (Emrich *et al*., 2004:381).

Emrich *et al*. (2004) argue that organisational culture is a function of top management, yet "people typically identify more closely with their societies' cultures than with their organisations' cultures [where] collisions between societal and organisational cultures are often dramatic and noteworthy". Societal Gender Egalitarianism values were found to predict organisational Gender Egalitarianism values ($p<0.01$), according hierarchical linear modelling (Emrich *et al*., 2004). According to Emrich *et al*. (2004:386/387) the:

> past literature on the link between nations' economic health and women's status and roles is…complex. The modernisation perspective proposes that economic growth creates additional work opportunities for women and other disadvantaged groups, whereas gender inequality persists despite economic development because women do not possess sufficient power to capitalise on this development. Findings from past research are most consistent with the economic competition perspective: Although economic growth is associated with a rise in women's labour force participation, they tend to cluster in occupations notably in service and in communication. Thus economic growth seems simply to provide new venues- "pink-collar ghettos"- for women to pursue stereotypically female roles.

The GLOBE research findings demonstrate that "gender effects differed significantly across societal cultures" (Emrich *et al*., 2004:388). In a summation of GLOBE research results relating to Gender Egalitarianism and leadership behaviours, Emrich *et al*. (2004:388) conclude that:

> [t]he most consistent findings to emerge from these analyses were that more gender egalitarian organisations and societies endorsed charismatic leader attributes such as 'foresight, ' 'enthusiastic,' and 'self-sacrificial' and participative leader attributes such as 'egalitarian', 'delegator,' and 'collectively oriented'. These same organisations and societies shunned self-protective leader attributes such as 'self-centred,' 'status-conscious,' 'secretive,' 'evasive,' and 'formal.'

Leadership is one aspect of organisations that relates to Gender Egalitarianism. Gender Egalitarianism might be associated with lower gender-related barriers to participation, where are thereofore expected to be positively associated with research productivity. The Assertiveness dimension derived by the GLOBE researchers (House *et al*., 2004) from Hofstede's (1980a) conception of Masculinity is now introduced.

2.5.5 Assertiveness

According to Den Hartog (2004:401), "culture can be seen as a set of relatively stable, basic, and shared practices and values that help human social groups or societies find solutions to two fundamental problems", these being "how to survive, grow, and adapt to the environment (external adaption)" and "internal regulation that permits this adaption", the latter also being the theoretical conception of Schein (1996). The GLOBE dimensions of Assertiveness and Gender Egalitarianism were derived from Hofstede's (1980a) theoretical construct of Masculinity (Den Hartog, 2004). The importance of achievement, performance, assertiveness, financial attainment and economic growth is associated with a Masculine orientation (Hofstede, 1980b). A Feminine orientation is associated with friendliness and cooperation (Hofstede, 1980b). According to Hofstede (1980b), the Masculinity dimension of a cultural orientation is related to the concept of Achievement motivation as conceived by McClelland and Winter (1969).

The dimension of Masculinity/Femininity expresses "the extent to which the dominant values in society are 'masculine'- that is, assertiveness, the acquisition of money and things, and *not* caring for others, the quality of life, or people", according to Hofstede's (1980b:46) definition. The GLOBE cultural dimension of Assertiveness, however, "reflects beliefs as to whether people are or should be encouraged to be assertive, aggressive, and tough, or non-assertive, nonaggressive, and tender in social relationships" (Den Hartog, 2004:395). The GLOBE definition of Assertiveness is "the degree to which individuals in organisations and societies are assertive, tough, dominant, and aggressive in social relationships" (Den Hartog, 2004:395), this derived from House, Hanges, Ruiz-Quintanilla, Dorfman, Javidan, Dickson, *et al*. (1999). The GLOBE scales, therefore, measure Assertiveness in terms of 'assertiveness versus non-assertiveness', and 'tough versus tender' measures (Den Hartog, 2004).

Success in science and technology was found to be correlated with Assertiveness societal values (0.34; $p<0.05$), according to Den Hartog (2004). To the extent that a society's success in science and technology might reflect some dimension of research productivity, Assertiveness might be expected to be positively associated with research productivity.

In the Big Five personality model, "assertiveness can be seen as extraversion", where "extraverts tend to be sociable and gregarious, but also surgent, dominant, and ambitious as well as assertive, active and adventurous" according to Den Hartog (2004:399). For Den Hartog (2004:399), low assertiveness, on the other hand, represented by being tender and nondominant "can be linked to the Big Five factor of agreeableness", where agreeable people are "cooperative (trusting, caring) and likeable (good natured, gentle); they are also soft-hearted and tolerant".

On the basis of an extensive review of the literature, Den Hartog (2004) suggests that agreeableness is typically not associated with higher levels of job performance, extrinsic career success, management potential, effectiveness or success. However, Den Hartog (2004) also stresses the cultural embeddedness of this body of literature in that it was mostly drawn from the U.S.A. context. Den Hartog (2004) argues that these findings might not necessarily be generalisable into other cultures. According to the GLOBE results, the mean across 61 countries for Assertiveness was 3.82 for values scores, in relation to a midpoint of 4 (Den Hartog, 2004).

Japan, China, the Philippines and Iran scored the highest on Assertiveness societal measures, with Turkey, Austria, Russia and Brazil scoring lowest (Den Hartog, 2004). Den Hartog (2004) suggests that a balance of Assertiveness might be necessary in a society; too much Assertiveness might impede internal integration and cooperation, and too little Assertiveness might constrain external adaptation and survival. A certain amount of competition and dominance might therefore be needed to survive in most environments (Den Hartog, 2004). Den Hartog (2004) acknowledges that the respondents of the GLOBE research, who were middle managers, might not reflect the broader society, because managers might be more Assertive as a societal group. However, the GLOBE research also used unobtrusive measures that indicated that middle manager views did reflect the society in which they were embedded (Den Hartog, 2004).

Hofstede (1980a) measured work goals in terms of earnings, recognition, advancement, and challenge as dimensions of Masculinity, and good working relationships; cooperation; the importance of a desirable living area; and employment security as Femininity. The GLOBE studies found a significant and positive correlation between these and Assertiveness societal practices scores ($r = 0.37$; $p<0.05$), yet not with the Assertiveness societal values scores ($r = 0.17$; $p > 0.10$) (Den Hartog, 2004). This suggests that Hofstede (1980a) was measuring practices and not values, which he claimed to be measuring. A range of behaviours associated with Masculinity might overlap those associated with Assertiveness (Den Hartog, 2004:413). According to Hofstede (1991), Individualism, Masculinity, and lower levels of Uncertainty Avoidance are related to innovativeness. It is argued that the relationships of the GLOBE organisational cultural dimensions with innovativeness may an important area of overlap in their relationships with research productivity.

"Surprisingly", according to Den Hartog (2004:412), "we did not find significant differences between men and women in terms of how they rated Assertiveness values and practices". This finding supports the differentiation (between Gender Egalitarianism and Assertiveness) developed by the GLOBE researchers. GLOBE measures of Assertiveness societal values were found to be negatively (-0.28; $p<0.05$) correlated with Gender Egalitarianism societal values, and positively correlated with societal Power Distance values (0.29; $p<0.05$) (Den Hartog, 2004). Unlike certain other values orientations, Assertiveness values were not found to be significantly associated with measures of societal health, human health, life expectancy, general satisfaction and the human development index (Den Hartog, 2004). The only significant association for this group of measures was that found between Assertiveness society values and respect for family and friends (0.36; $p<0.05$), which may indicate a relationship between collective practices and Assertiveness (Den Hartog, 2004).

Societies with maritime climates were found to be associated with softer, more non-Assertive values and societies with hotter weather and more rain were found to be associated with higher levels of Assertiveness (Den Hartog, 2004). Societal Assertiveness values were found to be significantly and positively associated with domestic political violence: political riots and armed attacks ($r = 0.27$; $p<0.05$), and also with temperature ($r = 0.34$; $p<0.05$), according to Den Hartog (2004).

Using hierarchical linear testing, the GLOBE researchers found a positive and significant relationship between societal Assertiveness values and organisational values ($p<0.01$) (Den Hartog, 2004). In English speaking countries, higher values of Assertiveness predominate (Den Hartog, 2004).

Deal and Kennedy (1982) offer a model of organisational culture which is based on four categories of cultures in organisations: the tough-guy culture, the work hard and play hard culture, the bet your company culture, and the process culture. Deal and Kennedy's (1982) tough-guy culture corresponds with the Assertiveness theoretical construct developed by the GLOBE researchers, according to Den Hartog (2004). The internal competition, and rewards conferred on individuals for aggressive risk taking which are associated with Deal and Kennedy's (1982) tough-guy culture tend, however, to be unsuited to teamwork and group cooperation (Den Hartog, 2004). Low Masculinity, or Femininity, is associated with higher levels of managerial concern for employees, which facilitates human relations and a supportive climate, and which also facilitates new product development (Nakata & Sivakumar, 1996).

Such socioemotional supportive climates support risk taking (Nakata & Sivakumar, 1996). Low Masculinity "with its focus on people and establishing a warm, nurturing environment, may be optimal for initiation" (Nakata & Sivakumar, 1996: 65). Through "creating a climate of give and take, divergent perspectives, trust, and supportive relations, low masculinity supports the idea generation, critiquing, and relational building tasks occurring during initiation" (Nakata & Sivakumar, 1996: 65). Low levels of Assertiveness might encourage innovative research productivity if this effect (of supportiveness for divergent perspectives) was stronger than the positive influence of Assertiveness in encouraging risk taking and individual innovativeness. The influence of Assertiveness on research productivity for an academic field might be a function of the level of Assertiveness of an academic field.

High levels of Masculinity, representing goal orientation and formalisation facilitate implementation when "priority is placed on bringing together the finer details of designing, assembling, and introducing new products within more fixed constraints" (Nakata & Sivakumar, 1996: 65). Consequently, higher levels of Assertiveness might be expected to be positively associated with higher levels of research productivity to the extent if such research is 'implementation' oriented yet not 'initiation' oriented.

Kedia *et al.* (1992) found a higher level of Masculinity (in terms of country based research) to be associated with higher levels of research productivity both in the academic and the industrial contexts of R&D units. Theory and research findings that relate to the potential influence of Future Orientation on research productivity are considered as follows.

2.5.6 Future Orientation

The cultural values of traditional Asian societies such as China, Hong Kong, Japan and Taiwan are typically associated with high levels of work ethic, the pursuit of education and determination (Hofstede & Bond, 1988). This led to a new field of study; temporal studies (Ashkanasy, Gupta, Mayfield & Trevor-Roberts, 2004). An interest in temporal cultural studies has spread, as from the 1980s Asian countries such as Japan, Hong Kong, Singapore, South Korea, Taiwan, Malaysia, Thailand and Indonesia have demonstrated significant economic progress (Ashkanasy *et al*., 2004). Chinese minority ethnic communities in certain of these countries have also found to be associated with economic success that differentiated them from other cultures (Ashkanasy *et al*., 2004). These successes have been ascribed to temporal effects associated with culture (Ashkanasy *et al*., 2004). In the absence of direct tested associations in the literature between Future Orientation and the research productivity of academic fields, the societal and organisational correlates of Future Orientation are reviewed as follows.

According to Ashkanasy *et al*. (2004:282), the temporal cultural orientation of Future Orientation represents the degree, or extent, to which a group "encourages and rewards future-oriented behaviours such as planning and delaying gratification". Ashkanasy *et al*. (2004:317) suggest that one "of the most important rationales for future-oriented culture is to help societies develop a capacity to invest and succeed in basic science and technology". Success in basic sciences was found to be negatively correlated with Future Orientation values (-0.62; $p<0.01$) (Ashkanasy *et al*., 2004:317). In contrast to expectations, the GLOBE research findings indicate that societal "values of future orientation are not significantly higher or lower for the Confucian Asia and Anglo clusters" (Ashkanasy *et al*., 2004:333). Conceptions of time, or temporal perspectives, are a key factor that guides human behaviour; therefore Future Orientation is considered by the GLOBE researchers to be an important cultural dimension of human culture (Ashkanasy *et al*., 2004). Conceptions of time have been

differentiated into physical, or linear time, and social, or episodic and cyclical time (Ashkanasy *et al*., 2004). Cultures typically are differentiated according to their time orientation; the placement of individual and social experiences into temporal frames can differ between different cultures (Ashkanasy *et al*., 2004). A low future orientation is typically associated with a spontaneous ability to enjoy the moment and hedonistic pleasures at the expense of delayed gratification and an inability or unwillingness to plan (Ashkanasy *et al*., 2004). Cultures with a high Future Orientation, however, are typically associated with goal formation and planning which might come at the expense of social relationships (Ashkanasy *et al*., 2004).

Individuals with a past-orientation are focused on the lessons of the past, and more generally "believe that plans should be evaluated in terms of their fit with the customs and traditions of society and that innovation and change are legitimated only according to past experience" (Ashkanasy *et al*., 2004:285). However, future-oriented individuals and groups extend past their traditions, and take into account their anticipated future rewards (Ashkanasy *et al*., 2004). Therefore, drawing from theory relating to these temporal relationships, the GLOBE definition of Future Orientation is "the extent to which members of a society or an organisation believe that their current actions will influence their future, focus on investment in their future, believe that they will have a future that matters, believe in planning for developing their future, and look far into the future for assessing the effects of their current actions" (Ashkanasy *et al*., 2004:285).

At an organisational level, Future Orientation is reflected in decision making, and can have an impact on firm's temporal focus, for example, a focus on short-term or long-term profits, or the degree of balance attained between these (Ashkanasy *et al*., 2004). Changing time orientation in organisations is especially difficult because time orientation of individuals is a fundamentally ingrained aspect of any culture (Ashkanasy *et al*., 2004).

Certain factors contribute to the time orientation of a society, including attitudes toward socialisation, socioeconomic conditions, political stability, education, gender roles and religion (Ashkanasy *et al*., 2004). Individuals in society are socialised into time orientation roles, and national, community and family institutions play a role in this (Ashkanasy *et al*., 2004). The socioeconomic situation of a society is also typically a determinant of Future Orientation; social deprivation and lower levels of education are associated with lower levels of Future Orientation (Ashkanasy *et al*., 2004). Political instability can be associated with

shorter time horizons in thinking, and in more stable industrialised environments, Future Orientation may be more prevalent (Ashkanasy *et al*., 2004). The process in which values are transmitted to children can result in gender differences in Future Orientation (*ibid.*). The relationship between different religions in contemporary society is complex: the influence of religious forces in history such as the Protestant Ethic are no longer clear predictors of temporal orientations, as many of the Protestant oriented societies are now focused on consumptive behaviour, according to Hofstede (2001).

Societal Future Orientation is a strong influence on organisational Future Orientation, yet organisations are exposed to a range of other influences that also influence their level of Future Orientation, such as their competitive environment, technology, organisational structure, size, institutional systems and leadership behaviour (Ashkanasy *et al*., 2004). In increasingly technologically oriented competitive contexts strategic time horizons might be shrinking, and quicker responses might entail a competitive advantage (Ashkanasy *et al*., 2004). In the face of price competition, organisations might opt for strategy associated with lower Future Orientation, as immediate survival and short-term profitability might be prioritisied (Ashkanasy *et al*., 2004). According to categorisation offered by Burns and Stalker (1961), a flexible and fluid organisational structure is expected to more timeously adapt to changing external conditions than a mechanistic structure. More entrepreneurial and smaller organisations might also be expected to have a lower Future Orientation (Ashkanasy *et al*., 2004). The following are characteristics of organisational Future Orientation: (i) the use of planning and control tools; (ii) a multidivisional structure; (iii) managerial mobility; (iv) institutional investors, (v) patient capital; and (vi) intellectual property rights (Ashkanasy *et al*., 2004). The vision that is developed and implemented by organisational leaders will also influence the degree of Future Orientation in an organisation (Ashkanasy *et al*., 2004). The charismatic leadership style, which is associated with a long range vision, is expected to be associated with both higher levels of organisational Future Orientation and higher organisational performance (Ashkanasy *et al*., 2004).

Individual "future orientation is not simply a reflection of societal future orientation, but is guided by an individual's interpretation of the cultural future orientation". Ashkanasy *et al*. (2004:298). Two categories of individual-level correlates with Future Orientation can be differentiated: general correlates and contextual correlates (Ashkanasy *et al*., 2004:298).

General correlates of individual Future Orientation include: (i) age, as individuals might adjust their personal networks and adjust goal selection according to perceptions of time available to them according to lifespan; (ii) deprivation, as higher socioeconomic status might influence Future Orientation positively and vice versa; (iii) adaptive capacity, where Future Orientation might enable adaptability, and may also influence optimism; and (iv) incentive or motivating factors, where "Future [O]rientation gives people the incentive to perform and achieve and to strive for certain goals" and where "future-oriented individuals modif[y] the psychological distance between present and future by perceiving the future distance in time nearer than individuals low in future orientation" according to (Ashkanasy *et al*., 2004:299).

Contextual correlates of Future Orientation, for example, include (i) investment in staff, which might be associated with more Future Oriented individuals; (ii) delayed gratification, where individuals with higher levels of Future Orientation may delay gratification for improved future rewards; (iii) psychological health, where Future Oriented individuals may be more psychologically healthy; and (iv) societal health, or better social relationships, which possibly reflect a more effective societal fit (Ashkanasy *et al*., 2004).

South African respondents were scored as fifteenth-last in Future Orientation society values, which perhaps indicate that South Africans aspire toward lower levels of Future Orientation (Ashkanasy *et al*., 2004). In terms of Future Orientation society values, Thailand scored highest, followed by Namibia, the lowest being Denmark, and second-lowest being China (Ashkanasy *et al*., 2004). More industrialised countries, with higher income levels, were found to score relatively lower on Future Orientation values, and lower income emerging countries were found to score higher in Future Orientation values (Ashkanasy *et al*., 2004). According to kAshanasy *et al*. (2004:305) this was an unexpected finding, which contradicted the general view "that lower socioeconomic status encourages a focus on immediate concerns for survival, whereas higher socioeconomic status allows savings and investments for the future". However, higher income societies might focus on immediate gratification with regard to material wealth; they might enjoy the present more due to their wealth that has already been accumulated (Ashanasy *et al*., 2004).

According to the GLOBE findings, three industries surveyed: food processing, financial services and telecommunications were found to not differ significantly according to Future Orientation societal values (Ashkanasy *et al*., 2004). Future Orientation values were found to

be positively correlated with Uncertainty Avoidance values (0.67; $p<0.01$); Institutional Collectivism values (0.48; $p<0.01$); In-Group Collectivism values (0.51; $p<0.01$); Performance Orientation values (0.41; $p<0.01$); and negatively correlated with Gender Egalitarianism values (-0.36; $p<0.05$) (Ashkanasy *et al*., 2004). Gender equality has also been found to be negatively correlated with Future Orientation values (-0.44; $p<0.01$) (Ashkanasy *et al*., 2004).

Future Orientation societal values have been found to be negatively correlated with economic prosperity (-0.62; $p <0.01$) and with measures of the World Competitiveness Index (-0.41; $p<0.01$) (Ashkanasy *et al*., 2004). Future Orientation values were found to be inversely associated with social economic success and to be negatively correlated with societal health (-0.54; $p<0.05$); life expectancy (-0.49; $p<0.01$); general satisfaction (-0.45; $p<0.01$); and a measure of the Human Development Index (-0.50; $p<0.01$) (Ashkanasy *et al*., 2004).

One "of the most important rationales for future-oriented culture is to help societies develop a capacity to invest and succeed in basic science and technology" (Ashkanasy *et al*., 2004:317). However, success in basic sciences was found to be negatively correlated with Future Orientation values (-0.62; $p<0.01$) (*ibid*.). Strength of family ties were found to be positively correlated with Future Orientation values (0.49; $p<0.01$), and Future Orientation values were also found to be positively correlated with a measure of respect for family and friends (0.61; $p<0.01$).

Future Orientation values were found to be associated with the following measures of ideology: passiveness (0.53; $p<0.01$); lack of voice (0.43; $p<0.01$); and a more extensive role for government (0.53; $p<0.01$) (Ashkanasy *et al*., 2004). According to hierarchical linear modelling, Future Orientation societal values were found to predict organisational Future Orientation values ($p<0.01$) (Ashkanasy *et al*., 2004). Although it is a different dimension of cultural values, Future Orientation is also related, conceptually to the temporal dimension of Confusion Dynamism.

Confucian Dynamism, in its emphasis on action and future possibilities, contributes positively to new product development, according to Nakata and Sivakumar, (1996). However, the negative pole of Confucian Dynamism, relating to saving face, or giving face, can be associated with extremes such as 'facework' or "being too preoccupied with the

efforts of certain actions or events on a person's own or another's reputation, may work against successful new product development" (Nakata and Sivakumar, 1996: 67).

Despite certain conceptual similarities, Future Orientation has not been found to be significantly associated with the Confucian Dynamism scale developed by Hofstede (2001), according to Ashkanasy *et al*. (2004). Ashkanasy *et al*. (2004:313) argue, however, that Hofstede's (2001) measures are fundamentally associated with multiple interpretations, and consider that "these findings suggest a need for caution in interpreting the Confucian Dynamism scale as a proxy for long-term orientation, and indicate that such an interpretation may not be appropriate".

If, across countries, success in basic sciences has been found to be negatively correlated with societal Future Orientation values (-0.62; $p<0.01$), and to if Future Orientation societal values have been found to predict organisational Future Orientation values, then research productivity is expected to be negatively associated with higher levels of Future Orientation. The GLOBE dimension of Performance Orientation is considered as follows.

2.5.7 Performance Orientation

Performance Orientation is associated with "innovation, high standards, and performance improvement" (Javidan, 2004:239). According to Javidan (2004), Hofstede's (1980a) notion of performance is confounded with other theoretical perspectives of the Masculinity versus Femininity construct; because of this the GLOBE researchers did not include Hofstede's (1980a) conception of 'masculinity' related achievement as a theoretical component of the Performance Orientation construct (Javidan, 2004). Instead, Performance Orientation drew more from McClelland's (1961) theory (*ibid*.).

At the organisational level of analysis, Performance Orientation relates "to the extent to which the organisation is focused on ambitious and challenging goals and results and is driven by competition and winning through innovation and performance improvement" (Javidan, 2004: 277). Of all the measures tested, the GLOBE research found Performance Orientation to be the most coveted, which contrasts with its low level of coverage in the cross-cultural literature, according to Javidan (2004). The findings for Performance Orientation were, however, not industry specific (Javidan, 2004).

Performance Orientation society values were found to be negatively correlated with economic prosperity (-0.28; $p<0.05$), the World Competitive Index (-0.44; $p<0.01$) and longevity (-0.30: $p<0.05$), yet were not significantly correlated to societal health, human health, general satisfaction, psychological health, or the Human Development Index (Javidan, 2004).

Javidan (2004:255) argues that Hofstede & Bond's (1988) Confucian Dynamism construct "has much in common with McClelland's need for achievement and GLOBE's Performance Orientation, lending support for the argument that no particular religion or philosophy has a monopoly on achievement". Javidan (2004) stresses that combining values, societal practices and individual practices in a single measure [as Hofstede (1980a) and Hofstede & Bond (1988) may have done] can result in a process that confounds the results, and might obscure the effects of performance orientation that are measured when methodological processes might require that these measures are sampled separately. Javidan (2004) stresses, therefore, that values and practices should not be combined in culture research because, as the GLOBE findings evidence indicates, they are not necessarily related at a point in time.

According to Javidan (2004), two fundamentally different ideologies dictated societal and political formations globally over the course of the twentieth century: the liberal ideology, based on rationality, self-interest and property rights, and the socialist ideology, based on a labour orientation and wealth distribution equality. Of these two, according to Javidan (2004), the liberal ideology has dominated in the twenty first century. According to Javidan (2004), the GLOBE research findings indicate that despite ideology, governments' policies and actions reflect societal values, and governments in turn seem to reinforce those societal values. These findings indicate that the economist's conception of a rational individual falls short of explaining human societal behaviour since it fails to incorporate the "critical role of national value systems" (Javidan, 2004:256). Therefore, according to Javidan (2004:256):

> [i]ntrusiveness and pervasiveness of government regulations, which usually lead to cumbersome and complicated regulatory frameworks, may be caused by deep-rooted societal values that prefer more structure, less uncertainty and a bigger government. Rationalising the regulatory framework may involve more than a change in laws. It may warrant a fundamental change in the society's value system.

Javidan (2004) argues that despite the stress by economists on variables such as investment, infrastructure, and domestic competition, the findings of the GLOBE research indicate that an "even more fundamental requirement" exists: cultural influences.

No association was found between religion and Performance Orientation (Javidan, 2004). McClelland's (1961) finding; that societies with higher need for Achievement scores were associated with areas of the globe with moderate climates rather than tropical climates was found to be weakly supported, where 68 percent of the variance in Performance Orientation societal values explained by regional factors and 32 percent by individual factors (Javidan, 2004). According to these results, geographic proximity might facilitate cross-cultural communication and value sharing, with English speaking countries (South Africa being the exception) reflecting the potential influence that heritage might have played in their cultural orientations (Javidan, 2004).

Societal Performance Orientation practices and values were found to positively predict Organisational Performance Orientation practices ($p<0.01$), and values ($p<0.01$), respectively (Javidan, 2004). Because the GLOBE Performance Orientation construct is developed from McClelland's (1961) theory of need for Achievement (n Achievement), the latter is reviewed as follows.

McClelland (1961:37) explains the development of needs as follows; according to him, man is:

> conceived as an animal engaged in a struggle for survival with nature…an obvious corollary [being] to assume that because man struggled he had a desire to survive. Biologists and psychologists [suggested] how such a desire was mechanically controlled by the organism, since unmet physiological needs ordinarily triggered certain danger signals which would irritate or disturb the organism until the needs were satisfied.

Psychologists have tended to differentiate between motivation and action, and therefore between the desire to achieve and actual achievement, according to McClelland (1961). Actual achievement is the result of a range of forces, and therefore is a less reliable measure of the need for achievement (McClelland, 1961). McClelland (1961) tested the degree to which people's thoughts expressed an 'inner concern' with achievement: a bias, or a need for achievement. McClelland (1961) measured the number of times achievement related ideas were found in stories written by research subjects.

According to McClelland (1961:43), there "may be cultural differences, but the data to date point to major similarities-inducing achievement motivation increases in all types of subjects". American males with high n Achievement have been found to come from middle class rather than high or low class backgrounds, and were more resistant to social pressure (McClelland, 1961). The extent to which n Achievement is found along a class 'schism' might indicate that the cultural attitudes and values differences between these classes reflect a dimension of culture. This might suggest a predicted correlation with some dimension of Hofstede's (1980a) cultural factors. American respondents with a high level of n Achievement also tended to be more likely to volunteer as subjects for psychological experimentation (McClelland, 1961).

Weber (1958) identified a 'Protestant Ethic' and its association with harder and longer hours of work, entrepreneurial success, and a lack of extrinsic manifestation of wealth in favour of an intrinsic sense of having done a job well. There is an intrinsic character transmission between religious beliefs to the culture of the group, according to Weber (1958). It is perhaps reasonable to regard the success of this culturally homogenous group to have had no other advantage in achievement other than the underlying values that underpinned their behaviour. Weber (1958) also explicitly points to the individualism of this group, and its challenge to other norms, as a contributing factor to their success.

On the basis of the literature reviewed above, it is expected that Performance Orientation is associated with higher levels of performance. Research productivity, as a dimension of job performance, is expected to be no different. The GLOBE dimension of Humane Orientation studies is considered as follows.

2.5.8 Humane Orientation

Humane Orientation represents the degree to which "an organisation or society encourages and rewards individuals for being fair, altruistic, friendly, generous, caring, and kind to others" (House *et al.*, 1999). This orientation is reflected in the way people treat others and in the institutions present in a society (Kabasakal & Bodur, 2004). According to Kabasakal and Bodur (2004) the 'tenderness' pole of the tenderness versus toughness dimension of Hofstede's (1980a) Masculinity index, or Femininity, corresponds theoretically with the Humane Orientation dimension of the GLOBE research theory. To some extent, then,

Humane Orientation is also a derivative of Hofstede's (1980a) Masculinity construct. Although Humane orientation is also derived from McClelland's (1961) need for Affiliation construct (House *et al*., 2002), need for Affiliation is not reviewed here, as it has already been discussed, in the above sections, that relate the need for Affiliation to collectivism. Humane Orientation also derives aspects from the 'Kind Heartedness' dimension offered by Hofstede and Bond (1988), and also in Putnam's (1993) and Kluckhohn and Strodtbeck's (1961) seminal work (House *et al*., 2002). In the absence of evidence of direct tested associations between Humane Orientation and research productivity, and because of the significant associations between societal culture and organisational culture, certain tested relationships of Humane Orientation that are available in the literature are now reviewed.

Societies with the highest measured Humane Orientation values are Nigeria, Finland, Singapore and Austria, whilst the lowest measured societies included New Zealand, Costa Rica, Thailand and Kuwait (Kabasakal & Bodur, 2004). The GLOBE findings indicate that the more humane oriented a society is, the more liberal thinking, or "right-wing and less socialist its political ideology" (Kabasakal & Bodur, 2004). The Gini coefficient of a society was not found to be associated with societal values of societal Humane Orientation (Kabasakal & Bodur, 2004). This indicates that Humane Orientation is not related to the differential distribution of wealth in a society (Kabasakal & Bodur, 2004). Geographic region was found to contribute 13.5 percent of the variance in societal Humane Orientation values (Kabasakal & Bodur, 2004).

For Kabasakal and Bodur (2004), the psychological health of individuals in societies is related to parental nurturance and lower levels of punitiveness in families; Humane Orientation is related to psychological health. The economic value of children in developing societies where children contribute to family incomes derives from obedience (Kabasakal & Bodur, 2004). In contrast, the psychological value of children is regarded as important in more developed countries where more autonomy is encouraged (Kabasakal & Bodur, 2004). For instance, a significant and negative correlation ($p < 0.01$) has been found between GNP per capita and the economic value of children (Kabasakal & Bodur, 2004). These are salient societal aspects associated with societal endowments of Human Orientation, according to Kabasakal and Bodur (2004). Societal Humane Orientation values scores ($p < 0.10$) have been found to correlate with organisational-level values scores (Kabasakal and Bodur, 2004).

Humane Orientation values have also been found to be associated with a host of effects at the organisational level (Kabasakal & Bodur, 2004).

The convergence thesis postulates that industrialisation has a global effect on all organisations and that, as a result of this; economic development and technological progress will tend to produce a homogenous global organisational culture that is unrelated to societal culture (Kabasakal & Bodur, 2004). Consequently, "De-Taylorisation" has been an international trend, as the Taylorist, or Fordist, paradigm of work is increasingly being replaced by a more humane oriented working paradigm (Kabasakal & Bodur, 2004:584). However, the GLOBE research findings indicate that, despite the associations between the Humane Orientation values of the telecommunications, food processing, and finance industries, these associations do not provide evidence, yet, of the elimination of industry effects (Kabasakal & Bodur, 2004). The financial sector, in particular, has been found to measure lower in Humane Orientation values, relative to the food processing sector and the telecommunications sector (Kabasakal and Bodur, 2004).

The influence of GLOBE societal cultural values on organisational culture values has been found to be present on a world-wide basis (House *et al*., 2004). In societies high in Humane Orientation, organisations are "relatively autonomous in their employee relations, whereas in the relatively low humane orientation societies there is greater control of organisations in their HRM practices" (Kabasakal & Bodur, 2004: 584). According to Kabasakal and Bodur (2004), the relatively low Humane-Oriented European system of HRM encompasses social partners, such as trade unions, which have input into HRM policies. Despite the Humane organisational structures and processes associated with a move away from Fordism and Taylorism, these societies and organisations have been found to score relatively low on Humane Orientation measures (Kabasakal & Bodur, 2004).

Kabasakal and Bodur (2004) argue that in an increasingly globalised context, the level of global Humane Orientation can influence organisational practices negotiations, employee relations, human resources practices and leader behaviours (Kabasakal & Bodur, 2004). According to Kabasakal and Bodur (2004: 597), Humane Orientation therefore "becomes a valuable analytical dimension for international business as well as for organisational theories". In the above sections, literature that related to each of the GLOBE dimensions was

reviewed. A more specific review of industry specific effects and their relationships with the GLOBE cultural dimensions is provided as follows.

2.5.9 GLOBE Research: Specific Industry Effects

According to the GLOBE theoretical model, societal culture influences the organisations embedded within a particular society, and industries are also shaped by forces in their environment, such as technological and environmental turbulence (Brodbeck, Hanges, Dickson & Dorfman, 2004). The GLOBE research studies primarily investigated the effects of culture at the societal and at the organisational level yet also investigated the effects of culture across three specific industries: the telecommunications, food processing, and financial industries (Brodbeck *et al*., 2004). These three industries were selected due to their universal nature; they were present in all surveyed countries yet also represented industries that were fundamentally different from each other (Brodbeck *et al*., 2004). The effects of culture needed to be tested in different industries that represent different areas of an economy (Brodbeck *et al*., 2004). The telecommunications industry was taken to represent a relatively new industry by the GLOBE researchers, notwithstanding the changes associated with reduced government involvement in this sector in many societies (Brodbeck *et al*., 2004). The food processing industry is perhaps more resistant to economic variation, with stable demand patterns; a safe haven for investment in economic downturns (Brodbeck *et al*., 2004). The financial sector, in contrast, is a service industry that is largely more vulnerable to economic fluctuations, with a heightened sensitivity to international economic crises (Brodbeck *et al*., 2004).

Other factors, however, also influence the relationship between the effects of societal-level, or industry-level, values on organisation-level values. The "effect of a value at the societal level on the analogous value at the organisational level is mediated" by the intent of senior management or foundational intent" (Brodbeck *et al*., 2004: 657). According to Brodbeck *et al*. (2004: 656), the convergence of organisational culture is predicted might occur through [i] "coercive isomorphism (based on political and legal pressures), [ii] mimetic isomorphism (based on modelling other successful organisations), and [iii] normative isomorphism (based on rules and norms)". Organisations compete "in a globalising world on the basis of their home-base advantages" (Brodbeck *et al*., 2004: 656). According to Brodbeck *et al*. (2004: 656), an "industrial culture, therefore, emerges because of the similarity in practices by

organisations within a given industry" and "in global industries, one would expect a shared industry-wide practice to emerge as a result of benchmarking, and of common and converging technical imperatives, needs of customers, and regulatory standards", according to Brodbeck *et al*. 2004: 657). Convergence theory predicts that this isomorphism will eventually occur on a global basis, across organisations (Williamson & Flemming, 1977).

According to Dorfman *et al*. (2004), cross-cultural situations in organisations, irrespective of cultural values convergence, are typically associated with misunderstandings and communication difficulties. Dorfman *et al*. (2004: 709) reject the thesis that cultural convergence will solve all cultural problems in organisations. Dorfman *et al*. (2004: 709) argue that, despite the feasibility of the convergence hypothesis, it will not be expected to apply in an absolute manner, as "a contrasting position of cultural stability with enduring cultural patterns is more likely". Dorfman *et al*. (2004: 709) therefore contend that although "global communication, technical innovation, and industrialisation can create a milieu for cultural change, a convergence of cultural values is by no means assured", as "cultural differences among societies may be exacerbated as they adapt to modernisation while simultaneously striving to preserve their cultural heritage".

Within the global context, however, home-based industrial advantages can be developed, based on local culture (Brodbeck *et al*., 2004). Industry-specific learning can also occur within the context of local industry clusters (Brodbeck *et al*., 2004). The Southern African university is expected to reflect both the larger Southern African societal culture, yet also a globalised culture relating to the nature of a university, in terms of its connectedness to the 'research industry' as it exists locally and internationally, or globally.

According to Brodbeck *et al*. (2004: 657), "evidence indicates that industrial sector effects are often mediated and shaped by societal cultures". However, "the degree to which the organisations converge in responding to the common societal values" may differ according to differences in industries (Brodbeck *et al*., 2004: 658). These may differ because the "costs of leveraging societal values for developing organisational practices may vary by industry; the costs may be lower in relatively localised industries such as telcom, and be higher in relatively global industries such as financial services" (Brodbeck *et al*., 2004: 658). The benefits of differentiation based on societal culture may therefore be less effective for more global industries, and more effective in more local industries (Brodbeck *et al*., 2004). South

African societal culture might influence academic fields that are associated with industries that are less 'globalised' in nature.

Of all the GLOBE dimensions tested, the GLOBE research findings indicate that the effect of industry on organisational cultural practices was limited to that of Gender Egaliarianism, ($p < 0.05$); a male-dominant industrial effect was associated with the telecommunications industry (Brodbeck *et al*., 2004: 661). The effect of industry accounted for eleven percent of the variance in in organisational Gender Egalitarianism (Brodbeck *et al*., 2004: 661). Because the effect of industry on organisational values can be local in nature, the GLOBE research studies also investigated interaction effects between industries and societies (Brodbeck *et al*., 2004: 661). Interactions between industry and organisational cultural practices were found to be significant for Assertiveness, Gender Egalitarianism, Power Distance, and Uncertainty Avoidance, where these interactions explained 19 percent, 28 percent, 42 percent, and 17 percent of the variance, respectively (Brodbeck *et al*., 2004: 661). Therefore four of the nine GLOBE dimensions of organisational practices were found to be influenced by the interaction of industry and societal culture (Brodbeck *et al*., 2004: 661).

The GLOBE research findings also found an interaction between societal culture values and industry influenced organisational cultural practices (Brodbeck *et al*., 2004: 661). The interaction effect of Uncertainty Avoidance was found to be strongest in the telecommunications industry and least so in the financial services industry (Brodbeck *et al*., 2004: 661). Assertiveness was also found to follow this pattern, with a strong manifested effect in the telecommunications industry but no discernible effect was found for the financial services industry (Brodbeck *et al*., 2004: 661). Interaction effects between societal Gender Egalitarianism cultural values and industry were found for the telecommunications industry and for the food processing industry but not for the financial services industry (Brodbeck *et al*., 2004: 663). Different academic fields have strong connections to their practitioner fields. If differences in associations and interaction effects exist for different industries, then differences in the relationships of GLOBE organisational culture are expected to exist between different academic fields. Differences in GLOBE organisational values endowments are expected to be related to differences in research productivity. A certain type of organisational culture might be more likely to facilitate research productivity. In the absence of literature-based evidence of direct tested associations between any of the GLOBE

dimensions and the research productivity of academic fields, the predictions derived above are considered to be tentative.

The weak industry effects found in the GLOBE studies for organisational culture across societies "strongly suggest that the major force shaping organisational practices is rooted in societal-level systems rather than industry-specific work systems" (Brodbeck *et al*., 2004: 665). This conclusion holds, despite the "societal-system by industry interactions (moderate to high in effect size)" that were found for Uncertainty Avoidance, Assertiveness, Gender Egalitarianism, and Power Distance, according to Brodbeck *et al*. (2004: 665). On the basis of these findings, Brodbeck *et al*. (2004: 665) conclude that this "interaction supports the paramount role of societal cultural variables as influencing organisational practices, either directly or indirectly".

Brodbeck *et al*. (2004: 667) conclude, further, from these findings that the "strong society systems effects found" suggest that "the organisational design and competitive advantage of firms tend to strongly influenced by their domestic home base"; especially in food processing and telecommunications, yet less so in financial services firms which might be "strongly interlinked" with other industries. Developing a localised competitive advantage on the basis of culture is less possible in the financial industry because this industry, and similar industries, might be less susceptible to localised cultural effects (Brodbeck *et al*., 2004: 667). It might be possible that the financial industry effects might be similar to university effects which are subject to international and other linkages. However, certain differences in organisational cultural values of the academic fields within such institutions are expected to reflect the corresponding industry fields that these academic units service.

The use of established precedent as a basis of the structure of organisations and their processes might derive from a flow of 'best-practice' knowledge. It is argued that different academic fields might differ in the extent to which they accept 'outside' information, and to the extent that they are more or less susceptible to localised cultural effects. If each academic field is expected to share organisational cultural values with its corresponding industry field, then organisational culture differences between industry fields might be expected to be reflected in differences in research productivity. There seem to be two possible alternative predictions that derive from the above review of the literature that relates industry effects to the GLOBE dimensions of organisational culture. *Firstly*, a certain type of organisational

culture might be expected to be associated with higher levels of research productivity, irrespective of the specific academic field. From the above review, the dominant GLOBE dimensions *associated with higher innovativeness might be expected to reflect a 'universal' typology most suited to research productivity*, given the assumption that research productivity does represent innovative knowledge creation. On the basis of the above review, this GLOBE typology is expected to comprise lower Uncertainty Avoidance, lower Future Orientation, lower Collectivism, lower Power Distance, higher Assertiveness and higher Performance Orientation. It is acknowledged, however, that these relationships are derived from an analysis of associations other than direct associations between research productivity and tested GLOBE dimensions (this research might offer the first test of these relationships). *Secondly*, the other alternative prediction is that industry differences in organisational culture introduce variance in practices and values between academic fields; enough to make any comparison of the influence of organisational cultural effects across academic fields problematic. Convergence theory predicts that organisational culture and the practices of organisations will become more similar across organisations over time (Williamson & Flemming, 1977). If organisational cultural values and practices were similar across different organisations, then the influence of different dimensions of organisational culture would be expected to reflect the relationships with research productivity that are predicted by GLOBE theory. In other words, the first of the alternative predictions discussed above would be expected to be supported. On the basis of the theory and empirical findings reviewed above, Hypothesis A is derived, that *there is a significant association between levels of the GLOBE dimensions of organisational culture and levels of research productivity at the level of the academic School.*

GLOBE theory is framed as a psychologically oriented motivational theory that operates at the grouped, or aggregated, level of analysis (House & Javidan, 2004); this theory does not incorporate the influence of social, psychological and biological bases of individual motivational values. Schwartz's (2007) individual motivational values theory does this, and predicts behaviour at the individual level of analysis. These two theories are used to analyse relationships at two corresponding levels of analysis. Schwartz's motivational values theory is introduced as follows.

2.6 INDIVIDUAL-LEVEL VALUES: SCHWARTZ'S MOTIVATIONAL VALUES

2.6.1 Introduction

This section will provide a review of certain values theory and research findings that relate to the individual level of analysis. Individual basic values theory, also termed Schwartz's motivational values theory (Schwartz, 1992; Schwartz, 1996; Schwartz and Boehnke, 2004; Ros, Schwartz and Surkiss, 1999) is reviewed, together with other theory and research findings that relate individual level values to job productivity in general, and, more specifically, to research productivity as an aspect of individual job performance. A certain structure of ten values, and four overarching 'higher order' value types, is found across cultures (Schwartz & Bardi, 2001). Individual variability of values, or different configurations of values between individuals, has been found to predict individual differences in behaviour (Schwartz & Bardi, 2001).

In terms of the relationship between individual values and group, or aggregate level values, Schwartz (1994:22/23) offers the following perspective:

> Is this set of ten value types exhaustive of all the main types recognized in different cultures? This question cannot be answered definitively…One assertion can be made. It is possible to classify virtually all the items found in lists of specific values from different cultures into one of these ten motivational types of goals.

Schwartz's (1994) individual values are associated with motivational goals, and are derived, or have an origin in, biological and social needs. It is in the explicit integration of the biological and social aspects of motivations that these values contribute an understanding of individual level values. Whereas GLOBE cultural values represent a factor analytic cluster of universal values that manifest at aggregated, or group, levels (House *et al*., 2004), basic individual values represent a cluster of values, based on both biological and social needs, that is structured according to a structure of human motivations, or goals (Schwartz, 1994). Both values theories, however, claim to be able to classify all values types into their typologies. Both bodies of theory, therefore, are regarded as comprehensive in their treatment of values. The primary difference between these two theories is the level of analysis.

For Rokeach and Ball-Rokeach (1989:775), the "concepts of value and value systems are among the very few social psychological concepts that have been successfully employed across all social science disciplines". Rokeach and Ball-Rokeach (1989:775) offer the

conception of value hierarchies, where "societies and individuals can accurately be compared with other societies and individuals not only in terms of specific values but also in terms of value priorities". The implication of this perspective is that values can meaningfully be measured in relation to other values (Rokeach & Ball-Rokeach, 1989). Rokeach (1973) reduced his analysis of the potential universe of values to a set of 36 values, and offers the following five value types: (i) personal values, (ii) social values, (iii) moral values and (iv) competence values. The study of individual values is an increasingly important research area (Schwartz & Bardi, 2001).

Individual motivational values are expressed as work goals, or values, in the context of work, according to Ross *et al*. (1999). Values represent, "in the form of conscious goals, three universal requirements of human existence: biological needs, requisites of coordinated social interaction, and demands of group survival and functioning" (Schwartz, 1996:122). Four types of work values therefore derive from these basic values, these being (i) intrinsic; (ii) extrinsic; (iii) social; and (iv) prestige values (Ross *et al*., 1999). Typically, value research focuses on investigating how value priorities are related to "attitudes, behaviour, and social experiences and roles", a body of research that includes work by Hofstede (1980a) and other theorists (Ross *et al*., 1999: 50). Values are defined as "desirable, trans-situational goals that vary in importance as guiding principles in people's lives" (Ross *et al*., 1999: 51), or as "desirable trassituational goals, varying in importance, that serve as guiding principles in the life of a person or other social entity (Schwartz, 1994:21). Schwartz (1994:21) stresses that "implicit in this definition of values as goals is that (1) they serve the interests of some social entity, (2) they can motivate action- giving it direction and emotional intensity, (3) they function as standards for judging and justifying action, and (4) they are acquired both through socialisation to dominant groups and through the unique learning experiences of individuals". Values, therefore, can be differentiated according to the motivational goals that they express (Ross *et al*., 1999). The theory of basic values offers the following differentiation between values, where (Ross *et al*., 1999: 51):

> [a] typology of the different contents of values was derived using the following reasoning: in order to cope with the challenges inherent in human existence, groups and individuals translate the needs and demands they experience into concepts about which they can communicate, expressing them in the language of universal requirements with which all individuals and societies must cope: needs of individuals as biological organisms, requisites of coordinated social interaction, and requirements for the smooth functioning and survival of groups.

Therefore, the ten values dimensions offered by Schwartz's values theory are motivationally distinct, in that they are underpinned by (i) biological requirements; (ii) coordinative social requirements; and (iii) survival and welfare requirements (Schwartz, 1992). The theory postulates that "groups and individuals represent these requirements cognitively, as specific values about which they communicate in order to coordinate with others in pursuing the goals that are important for them" (Schwartz & Boehnke, 2004: 234).

Such values have both structure and content (Schwartz & Boehnke, 2004). Schwartz's theoretical framework, therefore, is derived from a "nearly comprehensive set of different motivational types of values, recognised across cultures", where each "value type is represented by a number of single values that are combined to form relatively reliable indexes of values priorities", as value "systems can be treated as integrated wholes in their relations with behaviours" (Schwartz, 1996:119). The use of such a system of integrated values theory is justified on the following grounds, according to Schwartz (1996). Firstly, single-value research is associated with low reliability. Secondly, single-value research ignores the need to take into account the influence of dominant values, such as, for example, power values, that can be meaningfully related to most aspects of human life (Schwartz, 1996). Thirdly, single-value research does not take cognisance of the assumption that behaviour is the outcome of "tradeoffs among competing values that are implicated simultaneously in a behaviour or attitude" (Schwartz, 1996:121).

It is where conflict occurs between values that values become activated, and are actively used as guiding principles (Schwartz, 1996). Human behaviour typically follows "habitual, scripted responses", yet values activation results in the active guidance of behaviour by values, which is aligned with the value or values that dominate such an internal contest of values (Schwartz, 1996:121). This structure of values, however, is not static, but dynamic, where actions "taken in pursuit of each type of values have psychological, practical, and social consequences that may conflict with or may be compatible with the pursuit of other value types" (Schwartz, 1996:122).

This pattern of conflict versus compatibility between values manifests in a "circular structure of value systems", according to Schwartz (1996:123). Values more alike are closer together in such a structure, which reflects a continuum of values (Schwartz, 1996). The structure has been supported by research across different cultures, yet the relative importance of the ten

values types has been found to vary between samples (Schwartz, 1996:123). Motivational goals that are, according to the circumplex structure, opposed to each other "cannot easily be pursued at the same time", as, for example, "the pursuit of achievement values may conflict with the pursuit of benevolence values: Seeking personal success for oneself is likely to obstruct actions aimed at enhancing the welfare of others who need one's help" (Schwartz, 1996:124).

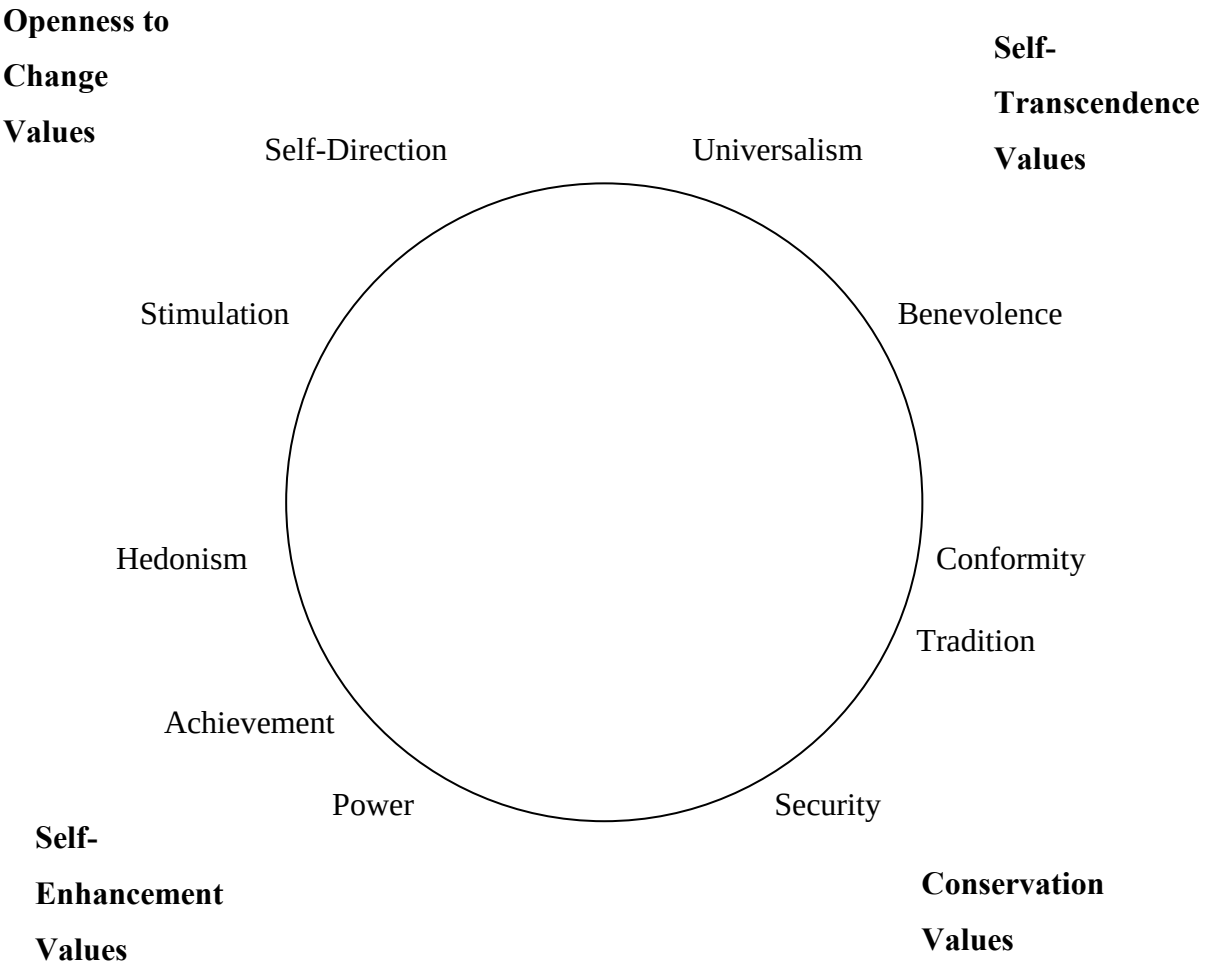
Openness to change, therefore, is opposed to Conservation, and Self-Transcendence is opposed to Self-Enhancement. The tension between these four higher order values systems, therefore, dominate the motivational structure of values in their influence on human behaviour (Schwartz, 1996). Single behaviours can be predicted from transituational variables such as values, as long as contextual conditions are stable (Schwartz, 1996:125).

2.6.2 The structure of Schwartz's Values Theory

Basic values are theoretically ascribed a structure (similarity or dissimilarity of values with each other) and a content (the range of identified values) (Schwartz & Boehnke, 2004). Schwartz values theory postulates that ten basic values are found in all societal contexts, and that the structure of these values takes the form of a quasi-circumplex structure that arises from an underpinning match, or miss-match, between their underlying motivational goals (Schwartz and Boehnke, 2004). The structure of these individual values is illustrated in Figure 2, below.

The quasi-circumplex model is representative of the theory, as the theory does not indicate an equal spacing of these values around the circle, termed circulant placement, or specifically an equidistant relationship of values in terms of distance from the centre (Schwartz & Boehnke, 2004). The approximate distance between these dimensions is shown in the relative placement of the names of the dimensions around the cirumplex in Figure 2, below. Schwartz and Boehnke (2004) tested Schwartz's values theory and found, using two sets of twenty-three samples from twenty-seven countries (n=10857), that confirmatory factor analysis supported these ten basic values, and further confirmed that these values formed a motivational continuum.

Figure 2. The Schwartz values theoretical circumplex structure



Source: Schwartz & Boehnke (2004:239)

The associative strength between variables is represented as stronger if the distance between the variables on the circle is less (Schwartz & Boehnke, 2004). According to Schwartz's values theory (Schwartz, 1992), ten basic human values are typically found across and within different cultures; the values of (i) power, (ii) achievement, (iii) hedonism, (iv) stimulation, (v) self-direction, (vi) universalism, (vii) benevolence, (viii) tradition, (ix) conformity, and (x) security (Schwartz, 1992). According to Schwartz (1992), the dynamic relationship

between these values can, therefore, be structurally represented. Therefore, according to Schwartz's values theory, "actions associated with any value have practical, psychological, and other social consequences" that may conflict with, or be compatible with, "the pursuit of other values" (Schwartz & Boehnke, 2004: 231).

An example of this conflict is behaviour that reflects Hedonism values, which will be expected to conflict with behaviour that reflects Tradition values, yet, in turn, will be expected to be compatible with Self-Direction values (Schwartz & Boehnke, 2004). The structure of these value relations, or the configuration of value relations unique to an individual, are expected to explain patterns in the associations between many behaviour, attitude and personality variables, and also reported priorities with regard to these values (Schwartz & Boehnke, 2004). In this motivational continuum, the closer that two value factors are together, the more similar their underlying motivational structures are considered to be (Schwartz & Boehnke, 2004).

A review of the values literature and research evidence, including over two hundred samples, in more than sixty countries, supports this theory to the following extent: (i) that these ten values are distinct; that (ii) these values are comprehensive with regard to motivationally differentiated types of values; and (iii) that the circumplex structure is an appropriate representation of these values (Schwartz & Boehnke, 2004). A specific value "represents a type when actions that express the value or lead to its attainment promote the central goal of the type" (Schwartz, 1996:122).

2.6.3 Higher order values types

As outlined above, these ten basic values converge into four universal 'higher order' values types, which are characterised by a fundamental tension: between Openness to Change values and Conservation values; and between Self-Enhancement values and Self-Transcendence values. (Schwartz & Boehnke, 2004). These four higher order types form a structure at polar points to the circumplex structure (Schwartz & Boehnke, 2004). The four higher order types are: (i) Openness to Change, which is closely associated with Self-Direction and Stimulation values; (ii) Self-Enhancement, which is closely associated with Hedonism, Achievement and Power values; (iii) Conservation, which is associated with Security, Conformity and Tradition values; and (iv) Self-Transcendence, which is associated with Benevolence and

Universalism values (Schwartz & Boehnke, 2004). These value dimensions are each considered as follows.

2.6.4 Openness to Change Higher Order Values: Self-Direction and Stimulation

The higher order value type 'Openness to Change' is theoretically associated with a motivation for people to follow emotional and intellectual interests that are self-oriented in "unpredictable and uncertain directions (openness) versus to preserve the status quo and the certainty it provides (conservation)" (Schwartz & Boehnke, 2004:236). This higher order value type is associated with the values of Self-Direction and Stimulation. Both Stimulation and Self-Direction are associated with "intrinsic motivation for mastery and openness to change" (Schwartz, 1996:124). Self-Direction and Stimulation values are discussed individually as follows.

2.6.4.1 Self-Direction

Self-Direction values are associated with "independent thought and action- choosing, creating, exploring", and with motivational goals associated with "creativity, freedom, [being] independent, choosing [one's] own goals" and curiosity (Schwartz & Boehnke, 2004:239). Self-Direction, therefore, is represented by independence, or autonomy. Self-Direction values derive from goals which arise from the needs of an individual as a biological organism and also from the requirements of coordinated social interaction (Schwartz, 1994).

The changing societal values that are associated with individualism are also associated with autonomy (Harrell & Alpert, 1979:259). Harrell and Alpert (1979:259) investigated the influence of the need for autonomy (n Aut), defined as a need for the "quality or state of being independent, free and self directing". According to Harrell and Alpert (1979) the need for Power (n Pow) overlaps the need for Autonomy. Harrell and Alpert (1979) offer qualified support for McClelland's notion of the need for Power being more important for organisational managers than the need for Achievement, and that the need for Achievement might not be desirable for organisational mangers due to its egocentricity. However, according to the structure of values, Achievement and Power are both associated with the higher order type of Self-Enhancement, which is, fundamentally, individualistic (Schwartz & Boehnke, 2004). However, Self-Direction, as a value, which is primarily associated with Openness to Change, is adjacent to, or related to, the two Self-Enhancement values,

notwithstanding the differences between Power values and Achievement values (Schwartz & Boehnke, 2004).

Studies of MBA graduates ten years after graduating have been found to indicate that later earnings were inversely related to their need for Achievement scores measured at the time they were studying (Harrell & Alpert, 1979). No association was found between need for Power and earnings for those becoming organisational managers (Harrell & Alpert, 1979). According to Schwartz and Boehnke (2004), Harrel and Alpert's (1978) research supports this commonality between Power values and Self-Direction values, where Openness to Change (of which Self-Direction values are a component) is adjacent to Self-Enhancement (of which Power values are a component). These dimensions; Self-Direction, Achievement and Power values, therefore, share an individualistic, or autonomous aspect. However, whereas Achievement and Power values relate to the goals of the prioritisation of the individual over others, Self-Direction relates to the goal of independent thought, for its own sake, and, according to Schwartz and Boehnke's (2004) conception, Self-Direction, of all the values types, is expected to be most strongly related to Harrel and Alpert's notion of autonomy.

Harrell and Alpert (1979) propose a continuum of organisational roles that are best suited to differing endowments of need for Autonomy. According to Harrell and Alpert (1979), for example, government work is least suited to, and entrepreneurial work most suited to, a need for Autonomy. For Harrell and Alpert (1979), in the "middle of the continuum is the tenured faculty position" in a university that "provides an opportunity for the expression of autonomy and other individualistic needs" as the "pressure for new research contribution is an invitation for creativity although there are certain constraints on behaviour with respect to the usual requirements for teaching". To the extent that the academic research role is associated with 'the expression of autonomy and other individualistic needs', higher individual levels of Self-Direction values are expected to be a better match with the nature of work associated with research productivity. Higher levels of Self-Direction values are, therefore, expected to be associated with higher levels of individual research productivity. Teaching, however, is expected to be a better match for lower levels of Self-Direction. A tension between the teacher role and the researcher role is expected to manifest along the dimension of Self-Direction motivational values. Literature that relates to the tested associations of Self-Direction values, and each of the Schwartz valued dimensions, is reviewed in the section

below titled ‘previous empirical findings’. Self-Direction values and Stimulation values are adjacent to each other on the circumplex structure of values, and both “express reliance on one’s own judgement and comfort with the diversity of existence” (Schwartz, 1994:25). Stimulation values are considered as follows.

2.6.4.2 Stimulation

Stimulation values represent excitement, “novelty, and challenge in life (Schwartz & Boehnke, 2004). These values are related to motivational goals associated with daring, a varied life, and having an exciting life (Schwartz, 1996:122). Stimulation values are associated with goals that derive from the individual needs of individuals as biological organisms, rather than the requirements of coordinated social interaction or the smooth functioning and survival of groups (Schwartz, 1994). Stimulation values, together with Hedonism values, are the only values that have a biological origin, with no interaction or group source for the goals of these values (Schwartz, 1994). As such, the extent to which an individual has ‘transcended’ the influence of biological needs might reflect the extent to which such an individual might be able to subordinate such needs to the requirements of work. If research work, for example, entailed many hours of data capture and analysis, and did not offer as much in the way of stimulation when compared with other tasks, then such work might not be an optimal match to higher levels of Stimulation values (or Hedonism values). Stimulation values might be expected to be negatively associated with research productivity to the extent that such work might be less ‘stimulating’ relative to other work tasks. This relationship, however, is expected to vary according to the extent to which such work is indeed relatively ‘less stimulating’. Self-Enhancement values are considered as follows.

2.6.5 Self-Enhancement Higher Order Values: Hedonism, Achievement and Power

Hedonism values, Achievement values, and Power values make up the higher-order value set of Self-Enhancement values (Schwartz & Boehnke, 2004). Self-Enhancement values motivate people to prioritise their own interests over the interests of others. “Power and achievement values “both emphasise social superiority and esteem” (Schwartz *et al*., 1996:123). Both Achievement and Power values, according to Schwartz (1992) are associated with social esteem. Achievement values, however, are associated with striving to demonstrate competence, and power values are associated more with abstract outcomes that

are related to status in social relations (Schwartz, 1992). Achievement values are associated with individual action, or individual striving, whilst Power values are associated with the hierarchical differentiation of societal relations (Schwartz, 1992). Achievement values are predicted to conflict with benevolence values; the pursuit of self-interest associated with the former are expected to conflict with the process of helping others (Ros *et al*., 1999). Power is adjacent on the circumplex structure with security; values are compatible because they both stress the avoidance of uncertainty through a motivation to control relationships and resources (Ros *et al*., 1999). Security and Power both, therefore, "stress avoiding or overcoming the threat of uncertainties by controlling relationships and resources" (Schwartz, 1996:124).

2.6.5.1 Hedonism

Hedonism values are adjacent in the structure of values to Stimulation values (Schwartz, 1994). Hedonism values are defined as being associated with pleasure "and sensuous gratification for oneself", and associated with motivational goals of pleasure and the enjoyment of life (Schwartz, 1996:122). Hedonism and Stimulation values are both associated with a "desire for affectively pleasant arousal" (Schwartz, 1994:24). Hedonism values are also, in the same manner as Stimulation values, associated with goals that derive from the individual needs of individuals as biological organisms, rather than the requirements of coordinated social interaction or the smooth functioning and survival of groups (Schwartz, 1994). Individuals are able to subordinate biologically oriented goal-related values such as Hedonism to work tasks that are relatively 'less pleasurable' will be expected to have a greater tolerance for work that might offer less immediate gratification. If research work is less 'pleasurable' than other tasks, it is expected that Hedonism values are negatively related to research productivity. Achievement values are introduced as follows.

2.6.5.2 Achievement values

Hedonism and Achievement values, which are adjacent to each other in the circumplex structure of values, are both associated with a "focus on self-centred satisfaction" (Schwartz, 1994:24). Achievement values are defined as being associated with personal "success through demonstrating competence according to social standards", and motivational goals related to being "successful, capable, ambitious and influential" (Schwartz, 1996:122). Achievement values are associated with goals that are derived from interaction needs, or the requirements

of coordinated social interaction, and also group needs, or the requirements for smooth functioning and survival of groups (Schwartz, 1994). Achievement values, therefore, are an important aspect of work that relates to the social context. Achievement values and Power values both emphasise social superiority and esteem (Schwartz, 1994). However, despite certain commonalities, Achievement values differ significantly from Power values.

For Winter (1973:93), the need for Power and the need for Achievement "are really quite distinct both conceptually and empirically" because "doing a job well or reaching a goal with excellence (achievement) is not at all the same as having power or control of the process (power); indeed they might often conflict". Notwithstanding these differences, a slight positive correlation has previously been found between these constructs (Winter, 1973).

For Winter (1973:93), "at the level of behaviour, I would predict that the principal difference between the two motives [Power versus Achievement] is in the reaction to negative results and the use made of such information". Individuals with a need for Achievement might tend to use such information to adapt to and improve their performance, yet an individual with a high need for Power might be expected to suppress such information or use it to support a power agenda (Winter, 1973).

A need for Power might indicate a short-term perspective: a "moment-by-moment" quality of power- it is not constantly demonstrated, it may be lost" (Winter, 1973:93). In this way it differs from achievement. Winter (1973:93) expresses the difference between a need for Achievement and a need for Power as follows: these motives "are nicely combined in the old saying, 'Build a better mousetrap [achievement], and the world will beat a path to your door [power].' The whole point of the power game is to have the world come to your door without having to build a better mousetrap". According to Winter's (1973) conception, then, an individual with a need for power will not necessarily be motivated to achieve in order to obtain power. However, an individual motivated by a need for Power will be expected to behave in a way that increases the likelihood of increasing his or her level of power. Therefore a certain achievement orientation is expected, to the extent that this achievement is perceived as supporting a power goal. For example, if promotions based on research productivity are an avenue to power, individuals with a higher need for Power might be expected to be more research productive.

McClelland (1961) found that businesspeople were typically high in a need for Achievement; particularly entrepreneurs and innovators. According to Winter (1973), however, 'businessmen' or business managers that are primarily concerned with coordination and control of business functions are expected to have a higher need for Power than business managers that are more concerned with entrepreneurship and innovation. Therefore, the larger the bureaucratic organisation, the more opportunities might exist for the individual with a high need for Power (Winter, 1973). Individual academics in business-oriented academic fields are, on the basis of Winter's (1973) and McClelland's (1961) work, expected to have higher levels of Power values as well as Achievement values. Further differences between individuals with different endowments of power and achievement needs have been found along the dimension risk taking.

Using testing situations where the outcomes were influenced differently according to effort and chance, McClelland and Watson (1973) found risk taking behaviour to be differently associated with individuals having different endowments of a need for Power, a need for Affiliation and a need for Achievement. Individuals with a high need for Power were found to take riskier bets, whilst individuals with a low need for Power were found to take less risky bets (McClelland & Watson, 1973). Individuals with a high need for Achievement, however, were found to choose moderate risk (McClelland & Watson, 1973).

McClelland and Watson (1973:139) found that individuals with a high need for Achievement tend to "set goals privately for themselves of intermediate difficulty so that they are likely to get a sense of personal accomplishment". In contrast, individuals high in a need for Power "seek to stand out publicly and do so in gambling by taking more extreme risks"; while those high in Affiliation "try and avoid public competition by taking low risks" (McClelland & Watson, 1973:139). McClelland (1987:249) argues "that individuals high in *n* Achievement should be more restless and avoid routine" and "should be more likely to seek out information to find better ways of doing things" and therefore "should be more innovative".

On the basis of the above literature, it is expected that individuals with higher levels of Achievement values might tend to cluster in business-oriented professions. If academic fields are related to their corresponding practitioner fields, it is expected that academics in academic fields such as commerce, accounting and management will be more achievement, and also more power, oriented. Achievement values are expected to be associated with higher levels of

job performance, and, to the extent that research productivity is a form of job performance, also with higher levels of research productivity. Power values are considered more specifically as follows.

2.6.5.3 Power values

Power values are defined as a motivational type of value associated with "[s]ocial status and prestige, control or dominance over people and resources", that has goals associated with social power, authority and wealth (Schwartz, 1996:122). Power values, like Achievement values, are associated with goals that derive from interaction needs, or the requirements of coordinated social interaction, and also group needs, or the requirements for smooth functioning and survival of groups (Schwartz, 1994). The motivational goal structure of Power values is expected to correspond with McClelland's (1961; 1987) and Winter's (1973) motivational structure of learned needs.

The word 'power' originates from the Old Latin root 'potere' meaning 'to be able' (Winter, 1973). For Winter (1973:5), power refers to (i) social power, that (ii) is intentional, and (iii) it entails a capacity as well as an action, in that "social power is the ability or capacity of O to produce (consciously or unconsciously) intended effects on the behaviour or emotions of another person P". Different classifications of power have been made, such as by French and Raven (1959); where power is classified according to their bases: reward, coercive, legitimate, referent and expert power. According to Winter (1973), these classifications offer a differentiation of sorts between 'good' power and 'bad' power.

In terms of the effect of context on the effect of a manifested need for Power in a leader, Winter (1973:14) offers the following:

> While the situation affects the allocation of power and leadership, it is the situation as perceived and judged by the group members. These perceptions and opinions can be influenced and manipulated just like any other perception or judgment. Thus if a person who seeks power is constrained or blocked by the perceptions and judgments of his followers, he may be able to change these perceptions and thereby to create power. Skill in defining situations, in convincing others of these definitions, and in portraying one's own role as important or indispensable to the achievement of these redefined group goals would thus permit a person to have power within the constraints of a situation.

According to Winter (1973), the manifested effect of a need for Power can occur irrespective of initial contextual factors. However, the degree to which power is maximised within the effect of context is dependent on a combination of the individual factors, the situational

factors and the individual's motivation to use their capacity for power (Winter, 1973). It is this motivation to use the capacity for power which is measured as a need for Power (Winter, 1973). This motivational aspect is taken to correspond with the motivational goal structure of Power values, according to Schwartz's (1994) conception.

McClelland (1987) developed his measures of the need for Power from the work of Veroff (1957) who researched themes around control of the means of influence. Theoretically, motives "drive, orient, and select behaviour" according to McClelland (1987:271). Previous research has indicated that when respondents have been exposed to the activation of need for Power, there have been shifts in respondent's concentrations of epinephrine, or adrenaline in the urine (representing emotional or physiological arousal) (McClelland, 1987). Such increases have been found after exposure to famous inspirational speeches (McClelland, 1987). A high correlation was found between epinephrine excretion and the amount of power imagery present in stories written by respondents after exposure to the stimulus (McClelland, 1987). This effect, however, was not found to manifest when the need for Achievement was tested (McClelland, 1987). This evidence contrasts with Schwartz's (1994) notion that Power values do not have a biological origin. If Power values are underpinned by a biologically causal mechanism (McClelland, 1987) as well as group dynamics (Schwartz, 1996) then such values are expected to manifest more strongly in behaviour than other values with only a biological- or a group-oriented source of goal direction. Power values, therefore, are accorded an important focus in this research.

With regard to a review of research findings relating to the need for Power, McClelland (1987:274) states that "we might infer that those high in *n* Power tend to dominance of the right hemisphere [of the brain], which is also more associated with norepinephrine output than the left hemisphere".

According to McClelland (1987:281) "what has gradually emerged out of research on the power motive is a picture of a person striving to be assertive in ways that either are appropriate to the situation or are not and therefore produce feelings of guilt and anxiety over the aggressive impulses". For McClelland (1987:281), therefore, what "is not in question is the general conclusion that people high in *n* Power strive to be assertive". Power values are expected to be associated with individual measures of the GLOBE value of Assertiveness. According to McClelland (1987:281) the "disposition to be aggressive or assertive leads

people to view themselves negatively for having what are generally considered to be antisocial tendencies", and this can be associated with a negative self-image.

There may also be a gender difference in the manifestation of a need for Power, in that both male and female respondents with a high need for Power revealed a high controlled level of impulses toward aggressiveness (McClelland, 1975). However, only male respondents were found to actually manifest more competitive and aggressive behaviour, and were also found to voluntarily participate in more competitive sports, and to report having more arguments (McClelland, 1975). These findings suggest that aggressive behaviour is moderated by a different mechanism between the sexes. Another moderating variable might be influence of group membership, such as social class membership.

Social class values were found to be associated with whether or not aggressive actions were actually carried out, according to a review of research on the need for Power by McClelland (1987). Group, or culture values, might moderate the influence of Power values on the aggressive behaviour that is manifested by an individual. Emotional problems and problems with sleep and unpleasant dreams have been found to be associated with a high need for Power (McClelland, 1975).

Winter (1973) relates the power motive to social learning theory, and makes the case that motives can be reconciled with the social learning theory perspective. Winter (1973:26), therefore, argues that the:

> basic claim of social learning theory is that all behaviour can be explained and predicted by a full specification of the reinforcement history of the person and the forces present in the situation. At first this seems similar to the attempt to explain motive as habit; but the social learning theorist would accept the notion of 'internal future-oriented stimuli,' which is the principal postulate of motive explanations. Social learning theory accepts the ideal of goals, but reflects the notion that for a person there are broad classes of equivalent goals, such that he can be said to be 'generally motivated for power' or 'assertive.' Social learning theory argues that behaviour is highly specific to the particular cues of each individual situation; thus that there is no use in postulating broad generalised categories across situations or over time.

Winter (1973) offers a conception of a motive as "a combination of directed attention, acquired emotional meaning for a significant category of stimuli, and a capacity for certain kinds of self-reinforcement". To the extent that a situation might be relatively stable over time, such as in the case of a relatively stable working context, it is expected that an

individual's motivational structure will manifest in specific behaviours, and that work outputs, such as research productivity, will be influenced.

According to Winter (1973), individuals with a high need for Power are expected to be motivated to occupy jobs with real power or influence over others, but not necessarily 'figurehead' jobs, which might be devoid of the expectancy and incentive of having power.

Winter (1973) found an association between a need for Power and participation is sports that were physically intense, or even violent. Winter (1973) found that students high in a need for Power "report that they would like to be teachers, psychologists, and clergymen" and there "is a tendency for them to choose business, although usually the particular business role (manager, technical, finance, etc.) could not be determined from the answers given". The need for Power found to be associated with teachers and clergy might be associated with the fact that these professions represent an opportunity to work in front of an audience: an avenue for the exercise of power and influence (Winter, 1973). Winter (1973) found that students with a high need for Power did not typically choose to study law, medicine, government or politics. According to longitudinal data of undergraduates at Oxford between 1961 and 1970, teachers, business managers, journalists and clergymen measured higher in a need for Power (Winter, 1973). According to these findings, it would be expected that the university job, to the extent that teaching is included as a major component of the job, might appeal to certain individuals high in a need for Power. Individuals that are motivated by Power values are perhaps expected to enjoy, or derive more satisfaction from, teaching, as opposed to individuals with a need for achievement who are perhaps expected to enjoy, or derive more satisfaction from, research more than teaching.

Winter (1973) found that individuals with a high need for Power tend to pick as close friends less well known individuals. These individuals are perhaps more likely to be loyal and are less threatening: the "loyal nucleus of an alliance" (Winter, 1973:114). Individuals that are high in a need for Power have been found to, proactively, build networks, or alliances (Winter, 1973). This behaviour is similar to those with a need for Affiliation (Winter, 1973). According to Winter (1973), individuals with a need for Power have also been found to conform to the norms and expectations of their closest associates.

Individuals with a high need for Power have also been found to direct competitive drives or hostility toward higher-status persons instead of at their closest associates (Winter, 1973). If a high cultural Power Distance exists, then it is expected that hierarchical organisational structures would be stronger, and that vertical linkages and flows of information and knowledge would be more formal, and informal communication channels less useful.

According to McClelland (1975), there is a gender difference in the manifestations of a need for Power. Female respondents reported having been taught more societal-oriented values; those with a higher need for Power dieted more frequently, used more credit cards, and were found to be more likely to favour organ donation (McClelland, 1975). It is unclear whether any gender differences might be expected in the relationship between Power values and research productivity by gender.

According to McClelland (1975), there is a negative and positive dimension to the need for Power. For McClelland (1975:263), the "positive or socialised face of power is characterised by a concern for group goals, for finding those goals that will move men, for helping the group to formalise them, for taking initiative in providing the means of achieving them, and for giving group members the feeling of competence they need to work hard for them". McClelland (1975:257) argues that:

> people cannot help influencing one another; organisations cannot function without some kind of authority relationships. It is necessary and desirable for some people to concern themselves with management, with working out influence relationships that make it possible to achieve the goals of the group. A man who is consciously concerned with the development of proper channels of influence is better able to contribute to group goals than a man who neglects or represses power problems and let the working relationships of men grow up without supervision.

Having considered seminal literature that relates to the relationships between Power values and a range of outcomes, and having deriving expected relationships that relate to research productivity as a form of job performance, literature relating to the higher order values type of Conservation is now introduced.

2.6.6 Conservation Higher Order Values: Security, Conformity and Tradition

Security, Conformity and Tradition values make up the higher order Conservation values type (Schwartz & Boehnke, 2004). The same broad motivational goal underpins both of these values: the subordination of the self to socially oriented external expectations (Schwartz & Boehnke, 2004). However, these do differ, in that conformity is associated with subordination to others that are regularly encountered, and tradition is related to subordination through more abstract notions such as religious or cultural customs (Schwartz & Boehnke, 2004). Conformity is associated with restraint of actions, impulses or inclinations that might have an effect on others, whereas tradition is associated with respect and commitment, particularly with regard to cultural or religious ideas (Schwartz & Boehnke, 2004). Tradition, conformity and security values both have a focus on the conservation of "order and harmony in relations" (Schwartz, 1996, 124). The individual factors of Security, Conformity and Tradition are introduced as follows.

2.6.6.1 Security

Security values are associated with safety, "harmony and stability of society, of relationships, and of self", and with motivational goals related to family security, national security, social order, cleanliness and the reciprocation of favours (Schwartz, 1996:221). The motivational goals of Security values derive from organismic needs (the "needs of individuals as biological organisms"), interaction needs (the "universal requisites of coordinated social interaction), and group needs (the "universal requirements for smooth functioning and survival of groups") (Schwartz, 1994:22). Security values, together with Benevolence values, are the only two values orientations that derive from all three of these types of origins. Both Security and Tradition values both "stress preserving existing social arrangements to give certainty to life", and both Security and Power values "stress avoiding or overcoming the threat of uncertainties by controlling relationships and resources" (Schwartz, 1994:25). Security and Power values might therefore be expected to be associated with the GLOBE dimension of Uncertainty Avoidance, as offered by House *et al*. (2004). Security values are therefore predicted to be negatively associated with research productivity. Conformity is now introduced.

2.6.6.2 Conformity

Conformity values derive from the "prerequisite of smooth interaction and of group survival" (Schwartz, 1996:122). Conformity values are associated with restraint "of actions, inclinations, and impulses likely to upset or harm others and violate social expectations or norms", and also with motivational values related to politeness, obedience, self-discipline, and honouring parents and elders. Both Benevolence values and Conformity values are associated with "normative behaviour that promotes close relationships" (Schwartz, 1994:25). Conformity goals are derived from interaction needs that support coordinated social interaction, and group needs that relate to the functioning and survival of groups (Schwartz, 1994). Due to the focus of Conformity values on the status quo rather than change and innovativeness, it is predicted that Conformity values are negatively associated with research productivity. Tradition values are now defined as follows.

2.6.6.3 Tradition

Tradition values relate to respect, "commitment, and acceptance of the customs and ideas that traditional culture or religion provide" which are related to motivational goals of humility, devotion, and acceptance of one's "portion in life" (Schwartz, 1994:22). These motivational goals, in turn, derive from group needs, or the needs for the smooth functioning and survival of groups (Schwartz, 1994). The origin of these values does not relate to biological needs, or to interaction needs for coordinated social interaction (Schwartz, 1994).

Benevolence and Tradition values both "promote devotion to one's ingroup" (Schwartz, 1994:25). To some extent, then, the corresponding values at the group-level, or aggregate level, are the GLOBE Collectivism values offered by House *et al*. (2004). Tradition and Conformity values share an aspect of subordination of the self to "socially imposed expectations", and they both prioritise the status quo in social arrangements in order to preserve certainty (Schwartz, 1994). Tradition values are therefore expected to be negatively associated with research productivity. The higher order values orientation of Self-Transcendence is introduced as follows.

2.6.7 Self-Transcendence Higher Order Values: Universalism and Benevolence

Universalism values and Benevolence values make up the higher order values type of Self-Transcendence (Schwartz & Boehnke, 2004). Self-Transcendence values motivate people to

"transcend selfish concerns and promote the welfare of others, close and distant, and of nature" (Schwartz & Boehnke, 2004: 236). Actions that arise from an individual's pursuit of benevolence and conformity are compatible, due to their common element of prioritising the approval of associated groups (Ros *et al*., 1999). Self-Transcendence is associated with a view of others as equals (Ros *et al*., 1999). Universalism and Benevolence, as values orientations, "both entail concern for enhancement of others and transcendence of selfish interests", according to Schwartz (1996:124). The structure of value relations derives from the assumption that actions are chosen by individuals in order to pursue these values, which have psychological, practical and social consequences that might be congruent to, or conflict with, other values types (Ros *et al*., 1999). Universalism values are now defined as follows.

2.6.7.1 Universalism

Universalism values are defined as related to understanding, "appreciation, tolerance and protection for the welfare of all people and for nature" and with motivational goals relating to broadmindedness, wisdom, social justice, equality, a world at peace, a world of beauty, unity with nature and protection of the environment (Schwartz, 1996:221). Universalism values and Benevolence values are both concerned with "enhancement of others and transcendence of selfish interests" (Schwartz, 1994:25). The motivational goals associated with Universalism values have an origin in, or derive from, organismic needs, or biological needs, as well as group needs such as those related to the functioning and survival of groups (Schwartz, 1994). However, in the case of Universalism, these group needs emerge as a response to the exposure of the individual to people outside the primary group; when intergroup interdependence is recognised and the scarcity of natural resources is also recognised (Schwartz, 1994). A desire to make a contribution in research might be expected to be associated with Universalism. It is tentatively suggested that Universalism is positively associated with research productivity. Benevolence values are introduced as follows.

2.6.7.2 Benevolence

Benevolence values are defined as being associated with the preservation "and enhancement of the welfare of people with whom one is in frequent personal contact", and are associated with the motivational goals of humility, acceptance of one's position in life, devotion, respect for tradition, and moderation (Schwartz, 1996:122). The motivational goal structure of Benevolence values have their origin in (i) organismic needs, or the "needs of individuals as

biological organisms", (ii) interaction needs, or the "universal requisites of coordinated social interaction", and (iii) group needs, or the "universal requirements for smooth functioning and survival of groups" (Schwartz, 1994: 22). Benevolence values are theoretically similar to the dimensions of tradition and conformity due to their focus on an individual's in-group, and these values are, therefore, adjacent to each other on the circumplex structure of values (Schwartz, 1996:124). If Benevolence values are fundamentally similar to Tradition and Conformity values then it is suggested that these values are negatively associated with research productivity. In the above sections, theory relating to each of the Schwartz values was reviewed. However, results of previous empirical testing of Schwartz theory were not included in the sections above. Instead, these previous findings are now reviewed as follows.

2.6.8 Schwartz Values: Previous Empirical Findings

In previous empirical Schwartz individual values research, a range of significant relationships have been found to exist between measures of the values dimensions and a host of different individual and contextual factors (Schwartz, 1996). This research seems to be the first study that tests associations of Schwartz values with research productivity. As in the case of the review of the GLOBE literature above, literature is reviewed of previous empirical studies testing Schwartz's theory in different contexts. Although these are not tests of research productivity, it is suggested that such a review is necessary. The review of these relationships is therefore offered as follows.

2.6.8.1 The South African Context: empirical findings

Schwartz, Melech, Lehmann, Burgess, Harris and Owens (2001) researched values theory in South Africa. They used the Portrait Values Questionnaire (Schwartz et al., 2001). Uncertain results had previously been obtained (Schwartz *et al*., 2001). A less abstract instrument than what was previously used. Interestingly, Schwartz *et al*. (2001) discovered a factor structure that was at odds with that of other samples from over the globe. "The location of the security items in the self-transcendence, higher order region" was unusual, which "may reflect the sensitivity of value structures to powerful historical events" (Schwartz *et al*., 2001:528). The security values were found to be adjacent to the pursuit of justice and equality rather than with the preservation of the status quo (Schwartz *et al*., 2001). Notwithstanding this difference, Schwartz *et al.* (2001:528) conclude that the structure of values was reasonably

well replicated in this context. This finding in the South African context suggests that an individual's experience of contextual change can shape an individual's values orientation.

Age, in past research, has been found to typically correlate with Conservation (Tradition, Conformity and Security), and to negatively correlate with Openness to Change (Self-Direction, Stimulation) and Hedonism values, as embeddedness in social networks, increasingly habitual patterns, and less exposure "to arousing and exciting changes and challenges", are typically related to increases in age (Schwartz *et al*., 2001:533). Other research suggests that family orientation and stability in occupational roles enable individuals to be less concerned with "their own strivings and more concerned with the welfare of others" (Schwartz *et al*., 2001:533). Representative national samples of Italian and South African respondents have provided empirical evidence that supports these conceptions. In the South African context, age (n=3210), has been found to correlate positively with Security values ($p<.001$); Conformity values ($p<.001$); Tradition values ($p<.001$); Benevolence values ($p<.001$); and Universalism values ($p<.001$).

Previous research has suggested that education can enable the "intellectual openness, flexibility, and breadth of perspective" essential for Self-Direction values (Schwartz *et al*., 2001:533). This intellectual openness also enables new ways of thinking, or Openness to Change, whilst challenging norms and traditions, therefore constraining Conservation values (Schwartz *et al*., 2001:533). In a representative sample, tests of South African respondents were found to reflect positive correlations between education and: Security values ($p<.001$); Benevolence values ($p<.001$); Universalism values ($p<.001$); Self-Direction values ($p<.001$); and Stimulation values ($p<.001$). For the same sample, education was found to be negatively correlated with Conformity values ($p<.001$); Tradition values ($p<.001$); Achievement values ($p<.001$); and Power values ($p<.001$). Hedonism values, however, were not found to be significantly correlated with level of education. The analysis used six levels of education in this representative sample: none; some primary; completed primary; some high school; completed high school; and beyond high school.

Previous research from the psychoanalytic, "role-learning, cultural feminism, and evolutionary theories of gender difference" have stressed the gender differentiation of values (Schwartz *et al*., 2001:534). According to these theories, men are posited to focus on "agentic-instrumental" values, such as Power, whereas women tend to stress "expressive-

communal values" such as Benevolence (Schwartz *et al*., 2001:534). These conceptions, however, are challenged by interactionist perspectives, which argue that no consistent gender differences are expected in values research (Schwartz *et al*., 2001:534). In the South African context, female respondents have been found to give higher priorities to Tradition values (r=.20;p<.01).

In the South African context, an index of the need for stimulation to facilitate optimum function was found to correlate strongly with exploratory consumer behaviour, and positively with Self-Direction values (p<.001); Stimulation values (p<.001); Hedonism values (p<.001) and Power values (p<.001); yet negatively with Security values (p<.001); Conformity values (p<.001); Tradition values (p<.001); Benevolence values (p<.001); and Universalism values (p<.001) (Schwartz *et al*., 2001). Alcohol use was also, with the same sample, found to be positively correlated with Self-Direction values (p<.001); Stimulation values (p<.001); and Hedonism values (p<.001); yet was found to be negatively correlated with Security values (p<.001); Conformity values (p<.001); and Tradition values (p<.001) (Schwartz *et al*., 2001). However, Benevolence values, Universalism values, Achievement values and Power values were not found to be significantly associated with alcohol use (Schwartz *et al*., 2001).

2.6.8.2 Empirical findings in other contexts

Schwartz *et al*. (2001), in the Israeli context, found differences by student values between economics (comprised of economics, accounting and business administration) and humanities (comprised of language and literature, history, philosophy and religious studies). This research supported previous research that found that the former are typically associated with Power value (F=25.06;p<.01) and Achievement values (F=4.09;p<.05) yet the latter with Universalism values (Schwartz *et al*., 2001). Humanities students were also found to score significantly higher in Tradition values (F=5.48;p<.05). Individuals that have values endowments that are aligned with those of their academic field might be expected to be more research productive.

In the same context, Schwartz *et al*. (2001) also found differences between values by political orientation, with students with a Nationalistic political orientation scoring higher in Security (F=11.13;p<.01) and Tradition (F=4.72;p<.05) values; whereas students with a Liberal orientation were found to score significantly higher in Universalism values (F=17.44;p<.001)

and Self-Direction values (F=3.74;p<.05). Students with higher levels of Self Direction values (p<.001); Hedonism values (p<.01); Achievement values (p<.01) and Power values (p<.001) were found to be associated with more autocratic interpersonal behaviour (Schwartz *et al*., 2001). In contrast, student with higher levels of Conformity values (p<.001); Tradition values (p<.01); Benevolence values (p<.05) and Universalism values (p<.01) were found to be associated with lower levels of autocratic interpersonal behaviour (Schwartz *et al*., 2001). Caprara, Schwartz, Capanna, Vecchione and Barararanelli (2006) also found Schwartz's value theory measures to explain more variance in Italian voting patterns than personality measures. According to Schwartz *et al*. (2001:538), their research "shows that the values theory is probably applicable in a very wide range of populations and independent of measurement method. According to Schwartz and Bardi (2001:2), average "value hierarchies of representative and near representative samples from 13 nations exhibit a similar pattern that replicates with school teachers in 56 nations and college students in 54 nations". Across all these samples, Benevolence, Self-Direction and Universalism values have been found to dominate in importance, with Power, Tradition and Stimulation values typically being the least important to respondents (Schwartz & Bardi, 2001).

In the above sections, literature relating to Schwartz's (2007) values theory was reviewed. Derived from the theory and empirical relationships reviewed above, Hypothesis B is derived, that *here is a significant association between levels of Schwartz individual motivational values and levels of individual research productivity*. In the absence of literature that relates directly to the relationships between values and research productivity, other available literature was reviewed, in order to provide a holistic perspective of the theory and relationships found in other contexts. At this nexus, a review of the literature that relates to the potential influence of individual level 'performance' factors on research productivity is undertaken.

2.7 INDIVIDUAL LEVEL 'PERFORMANCE' FACTORS AND RESEARCH PRODUCTIVITY

Differences in university research productivity have been found to be associated with a range of different factors (Dundar & Lewis, 1998, Erdogan & Bauer, 2005, Hales *et al*., 2005, Laursen & Foss, 2003; Morton & Beard, 2005; Rachal *et al*., 2008; Ramsden, 1994; Rothausen-Vange *et al*., 2005; Rynes *et al*., 2001). Research productivity is also constrained

as academic findings are often lost to the process, and do not form the inputs to further research and are forgotten; the 'death valley' phenomenon (Kobayashi *et al*., 2007). Whereas in previous sections GLOBE and Schwartz theory and empirical findings were the focus of the review, literature that relates to the influence of individual level factors on individual research productivity is now reviewed. These are termed performance factors for the purposes of this research. At the individual level of analysis, research productivity can be conceived of as dimension of job performance.

Schmidt and Hunter (1992:89) argue that perhaps "the most important dependent variable in industrial psychology is job performance". Typically, measures of performance used in research are objective, such as direct measures of behaviours and outcomes, or subjective, such as supervisor ratings and similar measures (Brommer, Johnson, Rich, Podsakoff & Macenzie, 1995). University research productivity might be considered a dimension of job performance because promotions, tenure and hiring decisions are based on these measures. A certain amount of the variance in research productivity in empirical testing was expected to arise from its nature as a dimension of job performance. One portion of this variance is expected to reflect relationships predicted in the literature that relate to most jobs. Another portion of the variance is expected to be associated with research productivity as a unique activity.

Hunter and Hunter (1984:72) report, on the basis of meta-analysis findings on entry-level jobs, that "there is no predictor with validity equal to that of ability, which has a mean validity of .53". Selection, as a predictor of job performance, that is based on current job performance, according to the work sample test has been found to have a mean validity of .54 (Hunter & Hunter, 1984). "High selection validity translates into considerable financial savings for most organisations" and is reflected in higher levels of individual performance (Hunter & Hunter, 1984:72). To some extent, variability in job performance is expected to be reduced by effective selection processes. In the University context, the strict use of objective criteria, such as educational qualifications and research publication records, to select and promote staff is expected to have relatively less extraneous variance. The use of educational and research attainment might also act as a proxy measure for cognitive ability. A certain degree of range-restriction might therefore be expected in the academic context; cognitive differences between individuals might be fewer than in many other contexts. The investigation of research productivity, as a measure of job performance, is therefore expected

to reflect some differences from research conducted across different cohorts of job types. Due to the large number of potential performance factors, the scope of the research was delimited to factors justified for inclusion on the basis of the qualitative research.

The literature review of individual performance factors, which were derived from the qualitative analysis, is structured as follows. These factors are termed 'performance factors' because the qualitative analysis findings suggest that these factors might contribute to research productivity as a dimension of job performance. The different factors were categories on the basis of a factor analysis performed on the tested variables. The literature review is therefore structured according to the following four component categories, in order to provide a coherent structure for the review:

- Component 1. Performance factors in the form of *biographical factors.* These are factors that are specific to the individual such as experience, exposure to other contexts, levels of formal education, extent of research collaboration on journal publications, preference for quantitative versus qualitative research methods, marriage, dependent children and gender.

- Component 2. Performance factors in the form of *personal orientation factors* are then reviewed, according to their potential relationships to research productivity. Included in this category of factors are personal 'intrinsic', or internal, endowments of job satisfaction, self-efficacy, affectivity and locus of control.

- Component 3. *Research Work Role Satisfaction* factors are reviewed next. These factors, which emerged from the qualitative analysis: satisfaction with research and satisfaction with teaching, relate to the significant differentiation of academic staff into two categories of work roles that might differ in their influence on research productivity.

- Component 4. *Supervisory Experience* factors are reviewed next. These factors represent supervision in its different forms, both as a research supervisor and as a work supervisor. Included in this component category are masters and doctoral supervision, rank designations and span of control.

The literature that relates to the first of the component categories; the biographical factor category, is considered as follows.

2.7.1 COMPONENT CATEGORY 1: BIOGRAPHICAL FACTORS

2.7.1.1 Experience and Research Productivity

Sources of experience and learning are considered to represent forms of human capital, according to Human Capital theory (Becker, 1964). According to Human Capital theory (Becker, 1964), human capital is any investment of learning or experience that can contribute to a return, in the form of increased productivity, to an activity. This conception extends not only to formal education but also to factors such as migration, or even improvements in health care (Becker, 1964). Over time, experience specific to a certain task context is expected to develop. Such experience can take the form of Specific Human Capital, where this knowledge, or learning, cannot be transferred to (and obtain a productivity return in) other work contexts, or can, alternatively, take the form of General Human Capital which can be transferred to (and obtain a productivity return in) other contexts (Becker, 1964). The critical notion in this regard is that time-related accumulated knowledge will be expected to represent an investment in human capital (Becker, 1964). However, deriving from Becker's (1964) theory is the implication that different types of learning-related Human Capital might be associated with different contexts of work experience.

The influence of age is considered to represent the accumulation of all learning investments in an individual. However, in testing eminent university scientists, McClelland, Atkinson, Clark, and Lowell (1953) found a negative correlation (-.39; $n=61$; $p<0.01$) between age and themes coded from TAT stories relating to Achievement imagery. This might indicate that a need for Achievement is inversely related to age. There is therefore a tension between different bodies of theory as to what the expected relationship is between age and research productivity. However, it is argued that the influence of Human Capital theory is a dominant effect, where all the Specific Human Capital and General Human Capital endowments, or learning, that an individual is exposed to, are embodied in age, which, in a bivariate manner, is expected to reflect such endowments. As such, age, in a bivariate sense, is expected to contribute to higher levels of research productivity within the broad range of working life. The learning effects associated with age are expected to dominate the influence of the purely biological effects of age.

Years spent in South Africa represent an inverse function of years spent in other countries. Exposure to other contexts and other ways of thought might be considered to represent another form of investment of Human Capital in the form of learning (Becker, 1964). The testing of such a factor, after the covariate effect of age is controlled, is expected to reflect a positive relationship between years spent in other countries and research productivity. This notion is, however, dependent on the assumption that exposure to other countries is in fact associated with learning, and that this learning is productive in nature with regard to research productivity. It is expected that exposure to globalised precedent will perhaps be associated with learning that would make an academic more able to align their research output with globalised norms in research output. Individuals with more international exposure are expected to have higher levels of research productivity, all else being equal.

As previously indicated, according to Human Capital theory, years of full-time working experience is expected to represent an accumulation of learning investments that contribute to task performance in a current job to the extent that such knowledge represents General Human capital (Becker, 1964) rather than Specific Human Capital, which cannot be applied in the current context. Therefore, years of full-time working experience, with experience as a researcher controlled, is expected reflect General Human Capital, and is expected to be associated with research productivity, yet less so than experience more specific to the work of a researcher. Of specific interest, in this context, is the relative contribution of these different measures of Human Capital to the different measures of research productivity.

The years of experience in this specific institution, with other research experience and age controlled will be expected to indicate the relative extent to which experience within this particular institution specifically contributes to research productivity. A more specific measure of Specific Human Capital in this context is the amount of years that an individual has spent as a researcher. The influence of exposure to the cultural context of the institution itself is expected to be picked up by a measure of the time spent working for the institution. Person-organisational fit is expected to increase over time, and time spend in the institution will also be expected to potentially influence job performance (in the form of research productivity) through its influence on person-organisation fit (Erdogan & Bauer, 2005).

2.7.1.2 Exposure to the international context and research productivity

If exposure to other contexts, and international contexts in particular, is considered to represent a form of investment in human capital (Becker, 1964) that can enhance productivity, particularly in terms of publication in international contexts, then exposure to such international contexts is expected to be significantly associated with higher levels of research productivity. In an increasingly globalised context of knowledge creation, interconnectivity between researchers is expected to significantly increase research productivity (Swan, 2007).

If cultural, economic and political differences are expected to be found between countries, then individuals born in such different countries will be expected to reflect such differences. Certain countries have been found to be associated with extensive networks of emigrants (Light, 1984; Shapero & Sokol, 1982; Wilson & Martin, 1982) and it is argued that individuals that are born in such countries might be more likely to build international linkages with other academics on a global basis. Such networks have also been found to be associated with social capital, or the resources that are available to individuals by virtue of their membership of groups (Wilson & Martin, 1982; Coleman, 1988). International collaborations and a greater exposure to the globalised networks of research are expected to be positively associated with the number of countries a researcher has lived in over time.

Differences in home languages might reflect a similar effect to that of differences in country of origin. Different home languages, as tested variables, might reflect differences in the relative disadvantages faced by individuals with regard to the hegemony of English as a globalised language of research. Experience in multinational corporations is expected to expose individuals to practices and to cultural norms which are aligned with globalised trends. As such, this exposure is expected to be associated with learning, as a form of General Human Capital (Becker, 1964). Such a form of General Human Capital is expected to be associated with higher levels of productivity, as long as research productivity is not a form of Specific Human Capital in and of itself.

Membership of professional networks is also expected to be associated with the social capital advantages typically related to network membership (Burt, 2001; Coleman, 1988; Lin, 2001). If these networks offer members advantages in international linkages, then international

linkages which contribute to research productivity might be enabled. According to Human Capital theory, research productivity is also expected to be a function of years of formal education, which are expected to increase an individual's productivity in work contexts (Becker, 1964). Formal education, as a dimension of Human Capital, is considered as follows.

2.7.1.3 Formal Education and Research Productivity

Formal education reflects an investment in individuals, in the form of learning skills, knowledge and attitudes, which are, in turn, expected to directly influence an individual's work, job or task productivity (Becker, 1964). It is argued that such knowledge, skills and attitudes contribute to mental or cognitive ability. Increased investments in Human Capital can enable learning about 'how to learn' (Schmidt & Hunter, 1992); the relationship between formal education and research productivity is expected to be positive.

The indirect effect of mental ability, though enabling knowledge acquisition, is expected to be stronger than its direct effect on job performance (Schmidt & Hunter, 1992). Mental ability is also a function of the education history of individuals, and also of their subjective engagement with the education process (Rosenthal & Jacobson, 1968). An integrative perspective, it is argued, is required in order to reconcile the notion of mental ability (Schmidt & Hunter, 1992) with the conceptions of accumulated Specific and General Human capital (Becker, 1964). It is argued that, in the context of this research, the conception of mental ability (Schmidt & Hunter, 1992) might effectively reduce to a factor that reflects the differing rates at which different individuals are able to accumulate Specific and General Human Capital, all else being equal.

As already indicated, according to this conception, mental ability, or cognitive ability, is also considered to be a function of Human Capital investments, in the form of formal education. The implication of this is that a 'virtuous circle' might be created when earlier investments of Human Capital are effective in facilitating context-specific knowledge creation. According to Schmidt and Hunter's (1992) conception, then, the influence of Human Capital on research productivity will be curvilinear for individuals with higher endowments of mental ability that is a function of previous endowments of Human Capital. The implication of this is, therefore, that at higher levels of Human Capital endowments, research productivity will be higher, and

that this relationship is curvilinear. The specific extent to which formal education contributes differentially to each of the measures of research productivity, is expected to provide context-specific insight into the workings of Human Capital. Research collaboration, as a potential source of experience and learning that might be related to research productivity, is considered as follows.

2.7.1.4 Research Collaboration and Research Productivity

According to Hara *et al*. (2003: 953), a review of the definitions of collaboration reveals two common elements: "working together for a common goal and sharing of knowledge". Hara *et al*. (2003) discovered a typology of different collaboration types. These were found to differ according to increasing levels of teamwork; ranging from complementary to integrative. Integrative collaboration is based on "awareness of common goals and sharing of knowledge or expertise" Hara *et al*. (2003: 958). According to Hara *et al*. (2003), the socio-technical infrastructure embedded in research organisations influences research collaboration. For example, researchers with their own laboratories might seldom communicate with others (Hara *et al*., 2003). Awareness of the work of others and the opportunities for communication are therefore important factors that can facilitate research collaboration (Hara *et al*., 2003). Hara *et al*. (2003) found such awareness to be facilitated by the geographic proximity of researchers to each other. Hara *et al*. (2003) also found that certain communication mechanisms are needed to support research collaboration. Hara *et al*. (2003: 963) found that external incentives, such as funding, publications, and prestige, are "fundamental factors" that contribute to collaboration at the complementary level of collaboration; yet these factors were not in themselves enough to automatically establish integrative collaboration. For integrative collaboration to be established, internal incentives are required, such as, for example, "solving interesting research problems and personal compatibility (Hara *et al*., 2003: 963).

Differences in levels of collaboration have also been found to exist between academic fields. For example, Higher Education as a research field may be associated with more collaboration than English, yet less so than the field of Psychology (Rachal *et al*., 2008). According to Rachal *et al*. (2008), higher education research differs from that of other academic disciplines because it publishes on a range of topics, across the academic spectrum. Themes in education research typically transcend academic department boundaries (*ibid*.). More multi-disciplinary

academic fields may have more extensive collaboration amongst academics, and in these fields the relationship between research productivity and collaboration might be stronger.

A schism also exists between organisational research and managerial practice according to Rynes *et al*. (2001), yet there is an increasing trend toward practitioners and researchers interacting. Rynes *et al*. (2001:348) conclude from a review of knowledge creation literature that "according to theory, the root of all knowledge creation is the mobilisation of tacit knowledge" yet "the most elite organizational science journals are heavily dominated by explicit-to-explicit knowledge conversion, which is the form least directly associated with tacit knowledge". According to Rynes *et al*. (2001), a lack of collaboration with practitioners, who are a source of tacit knowledge, constrains the knowledge creation process.

According to Rynes *et al*. (2001), the lack of collaboration and learning between practitioners and academics is also subject to the difficulties in knowledge transfer that exist even under the most favourable conditions. According to a review by Rynes *et al*. (2001:346) of knowledge transfer research, knowledge transfer "between groups with widely differing perspectives" is enabled through face-to-face interactions. In a review of forty-five journal manuscripts submitted to the Academy of Management Journal, Rynes *et al*. (2001) found 24 returned without review, 16 to have been rejected on first review, five rejected after revision and resubmission, and five to have been accepted for publication. Rynes *et al*. (2001) found that articles were more likely to be accepted if data were contributed by both academics and practitioners ($r = .32$), and if the authors regarded the knowledge transfer as not unidirectional but as a two-way process ($r = .45$) between practitioners and academics. These characteristics were found in four of the five articles accepted for publication. The manuscripts returned without review were mostly returned due to a lack of data or a violation of the journal's mission statement and guidelines (*ibid*.). Rynes *et al*. (2001) also found that the most common reasons for rejected manuscripts were construct validity problems (77%), theory-methods mismatches (46%), and weak or nonexistent theory (37%). With regard to collaboration between academics and practitioners, according to Rynes *et al*. (2001:343),

> coding revealed that fewer than 20% of the studies involved practitioners in their initial designs or engaged them as coauthors after the studies had been completed. On the other hand, 53 percent of the authors had direct contact with practitioners during the course of their studies, and approximately three-fifths of the articles stressed that academics and practitioners could learn from each other (as opposed to assuming that academics were the more knowledgeable group and that the problem of transfer runs only in one direction).

Rachal *et al*. (2008) found 49% of articles reviewed in two leading higher education research journals to have single-authorship, and 51% were found to be collaborations, mostly with two authors. Rachal *et al*. (2008) explain that the soft sciences, such as education, might be more likely to reflect distributed workloads, as different authors might do different tasks in a publication process, such as data collection, literature review, and statistical analysis; whereas in the case of a liberal arts author, the work studied is explored in its entirety, primarily by one author. If the specialisation of labour decreases the time and effort involved in producing a research output, then it is expected that collaboration is associated with higher levels of research productivity.

According to Hara *et al*. (2003: 952), due to the "complex problems, rapidly changing technology, dynamic growth of knowledge, and highly specialised areas of expertise" associated with scientific research, an individual can seldom provide all of the expertise and resources necessary to address complex research problems. Hara *et al*. (2003) researched collaboration between individuals within groups having between fourteen and thirty-four researchers as members. Hara *et al*. (2003) found the following factors to influence collaboration: (i) personal compatibility, (ii) work connections, (iii) incentives and (iv) infrastructure. Research collaboration in scientific research might differ from other forms of collaboration, according to Hara *et al*. (2003: 952), because of the unique way in which it is shaped by "social norms of practice, the structure of knowledge, and the technological infrastructure of the scientific discipline". Differences in norms, or values such as organisational cultural values between disciplines, or fields, are expected to be reflected in differences in research practices between academic fields.

Hara *et al*. (2003) used an intensive research approach to obtain quantitative and qualitative data in their investigation of the factors influencing research collaboration amongst chemical and chemical engineering researchers. Hara *et al*. (2003) found that prerequisites to the acceptance of researchers as candidates for collaboration included acceptance as a scientist and the value of a researcher's knowledge. Collaboration contributes to the process of gradually learning to be a researcher, according to Hara *et al*. (2003), who acknowledge Lave and Wenger's (1991) concept of communities of practice as providing insight into this phenomenon. Hara *et al*. (2003: 958) found that two kinds of collaboration may be found among graduate students, postdoctoral researchers and their advisors: firstly, collaboration *with* students, which includes such activities such as advising and mentoring, and secondly,

collaboration *through* students where a student working with two professors, for example, may provide "a channel for informational transfer between researchers". In terms of compatibility, when collaboration is complementary, then work style, writing style, and the priority of the collaborative research project were found to be important (Hara *et al*., 2003). However, fully integrative collaboration was found to require compatibility that extended to compatibility of personality which often included personal friendship and trust, and also a similar approach to science (Hara *et al*., 2003).

According to Hara *et al*. (2003: 962), the work of "theorists, simulators, and experimentalists, is enhanced" when one extends or tests the results of work through collaboration with others. Researchers that have differing areas of expertise may have less of a problem with the specification of ownership of collaborative research, and might be more inclined to take a chance with collaboration (Hara *et al*., 2003). Whether incentivised or not, collaboration is expected to positively influence research productivity. On the basis of the above discussions, it is expected that collaboration has a significant and positive effect on research productivity because it facilitates learning between individuals, and might also enable learning across the hierarchical levels of such institutions. It is also expected to facilitate higher levels of research productivity most strongly for individuals with less experience in research.

2.7.1.5 Quantitative versus Qualitative Methods and Research Productivity

Differences between academic fields are expected to exist on the basis of the methodologies that are dominant in different academic fields. For example, in fields of languages, qualitative research methods will be expected to dominate, and in the experimental sciences quantitative research methods would be expected to dominate. Inasmuch as neither of these types of methods is expected to dominate over the entire sample, neither of these methods is necessarily expected to be more significantly associated with research productivity over the entire sample. However, in different Faculties, and in different academic fields, skills specific to either of these methods might offer a researcher an advantage over other researchers. Nevertheless, the influence of methodological differences is expected to account for differences between academic fields, and thesea are therefore considered an important aspect of research productivity.

2.7.1.6 Marriage and Dependent Children: Work-Family Spillovers and Research Productivity

If research productivity is constrained by a scarcity of resources, then time constraints are, necessarily, an important aspect of such resources constraints. Time spent on teaching has been found to be a negative and significant predictor of research productivity, as measured by total publications ($p<0.01$) (Barbezat, 2006). However, time spent on research was not found to be significantly associated with other measures of research productivity beyond refereed articles, according to research conducted by Barbezat (2006). Academics that taught only graduate students were found to publish more in total, but no significant effect was found with regard to journal publications, according to Barbezat (2006). Given that academics need to balance the roles of administrator, teacher and researcher, the influence of family commitments such as marriage and dependent children are considered to potentially be associated with time constraints to research.

In order to differentiate between family commitments that relate to the upbringing of children versus those related to being part of a family yet not supporting children, these variables are differentiated. One aspect of the tension between work roles and family roles is the influence of such 'spillovers' on family life and on working outcomes. Working mothers have been found to experience higher levels of negative family-to-work spillover than fathers (Dilworth, 2004). Family-to-work spillovers have also been found to differ according to generational differences (Dilworth & Kingsbury, 2005). In terms of bidirectional interrole conflict, family boundaries have been found to typically be more permeable, in that work roles typically intrude more significantly on family roles than family roles on work roles, although not necessarily in a gender-specific manner (Eagle, Miles & Icenogle, 1997).

Barbezat (2006) found that the presence of children in a household, as a tested factor, was positively and significantly associated with increased research productivity, for both men and women. This is in contrast with the notion that family-to-work spillover effects are expected to, if found, be negative rather than positive (Dilworth, 2004; Dilworth & Kingsbury, 2005). However, it is unclear what the effect of family-to-work spillover would be in this context. Whereas certain factors might constrain the amount of time an individual academic can invest in research production, there are other processes that might be used to reduce the time constraints associated with research. Research collaboration is one method which might

contribute to enhanced research productivity along a range of different dimensions. The specific relationships around gender and research productivity are considered as follows.

2.7.1.7 Gender and Research Productivity

Gender, as a variable, is a measure of more than biological differences between the sexes. Such a measure, therefore, also acts as a proxy for the complex interplay between cultural norms and different societal expectations, which might constrain the productivity of individuals, depending on context. The academic context is expected to be no different.

Rachal *et al*. (2008) found, in a review of two leading higher education journals over an 11 year period, from 1995 to 2005, that 56.7% of the authors were male. Rothausen-Vange *et al*. (2005) studied a sample of 162 associate professors of organization science in American universities, and found gender differences in the publishing rate between more and less research-oriented departments, in that female academics published significantly more during this phase of their academic careers in more research-oriented departments. However, in less research-oriented departments, male academics were found to publish more, according to patterns in the data (Rothausen-Vange *et al*. 2005).

Barbezat (2006) found male academic respondents to report less time spent on teaching and more time spent on research than female academic respondents. Barbezat (2006) found that total publications, as a measure of research productivity, were significantly associated with gender, in that male researchers had more total publications. Barbezat (2006) found most male and female academics to include the following factors as constraints to research: high teaching loads, large courses, PhD courses, and an 'excessive emphasis' on teaching. Other factors identified as constraints by a smaller subset of respondents were: the lack of co-authors amongst colleagues, colleagues that did no research at all, family responsibilities, marital problems, and administrative and service commitments (Barbezat, 2006). According to Barbezat (2006), female perceptions of constraints to research productivity were, however, similar to those of male respondents. Barbezat (2006) concludes, on the basis of her research, that the differences between female and male researchers seem to span many variables, but that such differences are decreasing over time. Nonetheless, if working mothers have been found to experience higher levels of negative family-to-work spillover than fathers (Dilworth,

2004) then it is expected that gender differences in research productivity might be present in this specific work context.

2.7.2 COMPONENT CATEGORY 2 PERSONAL ORIENTATION FACTORS AND RESEARCH PRODUCTIVITY

Job satisfaction, self-efficacy, affectivity and locus of control were factors justified for inclusion in this research on the basis of the qualitative analysis; these were found to load together as a dominant category in the factor analysis. Literature related to these personal orientation factors is reviewed as follows.

2.7.2.1 Job Satisfaction

Job satisfaction is defined as the "pleasurable emotional state resulting from the appraisal of one's job as achieving or facilitating one's job values" (Locke, 1969:317). Job satisfaction and job performance are the two most significant foci of industrial/organisational psychology research (Judge & Bono, 2001). Satisfaction is expected to contribute to performance because dissatisfaction can lead to the withdrawal of an individual from an intrinsic investment in tasks (Organ, 1988). For Organ (1988:4), Organisational Citizenship Behaviour (OCB) is "individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system". This definition locates OCB at the individual level. However, Organ (1997:91) also offers a further definition of OCB as a group-level construct, as "contributions to the maintenance and enhancement of the social and psychological context that supports task performance (or the technical/technological/production system)". Satisfaction therefore underpins Organisational Citizenship Behaviour, which is, in turn, expected to contribute to work performance, both at the individual level (Organ, 1988), and at the group level (Organ, 1997).

In a meta-analysis of 312 samples, comprising of 54417 respondents, a mean true correlation between "overall job satisfaction and job performance was estimated to be .30" (Judge, Thorensen, Bono & Patton, 2001). In this context, however, it is expected that job satisfaction is the net manifestation of a host of satisfaction loci. To the extent that OCB theory is prioritised in the performance literature and also explains the relatively high levels of performance of certain individuals in the absence of commensurate remunerative systems (Organ, 1988; 1997), it is predicted that job satisfaction will be positively associated with research productivity, as a form of job performance. Job satisfaction is considered to be a

necessary condition for OCB, yet not a sufficient condition. The overarching mechanism through which satisfaction contributes to job performance is taken to be related to the action of OCB, according to Organ's (1988; 1997) theory. Within this net effect, however, a range of other effects are expected to influence this overarching effect. Although OCB theory is expected to dominate in the prediction of the influence of satisfaction on research productivity, other theory also predicts this relationship. Certain of these theories are also reviewed as follows.

Person-organisation fit and person-job fit might also influence satisfaction and job performance, and certain personality attributes might also influence satisfaction (Erdogan & Bauer, 2005). Individuals with low person-organisation, person-job fit and person-environment fit might be less satisfied with their work. Such dissatisfaction might, in turn, reduce performance though reducing the extra-role behaviour associated with OCB (Organ, 1988; 1997). An individual might be a different fit with teaching versus research as aspects of academic work.

Erdogan and Bauer (2005) found person-job fit to be a strong moderator of research productivity, yet person-organisational fit was not. The match between an individual and the tasks associated with research might contribute to satisfaction. To the extent that research productivity is, to some extent, discretionary work in a context of tenured relationships with no or little penalty for not researching, it is expected that research production would conform to the predictions of OCB theory. Satisfaction, therefore, is considered a necessary condition to such citizenship behaviour. At the core of literature that relates to the match of the individual with tasks associated with a job is Activation theory, a seminal theoretical rationale for the person-job fit conception. This theory offers a perspective on person-job fit which is based on person-task fit.

Individuals have been found to respond to chronic states of under activation in work contexts through a process of arousal-enhancing behaviours (Scott, 1966). However, such behaviours have also been found to be associated with negative effects on work effectiveness (Scott, 1966). Psychologists "in widely diverse fields have acknowledged the importance of activation and affective constructs originating in the investigations of the reticular formation and brain stimulation experiments" (Scott, 1966:4). Scott (1966:4) argues that activation theory can explain differences in performance on certain tasks, including the 'Hawthorne'

effect and certain accident behaviour in the workplace. Activation Theory is also expected to offer insights into performance in research tasks.

Performance decreases on monotonous or repetitive tasks can result from fatigue, yet fatigue does not fully explain the effects of repetitive work (Scott, 1966). In monotonous or repetitive tasks, initial increases in performance can temporarily diminish over time with practice (Scott, 1966). The "degree of activation of an organism is a major variable in a wide range of behaviour processes" according to Scott (1966:11). Scott (1966:11) defines activation as "the degree of excitation of the brain stem reticular formation". Stimulation of this mechanism can occur through [i] variation in "the total number of different stimuli impinging on the individual, [ii] periodic fluctuations in stimulus intensity, [iii] variation in the degree to which novel stimuli are introduced into the stimulus field and the relative degree of stimulus novelty for the individual, [iv] variation in the relative speed and [v] unexpectedness with which the stimulus complex is introduced, and so on" (Scott, 1966:12). Further, Scott (1966:12) stresses that other "properties that have been suggested are stimulus complexity, uncertainty, and meaningfulness". Hence, it is "also clear that, as one moves from the physical intensity of a stimulus to such properties as complexity and meaningfulness, individual perceptions and interpretations of the external stimulus configuration become increasingly significant as determinants of activation level" (Scott, 1966:11). If research work entails monotonous, or repetitive, aspects, then meaningfulness will be expected to contribute to productivity in these tasks.

The "degree of activation" of an organism is, therefore, the "degree of excitation of the brain stem reticular formation" for Scott (1966:11). Different job tasks are expected to offer different levels of stimulation. Research work is expected to be no different. Activation is typically considered to be associated with performance in a relationship described by an inverted U shape (Scott, 1966). A low level of alertness, sensory sensitivity and muscular coordination is associated with a low level of cortical stimulation, which, in turn, is associated with low levels of performance (Scott, 1966). The middle range levels of activation are associated with optimal performance, yet at higher levels of activation lower levels of performance result because of hypertensiveness; a "loss of muscular control, 'impulsion to action', and in the extreme, total disorganisation of responses (Scott, 1966:13).

On the basis of a review of the neuropsychology literature, Scott (1966:13) stresses that an interaction between affective states occurs, as "negative affect is experienced when activation differs markedly from the individual's characteristic level; positive affect is associated with shifts of activation toward the characteristic level". Individuals, therefore, have different characteristic activation levels that are specific to themselves (Scott, 1966). If a task is not matched to the characteristic activation level of an individual, task performance will be constrained. Research is an aspect of academic work that may have its own level of stimulus. Individuals might differ to the extent that they match the tasks inherent in research work.

Certain work processes may be associated with different levels of stimuli that might or might not be a better fit with levels of activation. Positive or negative affect may be influenced in turn by the match between the activation level of the individual and the level of stimulus associated with a task itself (Scott, 1966). The tasks involved in research, such as literature review, analysis, and writing, might have their own levels of stimulus, or activation levels. If an individual's characteristic level of activation differs from that of these tasks, then it might be difficult for such individuals to perform such tasks in a sustained manner. On the other hand, individuals that have activation levels that are aligned with the tasks of research are expected to be more research productive than others that are faced with under-activation when performing research tasks.

If an individual is faced with over-activation, such a state may be characterised by stress and negative affectivity (NA) due to the difference between an uncharacteristically high activation level and the individual's own characteristic level (Scott's, 1966). Similarly, if an individual experiences under-activation, then negative affect is expected to motivate a "greater effort on the part of the organism to increase stimulation" (Scott, 1966:14). The case for over-activation and its association with negative affect is strongly supported in the literature (Scott, 1966).

For Scott (1966:14) the characteristic activation level of an individual is a threshold of sensitivity to stimulation from all sources, which is primarily related to biochemical structure, which, in turn, is "in part, genetically determined". The repetition of tasks, and the learning associated with such repetition, is expected to be associated with a decline in the individual's activation level (Scott, 1966). If this activation level required of a work task drops below the individual's characteristic level then the individual will be expected to experience negative

affect, and will be motivated to increase impact, and increase stimulus exposure (*ibid.*). If, however, the individual is not able to increase impact, then performance will typically decline (*ibid.*). If the individual is able, however, to increase the impact of the stimulus associated with a work task then positive affectivity (PA) will result as the activation level approaches, or rises to, the characteristic level (*ibid.*).

However, if stimulus impact is not increased the individual will be expected to leave the situation if this is possible, either temporarily or permanently (*ibid.*). The degree of subjective engagement with the task, and the meaningfulness of the task, can enable a match between the individual and the task (Scott, 1966). Therefore, according to Scott's (1966) conception, there will be a match, or a level of fit between a person and the stimuli presented by a task, that is dependent on a genetic component that determines an individual level of activation and also a subjective engagement of the individual with the process.

PA is expected to be associated with a better alignment between an individual's characteristic activation level and the level of stimulus associated with the experience of a task. Although they represent separate constructs, PA is strongly related to satisfaction (Watson, Clark & Tellegen, 1988). It is predicted that if an individual's activation match with teaching differed from that with research, then there would be a difference in the satisfaction received from each of these tasks. Activation theory (Scott, 1966) therefore offers a rationale for the importance of person-job fit (Erdogan & Bauer, 2005); specifically in terms of research work.

Therefore individuals that are at an optimum level of simulation impact are expected to be more likely to display PA. PA might reflect the extent to which person-task, or person-job fit dependent on tasks, exists in a particular job. PA is therefore expected to be associated with higher levels of job performance, and therefore research productivity. NA, all else being equal, is expected to be an indicator of a mismatch; between an individual's characteristic or threshold level of activation and the stimulus impact associated with a task. NA, at least along this dimension, is expected to be associated with lower levels of performance, and therefore with lower levels of research productivity. The "impact-modifying" behaviour of the individual is therefore also expected to influence either, or both of, the quality and quantity of performance (Scott, 1966:15), and particularly research performance. However, certain impact-increasing behaviours such as social engagement might be incompatible with task performance which has a low stimulus level, such as research work, and "sustained

activation levels and 'high morale' but low performance" scenarios might prevail (Scott, 1966:16).

The individual might, however, be able to organise their work in such a manner as to introduce the required stimulus impact (*ibid*.). The effect of job enlargement on work processes will be expected to be associated with higher levels of job performance and positive affect (Scott, 1966). If research tasks are sufficiently varied, then job enlargement in research work might enable greater engagement with the tasks.

Beyond the inclusion of affectivity, and measures of job satisfaction, no physiological aspects, or factors associated with a neurological rationale for research productivity, are included in this research. Physiological motivations are already taken to be inherent in the motivational structure of individual values (Schwartz, 1992). Therefore, it is left further research to investigate the interactions of neurological factors in individuals and their influence on research productivity. It is acknowledged that neurological or physiological variance between individuals might account for certain of the variance in individual research productivity. Variance in affectivity, between respondents, is expected to be reflected in measured levels of job satisfaction. Another theory that relates individual differences to specific kinds of work is offered by Hackman and Oldham (1976).

The different characteristics of the type of work associated with a job can also be associated with individual motivation and job performance (Hackman & Oldham, 1976). Hackman and Oldham (1976) offer certain conditions that are posited to contribute to employee motivation and effective performance on jobs. Their model proposes an interaction amongst (i) psychological states which need to be present for internally motivated work behaviour, (ii) the characteristics of jobs that can contribute to these psychological states and (iii) individual attributes that contribute to an individual's response to complex and challenging jobs (Hackman & Oldham, 1976). This body of theory supports Scott's (1966) notion that the meaningfulness of certain work tasks will improve performance and satisfaction, whilst also acknowledging the type, or design of work in the process. A further theory that predicts that the nature of tasks within a job, through an 'intrinsic' mechanism, will influence motivation and satisfaction is Herzberg's Two Factor Theory (Herzberg, 1968). This theory is introduced as follows.

For Herzberg (1968), there are factors associated with a job that have different effects on individual motivation and satisfaction. However, according to Herzberg (1968), these factors can be differentiated into two categories; 'motivator' factors and 'hygiene' factors. The former have the potential to provide satisfaction and motivation, and, hence, result in superior performance to individuals through their nature as factors intrinsic to the work (Herzberg, 1968). These include recognition, achievement, personal competence improvements and other similar factors (Herzberg, 1968). Hygiene factors, on the other hand, are extrinsic to the job itself, such as working conditions and remuneration that do not primarily influence satisfaction, motivation and performance in the manner that motivator factors do (Herzberg, 1968). These intrinsic factors are taken to reflect the 'personal factors' component categorisation applied to structure aspects of this research.

According to Herzberg's (1968) theory, the intrinsic aspects of research production might hold the key to satisfaction, motivation and performance. As already indicated, job satisfaction is included as a measure in this research and satisfaction according to different loci are also measured; satisfaction with financial incentives for research and also satisfaction derived from teaching, administration, and research work. An implication of Herzberg's (1968) theory is that money or other extrinsic measures in performance management systems might not have the same impact on research productivity that other factors such as recognition, achievement, advancement, or personal growth or competence might have. However, to the extent that research productivity is typically displayed on school websites and are related to selection, promotion, and tenure decision making, research productivity may be influenced by internal motivator factors as well as extrinsic reward systems.

Professional awards, recognition and graduate training enhance research productivity and create an enhanced commitment to research (Young, 2005). The quantity and quality of research can be enhanced by "stating research expectations clearly, making appropriate resources available, adjusting teaching loads, and providing meaningful rewards" (Young, 2005:329). By doing these things, substantial changes in the research culture of a department is possible, according to Young (2005:329). A more extensive HRM focus on intrinsic rewards will be expected to contribute to increased research productivity, all else being equal. HRM policies that offer extrinsic rewards for research productivity, however, have also been found to be related to higher levels of research productivity (Hales *et al*., 2005). Satisfaction with extrinsic rewards for research productivity is considered as follows.

Hales *et al*. (2005) report on a programme implemented at the University of California, Davis School of Medicine, running from 1999, that assigned a monetary value to certain educational and research activities, including publications appearing in the previous year. Over the period from 1999 to 2003, despite an increase of faculty numbers of 11.4%, where staff increased from 35 to 39, there was an increase of 276.8% in the total monetary value of research grants per faculty member (Hales *et al*, 2005). After the implementation of incentives for research productivity, peer-reviewed papers per faculty member increased 8.9%, and the total number of publications, including peer-reviewed papers and non-peer-reviewed papers together with books or book chapters increased 31.4%.

Hales *et al*. (2005:247) argue that "the allocation of a dollar value to specific educational and research activities provides tangible, financial incentives to faculty to devote both time and energy to this work". They argue that "verbal encouragement of research or educational activities, without the appropriate financial incentives, in our opinion, rings hollow to faculty members and has only limited utility" (Hales *et al*., 2005:247). However, Hales *et al*. (2005) regard financial incentives for education and research to not be the only means to increase productivity. An incentive plan that rewards research productivity also needs to have a faculty's full support and trust in its objectivity and fairness (*ibid*.).

Satisfaction with the financial incentives for research is also expected to reflect a subordinate locus of satisfaction that might also influence research productivity. A measure of satisfaction with financial incentives, or extrinsic rewards, offered for research production is included in this research. It is used as a covariate measure, in order to control for the influence of satisfaction with extrinsic research rewards when the relationship between job satisfaction and research productivity is tested. Another important aspect of job performance is the influence of self-efficacy (Stajkovic & Luthans, 1998).

2.7.2.2 Self-Efficacy

On the basis of a meta-analysis (114 studies; k=157; N=21616), Stajkovic and Luthans (1998) found a significant weighted average correlation between self-efficacy and work-related performance of G(r) =.38, an effect size estimate transformed value of d.=.82, and an increase of 28 percent in performance associated with self-efficacy. Stajkovic and Luthans (1998)

found that the relationship between self-efficacy and work-related performance is weaker for tasks that are higher in complexity, yet the relationship was significant across levels of task complexity. Stajkovic and Luthans (1998) endorse Bandura's (1982:122) definition of self efficacy as a personal judgement of "how well one can execute courses of action required to deal with prospective situations".

Task complexity was therefore found to be a significant moderator of the influence of self-efficacy on work performance across the studies sampled. Stajkovic and Luthans (1998) argue that although the relationship found between self-efficacy and work performance is not relatively much stronger than the results found for generalised trait measures, it might be possible that the former results are conservative. The conservativeness of these results might stem from (i) the inherent nature of self-efficacy where individuals do not typically undertake tasks that they perceive to be "beyond their perceived capabilities", and (ii) the inherent nature of "complex naturalistic environments" that introduce variables that moderate the relationship between self-efficacy and work performance (Stajkovic & Luthans, 1998:253). The extent to which research tasks are complex will be expected to, therefore, moderate the influence of self-efficacy on research productivity. The influence of self-efficacy is expected to be stronger for less complex forms of research output, such as conference presentations, and weaker for journal publication, if the latter are more complex in their requirements for publication.

On the basis of their findings, Stajkovic and Luthans (1998) suggest that, over time, the influence of self-efficacy might reduce as individuals develop effective task strategies to deal with complex tasks, and higher levels of self-efficacy might also enable better task strategies. Further, in support of other literature, Stajkovic and Luthans (1998) suggest that higher levels of self-efficacy may allow for more focus on the task rather than the self; if ability is perceived as amenable to an incremental process of gaining new competencies rather than a fixed endowment then this might better facilitate the development of more effective analytic strategies for complex task performance. The lagged effects between self-efficacy and work performance for different levels of work complexity also suggest that learning effects might be reflected in these findings (Stajkovic and Luthans, 1998).

Self-efficacy was operationalised in this research according to Bandura's theory (1977, 1986, 1997), which was also used as the basis for inclusion requirements in Stajkovic and Luthans's

(1998) meta-analysis. In relation to their findings, Stajkovic and Luthans (1998) use the definition of task performance derived from Wood's (1986:62) theory of task: the "behavioural responses a person should emit in order to achieve some specified level of performance". Stajkovic and Luthans (1998:244) differentiate between general-, task-and situation-specific Self-efficacy as different constructs that differ conceptually and psychometrically; the former regarded as more of a trait and the latter as "task and situation (domain) specific cognition".

In their studies, from an initial sample of 2099 studies, 114 studies were included, with 157 correlations estimates; a total sample size of 21616 respondents and an average sample size per correlation of 138 respondents, according to Stajkovic & Luthans (1998). The first step of their meta-analysis entailed a computation of an index of correlation magnitude for the relationship between self-efficacy and performance for each individual research study using Pearson's correlation coefficient *r* (*ibid.*). Due to the underestimation of the magnitude of population correlations using Pearson's coefficient an unbiased estimator of r was calculated: G(*r*), and in the estimation of weighted average correlations for the entire set of studies *z* transformations were used to convert the G(*r*) values to *z* values and on the basis of this the weighted average was calculated (Stajkovic & Luthans, 1998). Confidence intervals were created for the population correlation through the identification of 95 percent upper and lower limits and the use of transformational equations (*ibid*.).

On the basis of their findings, Strajkovic and Luthans (1998:255) suggest that in order to improve performance on tasks, individuals should: (a) obtain more information or accurate descriptions of tasks performed in order to ensure an accurate assessment of his or her perceived efficacy; (b) be provided with the means to achieve such tasks; (c) experience fewer distractions or other negative influences from the environment; (d) should be provided with interventions that increase their self-efficacy; (e) should be provided with training "in developing effective behavioural and cognitive strategies for coping with complex tasks"; (f) should be given efficacy enhancement programmes that are close in time to the task; (g) should be provided with clear and objective standards against which performance can be judged; and (h) should have consequences attached to performance which provide the necessary incentives.

The influence of context on behaviour is not trivial. Certain influences on research productivity might be beyond the control of someone. Similarly, external influences can influence an individual's performance. Situations can influence self-perceptions and individual behaviours (Rosenthal & Jacobson, 1968). For instance, Rosenthal and Jacobson (1968) found that teachers with false expectations of the competence of learners (who were in fact chosen at random) behaved differently to such children on the basis of their expectations. The behaviour of these teachers was found to influence the performance of these children in the direction of the expectations of the teachers (Rosenthal & Jacobson, 1968). The behaviour of the children, as measured as Intelligence Quotient (IQ) testing, was found to align toward the expectations of the teacher (Rosenthal & Jacobson, 1968). This effect, or the "self-fulfilling prophecy" refers to the case where "one person's prediction of another person's behaviour somehow comes to be realised", and the "prediction may, of course, be realised only in the perception of the predictor" or may be "communicated to the other person, perhaps in quite subtle and unintended ways, and so has an influence on his actual behaviour" (Rosenthal & Jacobson, 1968: 20).

This effect has also been found in relation to animal experimentation and learning (Rosenthal & Jacobson, 1968). Certain rats that students had been told were bred for intelligence were found to perform better when taught by the same students to negotiate a maze (Rosenthal & Jacobson, 1968). After the tests the students rated the allegedly more intelligent rats as more intelligent, pleasant and likeable than other rats, and were also found to have handled the rats to a greater extent and in a gentler manner (Rosenthal & Jacobson, 1968). In terms of their research in the classroom, Rosenthal and Jacobson (1968) found that when children designated as 'intellectually less advanced' improved, when such improvement was not expected of them, teachers were found to regard such behaviour as undesirable. These effects were found to be strongest for younger learners, or learners in the lower grades (Rosenthal & Jacobson, 1968). Rosenthal and Jacobson (1968) conclude that performance management improvements in learners can therefore be obtained through higher expectations. Such a mechanism is relatively more cost effective than other innovative mechanisms of performance enhancement according to Rosenthal and Jacobson (1968). These examples offer insight into how self-efficacy may work to increase research productivity.

On the basis of the evidence in the literature that self-efficacy has been found to be associated with work-related performance, self-efficacy, or the self-belief an individual has in relation to

a specific task, is therefore considered to be an important contributor to performance of a task. An objective of this research is to thread out the *relative* contribution of predictors of research productivity in this context. Self-efficacy is considered to potentially be a necessary condition in research productivity. Therefore the action of self-efficacy is expected to exert more of a constraint at lower levels. The nature of the relationship between self-efficacy and research productivity is also expected to be recursive. Self-efficacy is expected to contribute to research productivity, and success in research production is expected to be associated with learning and increased confidence, which is in turn expected to again contribute to higher levels of self-efficacy. The contribution of affectivity to research productivity is considered as follows.

2.7.2.3 Affectivity

Affectivity has a basis in the physiology of individuals. In relation to his research, Scott (1966:10) argues that although "hedonism has been a controversial issue for many years, the results of these studies support those who postulate a mediating affective component in behaviour". On the basis of a review of other research, Scott (1996:10) suggests that "while the findings are by no means conclusive, they indicate that there are neural structures which mediate reward and punishment and that they are distinct from those which mediate generalised arousal or activation but continuous enough to permit interaction effects". NA and PA are therefore related to the responses of an individual to different stimuli.

On the basis of reviewed research, Scott (1966:10) argues for an affective component of behaviour "which is perceived as a bipolar continuum ranging from extreme negative affect (feelings characterised as unpleasant) through indifference to extreme positive affect (feelings characterised as pleasant)". For Scott (1966:10), "this affective construct does not specify behaviour direction" but "is one of the determinants of overt response". Affect might therefore influence individual behaviour, and, in turn, job performance and research productivity.

However, in contrast to Scott's (1966) conception of a bipolar continuum, affect has been found to manifest differently for Positive versus Negative Affect (Watson *et al*., 1988). Positive and Negative Affect have been found to consistently dominate results of studies into the structure of affect as independent factors (Watson *et al*., 1988). The mood states that

comprise Positive and Negative Affect are related to trait PA and NA, which correspond broadly to the "dominant [Big Five] personality factors of extraversion and anxiety/neuroticism, respectively" (Watson *et al*., 1988:1063).

Lynn and Martin (1995) investigated the correlates of personality and demographic variables across thirty-seven societies. Using factor analysis, three personality variables were derived and tested, these being interpreted as extraversion, neuroticism and psychoticism (Lynn & Martin, 1995). These correspond to the differentiation between Positive and Negative Affect. According to Lynn and Martin (1995), personality measures of neuroticism have also been found to be associated with Hofstede's (1980a) dimension of Uncertainty Avoidance. Lynn and Martin (1995: 405) found a significant and negative association between work ethic and psychoticism which refers to the "rejection of social, economic and moral conservation". Lynn and Martins' (1995: 406) factor analysis findings were found to indicate that (i) extraversion loaded with homicide and competitiveness; (ii) work ethic loaded with a negative factor: suicide; (iii) neuroticism, as a second personality factor, loaded with liver cirrhosis which represented alcoholism and a negative loading for gross domestic product.

Although there is evidence of a link between reported physiological adverse health measures and NA, the physiological basis for this relationship has been contested (Watson & Pennebaker, 1989). Watson & Pennebaker (1989) investigated previous significant associations in past literature between measures of health and neuroticism, or NA. On the basis of their research, Watson & Pennebaker (1989) argue that no conclusive evidence has been found to support a link between negative emotionality and objective measures of ill-health. However, the link does exist in terms of a relationship between higher levels of NA and self-reports of ill health (Watson & Pennebaker, 1989). For Watson & Pennebaker (1989:235), PA and NA are mood factors that "can be measured either as a state (i.e., transient fluctuations in mood) or as a trait (i.e., stable individual differences in general affective level)." Trait NA has also been called neuroticism and is associated with distress and dissatisfaction relatively independently of stressful stimuli (Watson & Pennebaker, 1989).

Trait NA is typically associated with introspection and a focus on negative aspects of performance, individual shortcomings and lower levels of self-satisfaction and general satisfaction with life in general (Watson & Pennebaker, 1989). Trait PA can be assessed as

trait measures of well-being and extraversion and is, unlike NA, found to have no relationship to somatic complaining (Watson & Pennebaker, 1989). The relationship between somatopsychic distress and NA is especially interesting, according to Watson & Pennebaker (1989), because of the non-existent relationship between PA and somatic complaints, which has effectively eliminated the disability model as a perspective of the relationship between NA and physiological health. Watson & Pennebaker (1989) stress, further, the differences in the correlates of PA and NA within the affectivity literature, where PA has been found to fluctuate according to the time of the day and seasons of the year, yet NA has, instead, typically been found to correlate with levels of perceived stress and perceived health complaints.

An implication derives from this body of research; that "NA can be expected to act as a general nuisance factor in health research, one that taps psychologically important but organically spurious variance" in certain research contexts (Watson & Pennebaker, 1989:249). Watson & Pennebaker (1989:250) also tested respondent reports of the frequency of chronic concerns and the intensity of these reported concerns and found a significant association between these measures and NA and conclude that "it seems advisable to include an established trait NA marker in health research, so that its influence can be identified and isolated". It might be possible that NA creates spurious variance in other survey research, beyond the scope of health research.

The influence of NA on subjective reporting of relationships in social research is therefore taken to be a potentially problematic factor. Therefore NA, and also PA, are included not only as analysis variables in terms of their direct relationship to individual job performance, but also as control variables. According to Podsakoff *et al*. (2003), Affect can act as a nuisance factor in certain survey items, and can contribute to method bias. According to their prescriptions, Affect is included as a control variable in this research. An external locus of control has also been found to be associated with higher levels of performance in difference job contexts. Literature relating to locus of control is reviewed as follows.

2.7.2.4 Locus of Control

Locus of control is a measure of an individual's perceptions of whether outcomes in such a person's life are either the results of his or her own efforts (an internal locus of control), or

are the results of factors outside his or her control (an external locus of control) (Rotter, 1966). Differences between individuals along the dimension of external versus internal locus of control are associated with differences in behaviour (Rotter, 1966). Meta-analysis findings indicate that locus of control has been found to have an estimated true score correlation of .32 with job satisfaction and .22 with job performance (Judge & Bono, 2001). In terms of differences in behaviour, locus of control has been found to be associated with a range of different outcomes, both at the individual level (see Littunen & Stormhammar, 2000; Miller, Kets De Vries & Toulouse, 1982; Wallston & Wallston, 1978), and at the organisational level (see Miller *et al*., 1982). For example, on the basis of a review of the literature, individuals with an internal locus of control have been found to typically be more satisfied in work; to be more effective leaders; to be more task oriented; and to be more likely to resort to persuasive forms of power use in work contexts (Miller *et al*., 1982). Other reviews of the locus of control literature indicate that differences between individuals on the basis of internal versus external locus of control are associated with differences in bodyweight and other health related behaviours (Wallston & Wallston, 1978). Spektor and O'Connel (1994) also found individuals with an internal locus of control to have significantly higher levels of job satisfaction and lower levels of work anxiety than individuals with an external locus of control. The effect of internal locus of control was also found to be more strongly associated with job satisfaction than measures of NA (which was not found to be significantly associated with job satisfaction), in tests of University Alumni (Spektor & O'Connel, 1994). In the sections above, certain literature was reviewed which suggests that differences between individuals on intrinsic satisfaction might account for differences in research productivity. One dimension of differences in job satisfaction in this context is the extent to which an individual derives their primary job satisfaction from research versus teaching. Literature that relates to this differentiation is reviewed as follows.

2.7.3 COMPONENT CATEGORY 3: RESEARCH WORK ROLE SATISFACTION AND RESEARCH PRODUCTIVITY

Three major theories predict a negative relationship between teaching and research; the scarcity model, the differential personality model and the divergent rewards model (Hattie and Marsh, 1996). However, two further models predict a positive relationship between teaching and research; the conventional wisdom model and the 'g' model (Hattie and Marsh, 1996). The 'g' model is defined as a model that predicts that an underlying cognitive ability,

represented as a general factor, or 'g', supports performance in both teaching and research (Hattie and Marsh, 1996). Yet another three perspectives have been advanced that argue for no significant relationship between teaching and research; the different enterprises model, the unrelated personality model and the bureaucratic funding model (Hattie and Marsh, 1996). These theories and models are introduced as follows.

Hattie and Marsh (1996) acknowledge Moore's (1963) concept of role conflict associated with the scarcity of time and energy as the basis of the scarcity model. According to the scarcity model, time, energy and commitment can be differentially distributed, and this constraint can lead to conflict (Moore, 1963). Fox (1992) also contests the notion of mutuality between teaching and research. According to Fox (1992), investments in research are different from investments in teaching. However, according to their meta-analysis of research findings relating to the relationship between teaching and research, Hattie and Marsh (1996) suggest that there is no overwhelming support for the scarcity model. In fact, certain findings have indicated that researchers, as opposed to 'teachers', have in certain cases been found to be more responsive to students; which might be due to higher levels of organisation and better time management, which are skills learned as a researcher (Hattie & Marsh, 1996). Other research also suggests that individuals with multiple roles with regard to research, teaching and administration perform at higher levels than individuals with a single such role (Hattie & Marsh, 1996). However, time "on research is positively correlated with research productivity", yet not with teaching quality (Hattie & Marsh, 1996:509). According to Hattie & Marsh (1996:509):

> Given these findings, the expected relationship between research productivity and teaching evaluations can be predicted by the principles of partial correlation. That is, if time on research and time on teaching are negatively correlated, time on research is correlated positively with research output measures, and the correlation between time on teaching and teaching evaluations is zero, then it is most likely that the correlation between teaching and research is zero- and not negative. Moreover, it is probable that there is not a one-to-one compensation when research time is increased at the expense of teaching time.

Based on the above literature, whereas the scarcity model predicts that the relationship between teaching and research performance will typically be negative due to resource constraints, there is also evidence that suggests that the relationship is orthogonal; that there are fundamental differences between these roles and that such relationships will not be significant.

The differential personality model predicts that, because there are different sets of attributes associated with research versus teaching, individuals with different personalities more suited

to different activities or attributes will be a better fit with either teaching or research (Hattie & Marsh, 1996). According to this model, differences in research productivity will be expected to be associated with differences in personality. To the extent that trait measures of personality such as extroversion and neuroticism reflect measures of PA and NA, such theory suggests that differences in research productivity might be associated with differences in affect. Similarly, individual differences in personality, reflected in endowments of PA and NA, and satisfaction, may be expected to be reflected in differing preferences for teaching, research or administration. Therefore, according to the differential personality model, differences in research productivity or teaching productivity might also be a function of differences in personalities.

According to the divergent reward system model the conflicting roles of teaching and research are associated with different expectations and obligations that are underpinned by different reward systems (Hattie & Marsh, 1996). According to their meta-analysis of the literature, Hattie & Marsh (1996) stress that, despite findings of relationships between teaching and research and feelings of accomplishment for both, *satisfaction* was found to be more important than potential rewards. The intrinsic aspect of motivation therefore dominated the extrinsic aspect (Hattie & Marsh, 1996). Research findings indicate that research, administration and public service are typically associated with higher levels of overall salary in universities, yet teaching is not (Hattie & Marsh, 1996). According to the divergent reward systems model the use of evidence of research productivity as a basis for recruitment, selection, tenure, promotion and remuneration should incentivise the role of research over and above teaching. According to these findings, it is expected that satisfaction might be a core differentiator between teaching and research roles, and that its influence might therefore, to some extent, be robust to the influence of extrinsic reward systems.

According to Hattie and Marsh (1996), two bodies of theory predict a positive relationship between teaching and research: the conventional wisdom model and the ‘g’ model. The conventional model predicts that because most academics claim that research interest is necessary in order to be a good teacher, and because most academics agree that these are positively related, a positive relationship is expected (Hattie & Marsh, 1996). In the literature, the relationship between teaching and research has been found to operate at three levels: (i) a tangible association that relates to the transmission of knowledge; (ii) an intangible association toward the development of students; and (iii) a global connection between

teaching and research at the administrative level over and above the individual level (Hattie & Marsh, 1996). However, the direction of this relationship in the literature has typically been recognised as being from research to teaching on the basis of potential enrichment of teaching from research productivity (Hattie & Marsh, 1996). In the literature, it has also been argued, by some, that teachers need to engage in research that benefits teaching, yet not in fundamental research which is more resource intensive (*ibid*). According to this conception, a differentiation is reflected in the literature; even the research performed by a 'teacher' is differentiated from that of a 'researcher'. This model does not suggest, however, that increased experience, or performance, in teaching contributes to higher levels of research productivity.

According to the 'g' model there is a common underlying ability, including a cognitive ability, in people that manifests in both teaching and research activities (*ibid*). This commonality can also extend to values, according to Hattie and Marsh (1996). On the basis of their literature review, Hattie and Marsh (1996) stress that certain values are typically associated with both good teaching and good research: high commitment (in the form of perseverance, dedication and hard work); creativity (in the form of imagination, originality and inventiveness); investigativeness and critical analysis. Hattie and Marsh (1996) also stress, however, that despite commonalities which may exist between good teachers and researchers there also may be moderators to this relationship such as commitment and time, that "mediate the relationship and may cause the relationship" to be negative (Hattie & Marsh, 1996:512).

The different enterprises model, the unrelated personality model and the bureaucratic funding model all predict no relationship between teaching and research (Hattie & Marsh, 1996). According to the different enterprises model teaching is fundamentally different from research according to the activities associated with each (Hattie & Marsh, 1996). The implication of this model is that these activities are so different that they can 'fit together' in a way so that more effort allocated to one will not necessarily detract from performance in the other.

The unrelated personality model suggests that personality differences exist between researchers and teachers and that because of these differences, teaching and research are unrelated; neither improves or diminishes the other; the relationship between teaching and research is orthogonal (Hattie & Marsh, 1996). According to this theory, teachers are "liberal,

sociable, showing leadership, extroverted, low in anxiety, objective, supportive, nonauthoritarian, not defensive, intelligent, and aesthetically sensitive" yet researchers are "striving to create order, independence, achievement orientation, and dominance" (Hattie & Marsh, 1996:514). Further, according to this theory, teachers and researchers both show leadership, but differ primarily in supportiveness (Hattie & Marsh, 1996). This theory suggests a differentiation between a focus on supporting others and a focus inwards, or a self-oriented aspect.

The Bureaucratic Funding Model suggests that if teaching and research are not related then teachers and researchers should be rewarded each for their different strengths (Hattie & Marsh, 1996). Indeed, in the literature certain researchers have claimed that curricula could be tailored better for student needs if they were not bound to research (Hattie & Marsh, 1996). The logic that flows from this perspective suggests that comparative advantage can be harnessed if resources are allocated on the basis of comparative advantage. However, if only research is incentivised, and if all academic staff are considered to be primarily 'researchers that also teach' then highly performing teachers might be more dissatisfied in such a context. Following the Bureaucratic Funding Model (Hattie & Marsh, 1996), tt is argued that an individual's specific locus of satisfaction cannot be disregarded when bureaucratic funding or reward systems are designed and implemented in such contexts. In fact, it is argued that an individual's locus of satisfaction will dominate the relationship between research productivity because of the role conflict between these two roles. Interestingly, there may be an interface between teaching and research productivity when it comes to postgraduate supervision. Postgraduate supervision is considered to represent an instance where an individual with a teaching locus of satisfaction might productively contribute to the research process in a way that is synergistic.

Having considered theory that predicts relationships between research productivity and teaching, literature that relates to supervisory experience is now discussed. The association between supervision experience and research productivity is considered as follows.

2.7.4 COMPONENT CATEGORY 4: SUPERVISORY EXPERIENCE AND RESEARCH PRODUCTIVITY

According to factor analysis results, higher degree supervision and the number of people reporting to an individual were found to load on the fourth component, termed supervisory experience. This was taken to reflect an aspect of both higher degree supervision as well as the supervision of others in the work context.

2.7.4.1 Higher Degree Supervision and Research Productivity

Due to the commonalities inherent in research supervision and research production, the learning investments in one are considered to be General Human Capital to the other (Becker, 1964); learning from experience is considered to be transferrable from one to the other. Further, the efforts of students can be harnessed toward joint publication of such work (Hara *et al*., 2003: 958). However, time spent on such supervision might also act as a constraint to time resources, but this effect is not plausibly expected to dominate the relationship between supervision and research productivity. It is predicted that postgraduate supervision is positively associated with research productivity.

2.7.4.2 University Rank Designation and Research Productivity

Rachal *et al*. (2008) found, in a review of two leading higher education journals over an 11 year period, from 1995 to 2005, that 33.7 percent of the authors were full professors, 11 percent were graduate students, and 10.6 percent were administrators. Of note, according to Rachal *et al*. (2008), is the fact that administrators often hold academic rank and also work in their academic roles. Rachal *et al*. (2008) also found that 20.6 percent of the articles were authored by assistant professors, and 15.1 percent by associate professors. These findings are, to some extent, expected, due to the fact that promotions to Associate Professor and to Professor are expected to be based on research productivity. However, a salient issue that is relevant to this investigation is whether research productivity is increasing, is decreasing, or is plateaued, after such promotions.

A range of different factors might influence promotions, and hierarchical rank in such institutions. Universities also recruit individuals with doctoral degrees from certain practitioner fields into the academic context, who do not necessarily have other academic experience (Crane, O'Hern & Lawler, 2009). However, there may be differences between the

experiences of this cohort of transitioning academics versus those that go directly into academia and do not first pursue a career as a practitioner (Crane *et al*. 2009). Notwithstanding these differences, differences by university designation; Mr./Ms.; Dr.; Associate Professor; and Professor are expected to be associated with a significant amount of the variance in the dependent variables because the differences between these designations are considered to be a function of research productivity.

Notwithstanding the effects that predict such rank attainment, the influence of such rank attainment over and above the associations between such rank and research productivity is unclear. To the extent that individuals at similar hierarchical levels of organisational 'rank' might interact in groups within the administrative system, this interaction might be expected to also have a 'grouped effect', where the relative interests of such groups are recognised and common values develop. On the basis of these conceptions discussed above, the extent to which hierarchical relationships, measured by the rank variable, might influence research productivity is therefore tested. As indicated, of particular interest in this research is the influence of such rank on research productivity over and above the influence of years of experience as a researcher. Closely associated with seniority is service to the university in the form of administrative, or managerial, duties.

2.7.4.3 Span of Control and Research Productivity

Span of control, or the number of individuals that report to an academic manager, is expected to be associated with time investments that may take time away from research. Span of control might act as a proxy for the amount of administrative work load an individual needs to deal with, which might be independent of rank, by virtue of a management position on the organisational hierarchy. The degree of administrative, or management, burden placed on an individual is expected to constrain the time-related resources that such an individual has available for research. Span of control is expected to be negatively associated with research productivity once years of experience as a researcher are controlled for.

2.7.5 The synthesis of Propositions and Hypotheses: Summary

In the preceding sections, certain literature relating to the predicted associations between individual performance factors and research productivity was reviewed. This literature review was primarily based on, and structured according to, the propositions that were derived from

the qualitative study. These performance factors were tested quantitatively, and the structure of the literature review was based on the results of a factor analysis, which grouped the variables into four component categories. The results of the qualitative analysis were therefore used to delimit the scope of the study, and of the literature review. The qualitative process that was used to derive propositions from the analysis during the first portion of Phase 1 of the research (the qualitative research component) is reported in Chapter 4.

2.8 CONCLUSION

In this chapter, the literature associated with knowledge creation and research productivity was reviewed. The broad context of knowledge creation was then introduced, and aspects of technological change and systemic knowledge creation effects were discussed. Differences between academic fields were then discussed in relation to the literature.

University knowledge creation was then considered in relation to emerging global changes. Literature relating to the role of University research productivity within the global 'research industry' was reviewed. Changes in academic contexts over time and cultural change were then considered, with specific reference to the work of Kuhn (1970) and the cultural effects of 'paradigms'. Having placed the research into the overarching context of university knowledge creation, the literature relating to GLOBE theory was then reviewed.

Literature associated with each of the following GLOBE dimensions of organisational culture was reviewed: (i) Uncertainty Avoidance; (ii) Power Distance; (iii) In-group Collectivism; (iv) Institutional Collectivism; (v) Gender Egalitarianism; (vi) Assertiveness; (vii) Future Orientation; (viii) Performance Orientation; and (ix) Humane Orientation. GLOBE findings that relate to specific industry-specific relationships were also considered. The potential influence of GLOBE organisational culture on organisational performance, and research productivity (conceived of as a dimension of organisational performance) was the key focus of the review.

Next, Schwartz values theory was discussed. It was stressed that for Schwartz (1994), all the types of values from different cultures can be classified into one of ten dimensions of individual values. Literature that relates to Schwartz's (1994) circumplex structure of motivational values was reviewed in order to provide insight into predicted relationships with

individual research productivity as a dimension of job performance. Literature that relates to the following ten Schwartz values dimensions was reviewed: (i) Stimulation values; (ii) Self-direction values; (iii) Universalism values; (iv) Benevolence values; (v) Conformity values; (vi) Tradition values; (vii) Security values; (viii) Power values; and (ix) Achievement values. The overarching tensions between the four higher order values types; (i) Openness to Change; (ii) Conservation; (iii) Self-enhancement and (iv) Self-transcendence.

Literature that relates to four component categories of individual-level performance factors that are potentially associated with research productivity in this context was then undertaken. Research productivity was framed as a dimension of individual job performance, and the literature that relates to individual job performance was also reviewed. Having introduced and engaged with the theory and empirical findings that relate to the phenomena being investigated in this research, the next step in the process is to introduce the methodology applied to this investigation. The methods and rationale applied in this study are derived from this same body of literature. The methods follow the precedent set by previous research reported in this chapter. The methodology applied in this research is outlined and discussed in the chapter that follows.

CHAPTER 3

RESEARCH METHODOLOGY

3 RESEARCH METHODOLOGY

3.1 INTRODUCTION

In the previous chapter, a review of literature that relates organisational cultural values, individual values, and individual performance factors to research productivity was provided. The aim of this research was to develop and test theory relating these three bodies of literature to research productivity. On the basis of this analysis, a holistic perspective of research productivity was expected to result. According to the literature reviewed in the previous chapter, certain precedents guide this research. This chapter therefore builds upon and extends the work of the previous chapter, as the research methods taken to be appropriate for an investigation of the influence of values at the individual and the aggregate level are justified. In this chapter, the methods of the qualitative and quantitative portions of the research that were applied to investigate these relationships are discussed. As previously indicated, the purpose of the qualitative study was to provide insight into the localised context of institutional research productivity, and to provide a localised theoretical framework that could also be empirically tested. In this way, this study attempted to provide a holistic analysis of research productivity, and its relationships with culture and individual values in this context. The methodology applied to this end is now discussed as follows.

3.2 QUALITATIVE AND QUANTITATIVE STUDIES

As discussed, in this research a qualitative study was undertaken in order to justify the inclusion of certain individual-level variables for testing quantitatively. A modified grounded approach was therefore applied. The objective of the qualitative research was to develop theory that related (i) cultural differences between academic fields to research productivity; (ii) individual values differences between individuals to research productivity; and also (iii) to derive a range of individual-level factors for quantitative testing based on their predicted relationships with research productivity. The quantitative analysis was used to test certain of the the relationships predicted by the qualitative analysis. The objectives of the quantitative analysis were: (i) *at the level of the academic school (representing the academic field)*; to test the relationships predicted by GLOBE organisational culture theory in terms of its relationships with research productivity; (ii) *at the individual level*; to test Schwartz values theory and its predicted relationships with research productivity; and (iii) to test the relationships between four component categories of individual-level factors and research

productivity that were predicted by the qualitative analysis. Through this process, a holistic analysis of research productivity within the institution was provided, which spanned two levels of analysis. The outcome of this process was the derivation of recommendations that relate to improved effectiveness and efficiency of research productivity. In this chapter, the qualitative research methodology is first discussed. The quantitative methodology is then considered. Firstly, however, the placement of this research within the literature that relates to research paradigms is undertaken as follows.

3.3 PLACEMENT OF THE RESEARCH: PARADIGMS

Certain assumptions underpin this research. These relate to epistemology, or assumptions about the grounds of knowledge itself, and ontology, or assumptions about the nature of the phenomena being investigated (Burrell & Morgan, 1979). According to Burrell and Morgan's (1979) classification, the empirical portion of the study is, ontologically, associated with realism, and epistemologically associated with a positivist perspective. The empirical portion of the study is therefore associated with the functionalist view, where an objective approach underlies the processes and understandings around the tested relationships (Lewis & Grimes, 1999). A consideration of the different perspectives of paradigms is considered to be particularly important for this study because of the multiplicity of factors that influence culture and influence the relationships between culture and behavioural outcomes; these factors are considered to represent 'k-factors' (Gelfand *et al*., 2004). The study of values, both at the individual and the aggregated level, therefore requires a holistic perspective. It is argued that a holistic perspective cannot be provided through a uni-paradigmatic perspective of the objective phenomena that represent the relationships around research productivity in this context. This argument seems to be reflected in Denison's (1996) argument that the two streams of culture research (qualitative 'culture' research versus quantitative 'organisational climate research'), which were at one time considered to be 'incommensurate', are now considered to complement each other because they provide different ways of looking at the same phenomena. The two paradigms applied to this research are therefore not considered to be incommensurate, because they both share the assumption that phenomena in the world are objective, and that causal relationships can exist between phenomena. This thesis seeks to extend the research of these two traditions (Denison, 1996) into this context for testing. No attempt is made in this thesis to step beyond paradigms that acknowledge an objective reality underlying phenomena. It is not the intent of this work to challenge any views of others that

relate to whether paradigms are incommensurable or not. By locating this research specifically within two paradigms (the positivist/postpositivist paradigm for the quantitative research and the transcendental realism paradigm for the qualitative research), these debates fall outside the scope of this study and are 'respected from a distance'. On the basis of these paradigms, knowledge is generated in different forms, one through a grounded qualitative process and the other through a quantitative process. The overarching logic behind the use of a qualitative process, however, was to provide insight into the quantitative testing of variables, in order to justify the choice of variables tested quantitatively. Though this careful choice of methods, the different paradigms and their different meanings that related to reliability and validity, and what can be termed objective knowledge were carefully considered. Because the qualitative research produces relied on the need to generate models of objective, or real causal relationships and the quantitative testing process entailed the testing of these relationships it was necessary to embrace the notion of an objective reality that underlies phenomena. A one-to-one correspondence between the paradigmatic prescriptions of transcendental realism and postpositivism were applied to the qualitative and quantitative research processes, respectively. It is stressed in this research that the research methods do not constitute the ontological/epistemological basis of the work in themselves; *this thesis is not aimed at making a contribution to the methodology or paradigm literature*. The placement of the research in relation to paradigms in the literature is undertaken to justify the methods used in this study, which were derived from seminal research precedent.

The quantitative portion of the research therefore falls into a group of theoretical perspectives associated with positivism (Bak, 2004), and rationalism (Guba, 1981). The purpose of knowledge, according to these perspectives, is to describe, analyse and predict, and to allow for the control of, and improvement of, phenomena and processes (Bak, 2004). A primarily deductive quantitative investigation of the relationships around research productivity was therefore judged appropriate for the quantitative portion of the research. The quantitative research component can also be considered to fall into the postpositive paradigm in terms of its knowledge claims (Cresswell, 2003). According to the postpositivist perspective, despite the acknowledgement of causal relationships, evidence is considered to be "always imperfect and fallible" (Cresswell, 2003:7). The precedent followed in GLOBE research is extended into this research; an exploratory cross-sectional correlational research design is applied to the research at the level of the academic school. The same research design was applied at the individual level of testing; the precedent of Schwartz (2007) values research was also

followed. It is acknowledged that causality cannot be established using statistical analysis, and the research attempted to provide a more holistic perspective of the relationships around research productivity by using both quantitative and qualitative methods.

The qualitative component of this study is also premised on assumptions about the nature of the social world that follow from transcendental realism (Miles & Huberman, 1994). According to the perspective of transcendental realism, social phenomena are considered to be real: existing in the mind and in an objective world that exists beyond the individual (Miles & Huberman, 1994). According to transcendental realism, relationships between social phenomena follow laws and have reasonably stable relationships, which can be related to regularities and sequences (Miles & Huberman, 1994). According to transcendental realism, for Miles and Huberman (1994:4):

> [h]uman relationships and societies have peculiarities that make a realist approach to understanding them more complex- but not impossible. Unlike researchers in physics, we must contend with institutions, structures, practices, and conventions that people reproduce and transform. Human meanings and intentions are worked out within the frameworks of the social structures- structures that are invisible but nonetheless real. In other words, social phenomena, such as language, decisions, conflicts and hierarchies, exist objectively in the world and exert strong influences over human activities because people construe then in common ways, Things that are believed become real and can be inquired into.

According to Miles and Huberman (1994:4), transcendental realism is in agreement with "interpretivists who point out that knowledge is a social and historical product and that 'facts' come to us laden with theory". Transcendental realism is also aligned with the interpretivist perspectives associated with the "subjective, the phenomenological, the meaning-making at the centre of social life" (Miles & Huberman, 1994:4). According to both these perspectives, attempts are made to actually explain events, and find causal descriptions of forces at work (*ibid*.). The qualitative paradigm adopted for the qualitative research component of this study is transcendental realism which shares its approach with the interpretativist approach (Miles & Huberman, 1994). According to the realist approach, therefore, the aim of this research was to reduce the problem space around knowledge of the contribution of organisational cultural values, individual values and individual performance factors to research productivity.

Although the qualitative and quantitative portions of the research utilise the two slightly different paradigmatic lenses introduced above, the overall, or overarching, perspective on knowledge claims taken in this study is associated with Cresswell's (2003:11) 'pragmatic knowledge claims' perspective; where instead "of methods being important, the problem is

most important". According to Cresswell's (2003) pragmatic knowledge claims perspective, researchers use different approaches to understand a research problem; researchers have the freedom to combine methods. Mixed methods research needs "to establish a rationale for the combination of methods" (Cresswell, 2003:12). The rationale for the approach used in this study is fundamentally premised on the principles of convergent and discriminant validity offered by Campbell and Fiske (1959), which was associated with their use of a multimethod matrix; based on the notion that using different methods to address a research problem can increase the validity of claims made in the process. Certain of these references are old but considered to still be valid.

Different methods and levels of analysis were used in this research in order to provide a holistic analysis of the constraints to research productivity in this context. This research therefore applied Cresswell's (2003) pragmatic approach to mixed methods methodology, and applied nine different analyses in order to provide a holistic perspective of research productivity. These nine analyses are shown in Table 1. Further, seven measures of research output were also included in the analysis, in order to increase the sensitivity of the analysis. Sequential analysis (Cresswell, 2003) was applied, as qualitative findings were used to justify the inclusion of individual performance factors in the quantitative analysis. In this way, a thorough process of investigation was applied. At this nexus, having explained the rationale behind the method applied in this research, further support for this process is provided, through recourse to seminal methodological precedent. The 'paradigm wars' have a long history (Denison, 1996). For Schutz (1954), academics have been engaged in a

> [C]ontroversy which for more than half a century has split not only logicians and methodologists but also social scientists into two schools of thought. One of those holds that the methods of the natural sciences which have brought about such magnificent resuls are the only scientific ones and that they alone, therefore, have to be applied in their entirety to the study of human affairs…The other school of thought feels that there is a basic difference in the structure of the social world and the world of nature. This feeling led to the other extreme, namely the conclusion that the methods of the social sciences are *toto coelo* different from those of the natural sciences.

For Schutz (1954:260), the "rejection of a purely 'objective' or 'behaviouristic' social science by the proponents of 'meaningful connections' as the goal of social sciences is unwarranted". According to Schutz (1954:260) "'theory' means in all empirical sciences the explicit formulation of deterministic relations between a set of variables in terms of which a fairly extensive class of empirically ascertainable regularities can be explained". The primary goal of the social sciences, for Schutz (1954:261), is to obtain "organised knowledge of social

reality", as "we, the actors on the social scene, experience the world we live in as a world both of nature and of culture, not as a private but as an intersubjective one, that is, a world common to all of us, either actually given or potentially accessible to everyone; and this involves intercommunication and language".

Schutz (1954:273) argues, therefore, that controversies between the social sciences and the natural sciences as to their ontological and epistemological differences might be "merely a special case of the more general, still unexplored, problem how scientific knowledge is possible at all and what its logical and methodological presumptions are". For Popper (1959), subjective knowledge differs from objective knowledge; the former depend on our senses and the latter is associated only with tentative hypotheses. Subjective interpretations rely on probability theory due to the incompleteness of knowledge, but remain beliefs, that can only be corroborated by degree (Popper, 1959). Objective interpretations can be tested (Popper, 1959). Hence we can only know what we can falsify. For Popper (1963:6), Einstein's theory that light would be influenced by gravitational forces was falsifiable, in contrast with Adler's psychological theory and Marx's theory which seemed to fit all instances of phenomena, or where "compatible with the most divergent human behaviour, so that it was practically impossible to describe any human behaviour that might not be claimed to be a verification of these theories".

Hence, "every genuine test of a theory is an attempt to falsify it, or to refute it", and confirming "evidence should not count except when it is the result of a genuine test of the theory; and this means that it can be presented as a serious but unsuccessful attempt to falsify the theory" (Popper, 1963:7). Knowledge is objective, according to Popper (1972), because it is (i) objectively true and (ii) because it has an ontological status; knowledge can be an object that exists independently of an individual, or a knowing subject. Popper (1972:73) distinguishes between "subjective knowledge (which should better be called organismic knowledge, since it consists of the dispositions of organisms); and objective knowledge, or knowledge in the objective sense, which consists of the logical content of our theories, conjectures, guesses (and if we like, of the logical content of our genetic code)."

This work follows Popper's (1972) rationale associated with the objective content of thought. According to this perspective, there are three 'worlds' of reality; (i) world one, which is the physical world, or which relates to physical states (ii) world two, relating to "our conscious

experiences", and the (iii) objective content of thought world; world three, which is the "world of the logical contents of books, libraries, computer memories, and suchlike" (Popper, 1972:74). In this third world, (i) problems can be discovered that existed "before anything corresponding to them appeared in the world"; (ii) the contents of this world are "autonomous: in this world we can make theoretical discoveries in a similar way to that in which we can make geographical discoveries in world 1"; and (iii) that "almost all our subjective knowledge (world 2 knowledge) depends upon world 3, that is to say on (at least virtually) linguistically formulated theories" (Popper, 1972:74). On the basis of these conceptions, Popper (1972:74) proposes "the thesis that full consciousness of self depends upon all these (world 3) theories". The implication of this is that the independence of the world of the objective mind exists, according to Popper (1972); in other words it exists and evolves independently of individual knowing subjects. A further implication of this is that as "soon as we take objective knowledge into account, we must say that at best only a very small part of it can be given anything like sufficient reasons for certain truth: it is that small part (if any) which can be described as demonstrable knowledge and which comprises (if anything) the propositions of formal logic and of (finite) arithmetic" (Popper, 1972:75).

Deriving from these arguments, this study takes the stance that advancements in knowledge can only take the form of reducing the problem space around a phenomenon. Consequently, following the precedent set by the two traditions of what is now contemporary culture research (Denison, 1996), qualitative research was used to develop theory that was then tested quantitatively. In this way this research makes an attempt to reduce the 'problem space' around research productivity and its relationships with organisational cultural values and individual values.

Table 1. The different analyses provided in this research and where these are reported or discussed

Phase 1: Grounded Analysis	Phase 1: Further Analysis	Phase 2: Quantitative Analysis
Grounded analysis of the relationships between organisational culture and research productivity. (Analysis 1; reported in Chapter 4)	Modified grounded analysis with GLOBE organisational culture values theory framework imposed on the analysis: of the relationships between GLOBE organisational culture values and research productivity. (Analysis 5; reported in Chapter 6)	Quantitative testing of the predicted relationships between GLOBE organisational cultural values and research productivity. (Reported in Chapter 5/Discussed in Chapter 6)
Grounded analysis of the relationships between individual motivational values and individual research productivity. (Analysis 2; reported in Chapter 4)	Modified grounded theory analysis with Schwartz motivational values theory imposed on the analysis: of the relationships between Schwartz individual motivational values and research productivity (Analysis 6; reported in Chapter 6)	Quantitative testing of the predicted relationships between Schwartz motivational values theory and research productivity. (Reported in Chapter 5/Discussed in Chapter 6)
Grounded analysis of which individual factors are associated with research productivity. (Analysis 3; reported in Chapter 4)	Statistical factor analysis performed in order to investigate the underlying component category structure of the performance factors. (Analysis 7; reported in Chapter 3)	Quantitative testing of the predicted relationships between the individual performance factors and research productivity. (Reported in Chapter 5/Discussed in Chapter 6)

In the midst of a range of potential paradigmatic perspectives, it is important to locate a research study in relation to them. Having located this research in relation to other paradigmatic perspectives, other methodological aspects of this research are now considered.

3.4 QUALITATIVE RESEARCH METHODOLOGY

This research utilised a modified grounded method, loosely based on Glaser's (1992) grounded theory methodology. Glaser's (1992) method of Grounded theory is premised on the principle that no theoretical framework is 'forced' on data; relationships arise from the analysis. These relationships are therefore 'grounded', or are inextricably derived from, the specific context (Glaser, 1992). Glaser's (1992) method is less methodologically prescriptive than other forms of grounded theory. The grounded analysis conducted in this research utilises thematic content analysis. Grounded theory was initially developed by Glaser and Strauss (1967). According to Grounded theory, the role of theory in research is aimed at the

prediction and the explanation of behaviour, and also aimed at informing practitioner applications (Glaser & Strauss, 1967). Glaser and Strauss (1967:3) suggest an "initial, systematic discovery of the theory from the data". The "hard study of much data" associated with grounded theory gives rise to theory that is more likely to be robust to testing, and be more likely to predict, explain and be relevant in fields of research (Glaser and Strauss, 1967:4). A brief overview of grounded theory and its practical application in the research is provided as follows.

3.5 GROUNDED THEORY: CRITERIA FOR A THEORY

Grounded theory is a "general approach designed to support the inductive development of theory about a phenomenon through a set of systematic procedures for the collection and analysis of qualitative data" (Locke, 2002:17). The adequacy of a theory is related to the process used to generate such a theory (Glaser & Strauss, 1967). In contrast to logico-deductive theory, grounded theory follows an inductive method (Glaser & Strauss, 1967).

Glaser and Strauss (1967:18) stress that both qualitative and quantitative data can be used for the generation of, and verification of theory, and that "the process of generating theory is independent of the kind of data used". Crucial elements of theory are, however, best found using qualitative methods "from data on structural conditions, consequences, deviances, norms, processes, patterns, and systems" (Glaser & Strauss, 1967:18). Comparative analysis is at the heart of the grounded theory method. The goal of such research is therefore to be able to make plausible claims based on theoretical "elements they compose from their empirical observations", where "naturalistic empirical observations are generalised in the developed conceptual framework" (Locke, 2002:23).

Grounded theory entails an approach to research and theory building that is fundamentally related to direct contact "with the social world, coupled with a rejection of a priori theoretical categories and propositions" (Locke, 2002:19). However, Locke (2002:19/20) cautions that this "does not mean that grounded theorists should embark on research without the guidance of some disciplinary school of thought that provides an orienting theoretical perspective" to inform the researcher's "understanding of complex social realities": an orienting framework of symbolic interactionism. Meaning, underpinned by the subjective experience of everyday interactions and behaviour, is therefore at the core of what symbolic interactionism represents

(Locke, 2002). Action, according to the symbolic interactionism perspective, results from meaning being ascribed to phenomena; this meaning arises from social interaction, and is not fixed, but flexible and can be modified at any time: therefore "all social enquiry must be grounded in the particular empirical world studied" (Locke, 2002:21).

As "a set of research practices, grounded theory reflects the assumptions of symbolic interactionalism that the social world should be studied in a way that keeps faith with it", as familiarity with the real social world is necessary (Locke, 2002:22). Face-to-face interviews and first-hand observation are also key practices; inquiry is not viewed as a testing task, but as a learning task "bringing to it as few advanced concepts and propositions as possible" (Locke, 2002:22). Miles and Huberman (1994:1) argue that qualitative data are "a source of well-grounded, rich descriptions and explanations of processes in identifiable local contexts" which can offer a perspective on chronological flow, and insight into the consequences of events, which can yield "fruitful explanations". They also argue that "good qualitative data are more likely to lead to serendipitous findings and to new integrations; they help researchers to get beyond initial conceptions and to generate or revise conceptual frameworks" (Miles & Huberman, 1994:1). Grounded theory as an approach is therefore aimed at supporting theory development, as the first phase of grounded theory research is empirical observation (Locke, 2002). This is followed by a definition of concepts, where the "set of research procedures that compose grounded theory are designed to help researchers make this move from empirical observation to composing theoretical categories and identifying the ways in which they relate to each other" (Locke, 2002:22).

Two forms of theory are developed by grounded theory applications; substantive theory and formal theory (Glaser & Strauss, 1967). They are termed 'middle range' types of theory because of their placement between minor hypotheses and grand theories. Substantive theory, for Glaser and Strauss (1967), is theory that relates to an empirical or substantive area of research, and formal theory relates to a conceptual or formal area of research. The application of grounded theory is premised on comparative analysis (Glaser & Strauss, 1967). Comparative analysis, for Glaser and Strauss (1967) is a general method which can be used for comparisons between social units of any size. If data are found that do not conform to a theory, then such new data might simply represent another theoretical property or category (*ibid*.). According to Locke (2002:24), "anything that might shed light on the phenomenon being studied is appropriate as data can be analysed in the same way as interview transcripts

or field notes developed from observations". Perceived patterns in the data are assigned places within conceptual categories, or codes, and a highly iterative and recursive process of redefining and renaming categories occurs (Locke, 2002). Texts, for example, are fractured into "discrete data fragments" and meaning is assigned to them (Locke, 2002:26).

In the intermediate phase of grounded theory, the focus shifts from the categorisation of units to the placement of the conceptual categories in terms of accounting "for both similarity and variation in the indicating data incidents" so that they make up a wider theoretical framework, as all the elements associated with a certain theoretical category are grouped (Locke, 2002). The set of in-process categories now provide a basis for further data collection that can inform the more complete understanding of a developing theoretical framework (Locke, 2002).

Multiple hypotheses are developed simultaneously, and the accumulating interrelationships based on these emergent categories and their properties will begin to form a central theoretical framework which is the "core of the emerging theory" (Glaser & Strauss, 1967:40). The propositions derived from the qualitative analysis are testable. At the level of the larger theoretical framework, a 'story' has emerged from the data, and analytic activity becomes oriented toward ensuring that the "core conceptual categories, their constituent sub-categories, and their relationships are adequately specified and developed": the selective coding phase of the process (Locke, 2002:38). When the researcher collects, codes, and analyses the data all at the same time, theoretical sampling can be used to make choices as to what data is to be further collected (Glaser & Strauss, 1967). The partial framework of 'local' concepts that is used at the start of the exercise has developed into theory that then begins to guide the research (*ibid*.). The emerging theory therefore begins to guide the process (*ibid*.). At this stage, relationships between the developed theoretical framework and other theory are typically drawn out, and the extent to which the developed theoretical framework "confirms, challenges, or extends existing ways of conceptualising the phenomena of interest" is established (Locke, 2002:38). The final stage of the category development process typically entails the presumption that core conceptual categories have been attained, and that a theoretical framework expresses these core conceptual categories (Locke, 2002). At this point, a theory 'of something' has emerged at the level of the individual conceptual categories, and further data do not add value though providing any more information about the "category, its dimensions, or its relationships" (Locke, 2002). This is the point of

theoretical saturation (Locke, 2002). The attainment of theoretical saturation is therefore a function of the "empirical limits of the data, the integration and density of the theory, and the analyst's theoretical sensitivity" (Glaser & Strauss, 1967:62). Maximising differences between groups is key to this process of achieving saturation (*ibid*.). The successfully developed theoretical framework contributed by grounded theory is never entirely complete, but is robust enough to "have something substantive to say about the research topic", rather than necessarily being a "completed formal theory", according to Locke (2002:39).

The following advantages exist for the application of a grounded analysis to a research process: (i) it is well suited to the complexity of human activity in terms of its analysis of context, actions of certain people, and processes; (ii) it is well suited to investigating practice in the real world context; (iii) it allows for the investigation of new phenomena as they manifest themselves in an organisational context using naturalistic data; (iv) new perspectives can be brought to 'mature' areas of investigation; and (v) grounded theory is well suited to the development of process-oriented theory, and can offer an insight into how and why phenomena occur (Locke, 2002:40).

Pitfalls, however, associated with qualitative research include: (i) the labour-intensiveness of the exercise; (ii) the possibility of researcher bias; (iii) the time demands associated with coding and processing data; (iv) sample adequacy challenges associated with small sample sizes (v) the problem of generalisability of findings; (vi) the quality and credibility of conclusions, and (vii) the degree of utility these findings might have for policy and action implications (Miles & Huberman, 1994). The use of a quantitative research process to test the theory developed qualitatively was taken to address certain of these limitations. In terms of the pitfalls of qualitative research analysis, certain principles can be applied to enhance the trustworthiness of the research process (Guba, 1981).

3.5.1 Verification of the qualitative process

The following are criteria that qualitative research needs to meet in order to be trustworthy, or in order for others to have confidence in the findings (Guba, 1981:79):

1. *Truth value. [Internal Validity] How can one establish confidence in the "truth" of the findings of a particular inquiry for the subjects (respondents) with which and the context in which the enquiry was carried out?* Truth value was addressed in this

research through the maintenance of tight linkages between the qualitative data and the analysis of this data. The delimitation of the scope of the qualitative research to include just relationships between objective phenomena ensured that such internal validity was more easily achieved.

2. *Applicability. [External Validity/Generalisability] How can one determine the degree to which the findings of a particular inquiry may have applicability in other contexts or with other subjects (respondents)?* Applicability was enhanced through the sampling process of the qualitative research, as respondents from as many different diverse fields and from a range of different institutions were included. Although the qualitative research component was based on sixteen cases, the need for external validity necessitated a purposive modified maximum heterogeneity sampling process, where respondents were chosen from diverse academic fields and across five different institutions. The common themes found to underlie relationships around research productivity across these different fields and institutions are taken to reflect salient relationships in this context.
3. *Consistency. [Reliability] How can one determine whether the findings of an inquiry would be consistently repeated if the inquiry were replicated with the same (or similar) subjects (respondents) in the same (or similar) context?* Consistency was strengthened through the use of respondents from different fields and from different institutions in the qualitative analysis, which allowed relationships to emerge that were consistent across such diversity. The processes of the enquiry were found to return responses that were consistent in some respects across contexts. External influences that might interfere with consistency were kept to a minimum. The analysis methods were also applied in a consistent manner.
4. *Neutrality. [Objectivity] How can one establish the degree to which the findings of an inquiry are a function solely of subjects (respondents) and conditions of the inquiry and not of the biases, motivations, interests, perspectives, and so on of the inquirer?* In order to support neutrality, a grounded qualitative approach was taken, so as to ensure that the relationships amongst phenomena that were most important for each respondent emerged from the data, without the imposition of any prior theoretical framework (Glaser & Strauss, 1967). As such, the causal structure of interrelationships between factors, according to responses, was objectively derived.

These criteria relate to the 'rationalistic paradigm'. Truth value, or internal validity, was ensured through the demonstration of isomorphism between the data and the phenomena

associated with research productivity, as alternative explanations were excluded as the data were analysed (Guba, 1981). An assumption of rationalism is that an underlying reality does exist and that such findings will converge on a "single reality" (Guba, 1981: 79). Applicability, or generalizability, was a goal of the theory development process, as the theory developed was related to differences in time and context that might influence the operation of such theory (Guba, 1981). The boundary conditions of such theoretical conceptions developed were, therefore, made explicit. Consistency was maintained by tracking the processes undertaken, as data records were maintained and all processes were recorded. Objectivity was maintained through the relation of data to other data in a systematic process, and through ensuring that each step in the analysis was warranted (Guba, 1981). Memos were used in order to note feelings or subjective interpretations on the part of the researcher. Subjective interpretations were identified and acknowledged. Other paradigms that are not premised on the assumption of an objective reality have other terms that correspond to these four criteria; Credibility, which corresponds with Truth Value; Transferability, which corresponds with Applicability; Dependability, which corresponds with Neutrality; and Confirmability, which corresponds with Neutrality (Guba, 1981). More specific aspects of the qualitative analysis process are discussed as follows.

3.6 THE QUALITATIVE ANALYSIS PROCESS

A process of coding was used. This process is now described. After this, the qualitative sampling process is discussed.

3.6.1 Coding and Analysis

An attempt was made to derive codes from the data that were at the level of more general relationships, or etic level relationships, and also at the level of relationships that were more specific to the respondents, or emic level relationships (Miles & Huberman, 1994). The coding list was amended, and adjusted iteratively in an inductive manner as the analysis progressed (Miles & Huberman, 1994). The codes were developed into themes. The lists of final codes used in the process are reported in table form in tables D, E, F and G of the Appendix. These tables include Table D: Research Productivity Qualitative Codes: Organisational Culture Codes; Table E: Research Productivity Qualitative Codes: Values Codes; Table F: Research Productivity Qualitative Codes: Individual-level Codes; Table G: Research Productivity Qualitative Codes: Individual-level Codes (continued). Codes at the

level of themes were retained for analysis. The first column of the lists of codes indicates the general code of the category, and the second column indicates the general aspect or descriptive name of the category. The third column indicates the code that relates to the general category. Column four indicates the proposition that the code relates to. Although the analysis developed its own structure, based on the grounded process, the scope of this research was delimited to the relationships around research productivity; *only the themes relevant to the research questions were reported and discussed in this research*. Thematic content analysis was the final form of analysis adopted for the reporting and discussion of the results. Only the most relevant themes were included.

The data was coded using descriptive codes and inferential codes at different levels of analysis, in a process that resulted in the re-coding of descriptive items as inferential items, where appropriate, during the analysis (Miles & Huberman, 1994). The final set of codes represents inferential codes in the form of themes. Pattern coding was used as an inferential technique in order to (i) reduce the data into core analytic units; (ii) facilitate the development of a cognitive map or "more integrative schema for understanding local incidents and interactions"; and (iii) for "surfacing common themes and directional processes" (Miles & Huberman, 1994: 69). The pattern coding process formed the basis of the final analysis, as relationships were discussed in terms of patterns in the form of themes in the writing up phase. In this research, the relationships between the data were premised to be at the level of 'consequences' (Miles & Huberman, 1994) because the qualitative questions were formulated in a way to collect data about what the 'causes' of research productivity were, or what factors contributed to research productivity. As such, although a modified grounded approach was used, the scope of the analysis was delimited to this focus. Interestingly, relationships were found to emerge that went well beyond strictly delimited relationships around research productivity, yet for the purposes of this research, only the relationships relevant to constraints and enablement of research productivity were reported and analysed. Following Glaser's (1992) precedent, interview questions were used to probe and explore responses from respondents, in a flexible manner.

The unit of analysis used for the data analysis was the 'concept', in the form of a theme, whether articulated as a short phrase or as a group of sentences which illustrated the concept. Pattern coding formed the rationale for the allocation of data into families of data (Q

analysis), or families of themes, following the prescriptions of Miles and Huberman (1994). This process is analogous to the use of statistical clustering techniques and methods such as statistical factor analysis (Miles & Huberman, 1994). Overarching core categories, or overarching themes, such as the differentiation between teaching and research, and the differences between academic fields are examples of core component categories that were found to emerge from the analysis. Thoughts and analysis originally captured as memos were integrated and developed further into the analysis. The patterns of relationships that related to each of the overarching conceptual categories were analysed. These categories included organisational culture and its relationships with research productivity, individual values and their relationships with research productivity and biographical and contextual factors and their relationships with research productivity.

Relationships were analysed, and propositions were derived. These propositions formed the input into the quantitative research process. An example of a theoretical relationship derived from the analysis is the proposition that academics differ fundamentally according to the source of their intrinsic job satisfaction. Such propositions were included as hypotheses in the quantitative research process. According to Spradley's (1979) typology of Universal Semantic Relationships (USRs), this relationship was classified as a form of strict inclusion, as these were considered to be types of academics. When tested quantitatively as hypotheses, the testing of these theoretic propositions were found to offer important insights.

Using respondents across different universities and across different academic fields, an attempt was made to gain an exploratory and emergent understanding of whether the factors included in the quantitative analysis were indeed justified for inclusion. An aim of the qualitative analysis was to explore the relationships of organisational culture and individual motivational values with research productivity. Over and above this aim was to derive a model of factors for inclusion into the quantitative analysis, notwithstanding the fact that the analysis developed 'a life of its own' and relationships were found that went beyond the focus of research productivity. The analysis reported in the following chapter, however, is strictly delimited to the focus of the research: on the relationships relevant to research productivity. The qualitative sampling process is now discussed.

3.6.2 The qualitative sampling process

As already indicated, the sampling for the qualitative research process was based on a modified purposive maximum heterogeneity sampling process. Individual researchers identified as the leaders in their fields, internationally, were identified as respondents, although certain other researchers were also sampled. In this way, heterogeneity was ensured; both across levels of research achievement as well as across different academic fields. Sixteen respondent cases were sampled from five universities across different fields, with the University of the Witwatersrand strongly represented. According to precedent offered by qualitative analysis, statistical generalisability was not the goal of the qualitative process, and a sample size of sixteen was judged adequate for the purpose of obtaining 'thick descriptions' of the relationships around research productivity (Miles & Huberman, 1994).

Respondent cases from different academic fields were sampled, such as medical research across three universities (the University of the Witwatersrand, the University of Cape Town and the University of Johannesburg); chemical and metallurgical engineering (University of the Witwatersrand); literary studies (University of KwaZulu-Natal); industrial psychology (University of South Africa); aeronautical and mechanical engineering (University of the Witwatersrand); microeconomics (University of the Witwatersrand); macroeconomics (University of the Witwatersrand); philosophy (University of Johannesburg); finance (University of the Witwatersrand); business science (University of the Witwatersrand); law (University of the Witwatersrand); education (University of the Witwatersrand); sports science (University of Cape Town) and a case from a multidisciplinary research context (University of the Witwatersrand). Certain of the respondents were interviewed and their responses were recorded. In other cases, where it was not possible to physically interview respondents, these respondents were sent a qualitative questionnaire instrument electronically. Responses were transcribed. The full transcripts were included in the Appendix for the purposes of thesis examination. Thereafter, following ethical prescriptions, they were removed from the Appendix. The transcriptions were coded and analysed. The analysis is reported in the chapter that follows and also in Chapter Six. The qualitative analysis process is summarised further as follows.

3.6.3 Summary of the qualitative research process

The objective of the qualitative research was to (i) develop theory that was grounded in the context, and therefore not necessarily available in the literature, (ii) to provide a validation, or justification, for the choice of variables tested quantitatively and to (iii) provide a triangulated perspective of the results of the entire study (in relation to the empirical results) in order to support recommendations made for this context. As explained, the qualitative methodology is focused exclusively on an inductive process, and the analysis is reported in Chapter Four. Another qualitative analysis, which was framed by the GLOBE and Schwartz theoretical frameworks, is discussed in Chapter Six, in relation to the quantitative findings and with reference to the overarching themes discussed in Chapter Four. In Chapter Four, testable propositions were derived, and hypotheses were derived from these for testing in the quantitative portion of the study. In the discussion chapter, a holistic analysis of the relationships around research productivity is undertaken and recommendations are derived from the analysis. The quantitative research process is now explained and discussed.

3.7 THE QUANTITATIVE ANALYSIS

The quantitative analysis proceeded using the inputs developed as part of the qualitative research process. In the following sections, the processes applied in the quantitative portion of this research are discussed. The research design, scope of the study, population and sample, methodology and levels of analysis are introduced and discussed. A discussion of methodological precedent that relates to levels of analysis then follows. The discussion of different levels of analysis is considered relevant because this quantitative research is undertaken at two levels of analysis: the level of the academic school and at the level of the individual. After this, issues relating to the data collection process, the sampling process, the sample size calculation, the sampling protocol, the interview process, and reliability and validity are considered. The hypotheses are then introduced, and the scale measures and statistical methods used to test each are also discussed. The chapter concludes with a discussion of ethical issues and the limitations associated with the research.

3.7.1 The Research Design

This research employs a limited modified qualitative grounded process, based on the inductive principle offered by Glaser (1992) in order to develop theory and to validate or justify the inclusion of variables in a quantitative research process. Testable propositions are

derived from the qualitative analysis and are then tested as hypotheses. The quantitative research design follows an exploratory cross-sectional associative research design.

3.7.2 Scope of the study

The scope of the study is delimited according to its focus: on the relationships between research productivity and (i) cultural values; (ii) individual motivational values; and (iii) individual 'performance' factors. The scope of the research is also delimited in terms of its measures of research productivity. Research productivity measures included: (i) Department of Education accredited journal publications, (ii) Thompson Reuters ISI or Proquest IBSS accredited journal article publications; (iii) conference proceedings publications; (iv) conference presentations; (v) book chapter publications; (vi) books published and (vii) an aggregated measure comprising (i), (ii), (iv), (v) and (vi). This aggregated measure was used as an index of gross research productivity, or how active a researcher has been, irrespective of the quality of the work. The qualitative research was delimited to academic respondents that worked within the context of South Africa, and that were primarily top academics in their fields. The quantitative research sampled the University of the Witwatersrand.

3.7.3 Population and Sample

The population from which the qualitative research respondents were drawn consisted of researchers in the South African context mainly from the University of the Witwatersrand but also from the University of Cape Town, the University of Johannesburg, the University of KwaZulu-Natal, and the University of South Africa. The population from which the empirical sample was drawn included all lecturers who are responsible for teaching and research output that are employed by the University of the Witwatersrand, a large University in the South African higher education system. The sampling frame consisted of all full-time lecturers (of all ranks and designations) at the University. The sample was drawn from the ranks of respondents across all departments, schools and faculties.

The objective of the qualitative portion of the research was to develop theory that related to the influence of culture, values and individual performance factors on research productivity. However, the objective of the quantitative research process was delimited to the testing of the theoretical relationships, or propositions, developed using the qualitative process, and to the testing of GLOBE and Schwartz theory. The rationale for this approach was derived from

methodological precedent (House *et al*., 2004) that required differences in organisational culture across academic fields to be investigated within a uniform HRM and institutional domain. In this way, differences found between academic fields would not include the confounding influence of differences in institutional systems across institutions. As an exploratory investigation aimed at providing 'proof of concept' evidence of negative associations between values systems and research productivity across academic fields, this approach was taken to be appropriate. The focus of this research was the differences between academic units or academic fields at one level of analysis and differences between individuals at the individual level of analysis. A process of total population sampling was used, with the entire organisational population comprising the sampling frame. With a sampling frame of about 883 full-time and permanent academic staff and a total academic staff complement of about 1300 including part-time staff, the sample of this study, of 225 respondents, provided a response rate of about twenty-five percent of the population of full-time and permanent academic staff and a response rate of about seventeen percent against all staff, including part-time academic staff. Due to the relatively high level of refusals (which were unconditionally respected on ethical grounds), results are claimed at the level of confidence associated with convenience sampling. This is considered as a limitation in the section that relates to limitations of the study. However, in line with the aim of the research, (to incrementally reduce the problem space around the relationships around research productivity) and in line with methodological precedent in survey research, the process was considered acceptable. Due to the different levels of analysis applied in this research, an overview of methodological precedent that relates to different levels of analysis is provided as follows.

3.7.4 Methodology and levels of analysis

According to Schmitt and Drasgow (2002:4) "more sophisticated tools should never be used when a simple mean, standard deviation, frequency table, correlation, regression analysis, or plot of the data is sufficient to answer a research question". This research follows this perspective, and uses qualitative analysis in addition to quantitative analysis in order to provide a holistic analysis in order to answer the research questions. The investigation of quantitative relationships in culture research requires an explicit focus on levels of analysis. Such a focus has implications for methodological processes. This research, therefore, faithfully follows the requirements of such methodological processes, and precedent therefore

guides the processes of this research. The precedents offered by GLOBE theory and research programmes (House *et al*., 2004), which focus on the aggregated, or group level of analysis, and the precedents offered by Schwartz values theory (Schwartz, 2007), which is applied at the individual level of analysis, are therefore faithfully followed in this research.

3.7.5 The aggregate or group level of analysis

Hanges and Dickson (2004:124) propose that organisational culture and societal culture dimensions are convergent-emergent constructs. This means that the convergent dimension of the construct relates to the manner in which responses from people in societies and organisations are expected to centre around scaled means (Hanges & Dickson, 2004:124). This emergent dimension relates to the response, which is "a function of the cognition, affect, and personality of the survey respondents" at the aggregated or group level of analysis (Hanges & Dickson, 2004:124).

The "psychometric properties of the GLOBE scales should emerge at either the organisational or societal level of analysis" according to Hanges and Dickson (2004:124). Klein and Kozlowski (2000:211) argue that multilevel research is at its best "complex, rigorous, and able to capture much of the nested complexity of real organisational life", yet that the "shift from single-level to multilevel research may be daunting". Klein and Kozlowski (2000) argue that findings need to be generalised with care across levels, or a fallacy might be committed. Having reviewed literature that relates to levels of analysis, the data collection and analysis methods applied in this research are now discussed.

3.7.6 Data collection processes

The requirements of relevance and informed consent (Anastasi, 1990) were used to guide the design of the instrument. Consent forms were used, and the processes ensured that anonymity and confidentiality were guaranteed to respondents. Cover letters and consent forms were attached to the survey instrument. The qualitative questionnaire and the quantitative questionnaire are both included in the Appendix, in Sections 8.4 and 8.5, respectively. Following Glaser (1992), the qualitative instrument was used as a guide to the questions posed to respondents, and a flexible approach was used, as probing questions were used to obtain more insight from respondents. A sampling protocol was established that specified the requirements for cases to enter the sample.

3.7.7 Sampling process and sample size calculation

A process of determining the confidence interval was applied, using the size of the population with inputs such as the sample size (n=225), and the size of the population (using both part-time and full-time staff).

Using the formula $D=(Z1-\alpha/2)\sigma/\sqrt{n}$ (Laiho, Penttilä & Laine, 2004), the inferential statistical power of the research was tested. Reworking the equation to give the minimum sample size necessary to obtain a difference in the dependent variables, the following formula was derived $n= (((Z1- \alpha)/2)\sigma/D)(((Z1- \alpha)/2)\sigma/D)$.

Testing at the 5% level of significance implies that $\alpha/2=.05/2=.025$. Therefore Z1-.025=1.96. The population standard deviation was not known, and the standard deviation of the sample was used instead (21.91). If a difference in total journal articles of 1 was the minimum difference needed to be picked up by the testing at the five percent level of significance, then a sample size (n) of 8.197 respondents would be required. The sample size of 225 respondents was taken to be sufficient. This sample comprised (225/883=.2548); of about twenty-five percent of the sample of full-time academic staff and (225/1300=.173) of about seventeen percent of the population of full-time and part-time academic staff of the institution. When a sample size exceeds five percent of the size of the population, a correction using Cochran's (1977) correction formula is required (Bartlett, Kotrlik & Higgins, 2001): n (required sample size for samples of over five percent of the size of the population) = no(sample size)/(1+no/size of population)= 191.8 respondents. According to this correction formula, the minimum required number of respondents is therefore 192. Given that measures of journal articles are considered to be ratio data that is continuous, it was taken that that 225 is sufficiently greater than the minimum number of respondents required to pick up a difference of one journal article using the five percent level of significance, given the assumption that the population standard deviation is comparable to the sample standard deviation.

3.7.8 Confidence levels for statistical testing

The significance level of five percent, or $\alpha = 0.05$ was used as the point where the probability of making a Type I error, or rejecting a true null hypothesis was considered equal to the probability of making a Type II error or rejecting a false null hypothesis (Edwards, 1984).

3.7.9 Sampling protocol and interview processes

The sampling protocol stipulated the use of standardised processes (Anastasi, 1990), so that no extraneous variance was introduced into the process. Unusual conditions that had the potential to influence responses were to be documented (Anastasi, 1990). The instrument was piloted and the items were developed in such a way as to enhance clarity and simplicity. The principles of reliability and validity guided the data collection and data analysis processes. The piloting process was used to gather information about reliability and validity. Precedent was followed, and scales were used that had been found to be reliable and valid in other contexts. The sampling protocol dictated that these scales needed to be tested in piloting. Precedence from previous research was also strictly followed in order to ensure that the sampling process did not introduce extraneous variance. This research extends previous research into a new context and the processes were carefully considered in order to maintain the integrity of the research. Questions included in the instruments were phrased in a neutral fashion so as to avoid social desirability bias (Murphy & Davidshofer, 2005). Content, construct, face and criterion validity were ensured throughout the sampling and instrument design stages. Information relating to convergent and discriminant validity was noted at all stages of the process. As per precedent, confidence testing was performed using the five percent level of required significance. Respect for the wishes of individuals approached was an important aspect of the sampling protocol, and any indication of refusal was unconditionally respected. Certain of these aspects are now considered in more detail as follows.

3.7.10 Reliability

A fundamental requirement of a measure is its ability to produce scores that are consistent, or to "at least assign scores in a consistent fashion" (Murphy & Davidshofer, 2005: 79). Reliability is therefore the consistency of a measure "of a concept", and a reliable measure needs to display stability, internal reliability and inter-observer consistency (Bryman, 2004: 71). According to reliability theory, responses contain both true score values as well as random errors of measurement (Murphy & Davidshofer, 2005: 129). Error can also be systematic, and can arise from inconsistency in measurement (Murphy & Davidshofer, 2005). The sources of variability most relevant to a study should inform the use of tests of reliability (Cortina, 1993). Chronbach's Alpha tests were performed in order to measure the internal consistency of items, as these are the appropriate tests to use for variance "attributable to the

interaction between subjects and items" (Cortina, 1993: 98). The specific results of the reliability testing of the different questionnaire items are reported below in the sections that relate to each of the specific hypotheses tested. Validity is considered as follows.

3.7.11 Validity

Validity is the degree to which a measure "actually measures what it purports to measure" (Anastasi, 1990: 29; Bryman, 2004). To ensure validity, original scales were used in the case of the organisational culture items (House *et al.*, 2004); in the case of the individual values items (Schwartz, 1992); and in the case of other constructs tested at the individual level. In each case, piloting was carried out. The discussions of scale construction and the use of different scales are to be found under the headings below that relate to each hypothesis tested. In each case a careful consideration of validity formed the basis of all actions taken. Validity cannot be reported in quantified terms (Anastasi, 1990: 139), yet measures were taken to ensure the validity of research at all stages of the process.

Content validity reflects the degree to which an item covers the behaviour domain sufficiently (Murphy & Davidshofer, 2005). Content validity was achieved though ensuring that the items of the questions correctly sampled what was meant to be sampled. Construct validity relates to the extent to which items successfully sample the theoretical domain from which a construct is derived (Murphy & Davidshof, 2005).

Construct validity was ensured through the careful comparison of questionnaire items with the theoretical constructs from which they were derived. Constructs that had had their validity already assessed in other contexts were prioritised for use in this context. Factor analysis was used in order to ascertain whether constructs conformed to the predictions of discriminant and convergent validity (Campbell & Fiske, 1958). In this way construct validity was ensured. Validation can be convergent (Campbell & Fiske, 1959), where confirmation is achieved by independent measurement techniques, and discriminant, where a factor differs from another as intended. According to Campbell and Fiske (1958), reliability and validity can be conceptualised as being located on a continuum, where reliability is the testing of the same factor in two different ways using maximally similar methods, and validity refers to the measurement of the same factor through maximally different methods. Correlations between variables were inspected for indications of support for convergent and discriminant validity.

In order to increase the validity of the research process, two fundamentally different methods in the form of a limited grounded qualitative analysis and statistical empirical analysis were incorporated into the design of the research.

Face validity relates to the extent to which a measure or a test appears superficially to measure what it is supposed to measure (Anastasi, 1990: 145). However, this type of validity needs to extend not just to the perceptions of respondents but also to others involved in the research process (Bryman, 2004). In this research, cover letters and consent forms were used and the processes were carried out in a consistent and professional manner. This supported perceptions of face validity of the research.

Criterion validity relates to the extent to which a measure can predict an individual's performance on an activity (Anastasi, 1990). Concurrent and predictive validity relate to the extent to which a measure effectively predicts the performance of individuals at a point in time, and at a later stage, respectively (Anastasi, 1990). This research sought to test the relationships between measures in order to test theory that related to individual performance.

Criterion contamination can occur when measurement feedback might influence respondent's responses (Anastasi, 1990). Feedback from researcher to respondent was minimised through the use of scripted and standardised responses and procedures in the quantitative research process. Having discussed reliability and validity as criteria requirements for this research, the hypotheses are each now introduced and discussed in relation to: (i) the statistical methods used to test each; (ii) the variables included for testing; and (iii) the scale development and construction process associated with each variable.

3.8 HYPOTHESES, METHODS, VARIABLES AND TESTS

The scales used in this research were carefully developed, with most of the constructs derived from previous research. Anonymity and confidentiality were stressed so as to ensure lower levels of bias from respondents. In the case of the measurement of items, continuous items were, as much as possible, designed to meet the requirements of ratio data, or where necessary, interval data (Stevens, 1946). Items were, however, used to sample data in each of the different forms: nominal, ordinal, interval and ratio data, where each form was appropriate (Stevens, 1946). Each form of data was identified and the assumptions of each

were checked. In the following sections, each hypotheses tested in this research is introduced and discussed in relation to the variables tested, the measures or scales of these variables, and the methods and statistical tests used. These sections are structured around the different hypotheses for the purposes of clarity and to provide a coherent structure which corresponds to the structure of the reporting of the results in Chapter 5. First, the measures of the dependent variable are discussed and the methods applied to test hypotheses relating to GLOBE values at the aggregated level of analysis are introduced. Second, the methods applied to test hypotheses relating to Schwartz values at the individual level are considered. Third, the methods applied to test hypotheses relating to biographical and contextual factors at the individual level of analysis are discussed. The measures and methods related to the testing of the dependent variables are introduced as follows.

3.8.1 Measures of the dependent variable: Research Productivity

Measures of research productivity have differed according to past research. According to Rachal *et al*. (2008) it is precedent to use journal publication productivity as a measure of a University's programme quality, influence and prestige. Further, Rachal *et al.* (2008:51) argue that the measurement of books, presentations, and grants are useful in measuring research productivity, but that "the esteemed place of the refereed academic journal is perhaps the *sine qua non* of scholarship, representing a discipline's most current thought, its newest findings, and critique of its established paradigms". Rachal *et al*. (2008) stress, however, that journal publication productivity studies, despite being "a very useful barometer of a programme's research excellence", need to be critically regarded in that they do fundamentally ignore books and excluded journals. In terms of quality, however, according to Rachal *et al*. (2008), journal articles can capture quality of research productivity in that peer research processes are used to determine acceptance and publication of journal articles, particularly in premier journals. In order to capture certain of the variance associated with such premier journals, the South African Department of Education accredited journals were differentiated between (i) those that were accredited according to Thomson Reuters's lists of accredited journals, formally termed ISI journal accreditation, and journals accredited by ProQuest's IBSS; and (ii) those that are South African Department of Education accredited journal articles that are not ISI or IBSS accredited. The former category of journal article publications are termed 'international' journal publications in this research and the latter are termed 'local', or DOE, journal article publication. Furthermore, in this research, for the

purposes of clarity and in order to avoid confusion, the Thompson Reuter's accredited journal articles are referred to as ISI accredited journals and the ProQuest accredited journal articles are referred to as IBSS accredited journals.

The success of research institutions is increasingly being measured by research productivity, and therefore "an individual faculty member's compensation, promotion and tenure, prestige, and marketability are very much related to his or her research productivity" (Chen, Gupta & Hoshower, 2006:179). Chen *et al*. (2006) measured research productivity by books published, book chapters or cases published, refereed journal articles, and monetary grants, and found research motivation to be correlated with journal articles ($p<0.05$) published in total and also over the past two years. However, Chen *et al*. (2006) did not find a correlation between research motivation and books published, chapters in books published, or monetary grants at this level of significance. These results indicate that research outputs are not necessarily homogenous. In this research they were not treated as such; seven different forms of research output were measured and tested. According to precedent in research productivity studies (Chen *et al*., 2006; Rachal *et al*., 2008), journal articles are considered a core component of research productivity yet the measurement of research productivity was also extended in this research to encompass (iii) conference presentations; (iv) the publication of conference proceedings; (v) the publication of books and (vi) the publication of book chapters as well as (vii) an aggregated measure, termed gross research productivity, that included journal articles, conference presentations and book chapters and was taken to represent a measure of research volume not primarily related to quality. The logic that underpinned this choice of measures derived from the assumption that different academics typically follow a progression of research productivity achievements that are associated with their stage of career. For example, beginning researchers might be expected to first attempt conference presentations followed by the publication of conference proceedings before then attempting local journal article publication and then international journal article publication. Similarly, less experienced researchers are expected to attempt book chapter publication before book publication. The specific items used to measure the seven core dimensions of research productivity are shown on the quantitative research instrument, which is included in Section 5 of the Appendix. These were asked as self-report items, in the form of ratio data (Stevens, 1946), which was considered to not suffer from scale coarseness and was appropriate for quantitative statistical testing.

These measures were tested for skewness and kurtosis, and on the basis of these tests a process of statistical testing was followed in order to address the potential non-normality of the underlying data. The final results of a range of statistical tests indicated that it was necessary to use bootstrapping. These processes are not discussed here, but are discussed and reported in Section 8.1 of the Appendix. The methods and measures associated with the testing of the GLOBE dimensions of organisational culture are introduced and discussed as follows.

3.8.2 Globe values: the aggregated level of analysis

In each of the following sections, which use each null-hypothesis or groups of subordinate null-hypotheses as headings, the methods and measures used to test each variable are explained. The statistical tests used to test each relationship, or hypothesis, are also outlined. The results of the tests of the assumptions of each statistical measure are reported in the following chapter. The hypotheses and the methods and measures associated with each are discussed as follows.

3.8.3 HYPOTHESIS A: THERE IS A SIGNIFICANT ASSOCIATION BETWEEN THE GLOBE DIMENSIONS OF ORGANISATIONAL CULTURE AND RESEARCH PRODUCTIVITY.

3.8.3.1 The GLOBE Organisational Culture Measures

The testing of the GLOBE measures faithfully followed the precedent offered by GLOBE research (House *et al*., 2004). The measures of the GLOBE items were taken from the original GLOBE items (Globe, 2006a; Globe 2006b). These items have previously been validated for use with professional-level respondents on a global basis and also in previous testing in the South African context. On the basis of the results of the piloting process, minor modifications were applied to the scales in order to ensure their reliability in this context. The specific GLOBE questionnaire items used are shown in Section 8.5 of the Appendix. Each GLOBE item was asked in a slightly different form three times, and the order was reversed in one or two of the items. Cronbach Alpha tests were performed on the items in order to measure their internal consistency or reliability. These measures were used to test organisational culture at the level of the academic School, which was meant to act as a proxy for the academic field. These scales took the form of seven-point Likert-type scales. In order

to understand the factor structure of these values in this context, a factor analysis was performed. The results of the factor analysis are included in Section 8.1.1 of the Appendix.

Based on the precedent offered by the GLOBE studies (House *et al*., 2004), respondent scores of each of the dimensions of organisational culture values were aggregated to the level of the academic School. For the testing of Null-hypothesis A. bootstrapped correlation Pearson tests of associations were applied; between each of the dimensions of GLOBE organisational culture with each of the seven measures of research productivity: (i) gross research productivity; (ii) locally (DOE) accredited but not ISI nor IBSS accredited published or accepted journal articles; (iii) ISI or IBSS accredited published or accepted journal articles; (iv) published (or accepted prior to publication) peer-reviewed conference proceedings; (v) presentations at peer-reviewed conferences; (vi) published books; and (vii) published book chapters. Following GLOBE precedent (House *et al*., 2004), bivariate measures were used to test the hypotheses relating to the GLOBE scales. On the basis of a process of bivariate testing, the GLOBE measures and the seven research productivity measures were tested for skewness and kurtosis. Bootstrapping was applied using SPSS software in order to mitigate the influence of skewness and non-normality in the data. Following the precedent of Aycan *et al*. (2000), an analysis of the potential influence of cultural values on individual outcomes was also conducted for further insight. This further analysis, of the associations between an individual's endowment of GLOBE organisational cultural values and individual research productivity, was also reported and discussed in order to provide a holistic insight into the results.

3.8.3.2 Reliability of GLOBE scales

The following Cronbach Alpha values were obtained for the GLOBE organisational culture dimensions tested in this context: .73 for Uncertainty Avoidance; .70 for Future orientation; .66 for In-Group Collectivism; .77 for Institutional Collectivism; .82 for Assertiveness; .83 for Power Distance; .80 for Performance orientation; .90 for Humane Orientation; and .78 for Gender Egalitarianism. Nunnally (1967: 226) suggests an absolute minimum internal consistency score of .5 for exploratory studies.

Each of the GLOBE dimensions were tested for zero-order Pearson correlation associations with each measure of research productivity and these tests were then all run again whilst

controlling for both measures of affectivity, as suggested by Podsakoff *et al*. (2003), in order to control for method bias. According to the GLOBE research precedent, the net associations were the focus of the results. The testing of the associations through the use of partial correlation analysis to control for Affect was reported in order to provide further researchers with complete information although this was not a feature of the GLOBE research precedent. All these tests applied bootstrapping with 1000 iterations. The use of bootstrapping was also considered necessary due to the relatively lower number of samples, as each academic school was the unit of analysis, and 13 Schools met the criteria for inclusion into the analysis. The minimum number of respondents required for a School to enter the analysis was six, which was taken to represent between ten and twenty percent of the population of each school. Schools with less than this number of respondents were not included in the analysis. Responses were included for analysis from academics in the following Schools (the number of responses from each School is shown in parentheses): the School of Accountancy (6); the School of Animal and Plant Sciences (7); the School of Architecture (10); the School of Arts (17); the School of Chemical and Metallurgical Engineering (8); the School of Education (11); the School of Geography (6); the School of Geosciences (7); the School of Human and Community Development (35); the School of Law (19); the School of Literature and Language Studies (14); the School of Social Sciences (22); and the School of Economic and Business Sciences (24). As indicated, bootstrapping of 1000 iterations was used in order to increase the accuracy of correlations based on the relatively low number of Schools included for analysis, and a corresponding analysis was performed with the full sample for the purposes of analysis.

3.9 SCHWARTZ VALUES: THE INDIVIDUAL LEVEL OF ANALYSIS

3.9.1 SCHWARTZ VALUES: SCALES AND MEASURES

The Schwartz values orientation items were used from Schwartz's modified Portrait Values Questionnaire (PVQ), which was used by the European Social Survey. This survey has also been used in over 70 countries in the world, with validity reflected in consistent results across these countries (Data Database, 2011). According to Schwartz (2007), although the Schwartz (1992) Value Survey (SVS) is widely used, the length of the scale has precluded its use in surveys such as the European Social Survey. Further, according to Schwartz (2007), people with less education have been found to have difficulty with the SVS, and suggests the use of the PVQ, which "is based on the same theory as the Schwartz scale and research with this

scale is relevant to the proposed method as well". Schwartz (2007:266) stresses that studies in over 65 countries support the theory and validity of the differentiation of values offered by Schwartz values theory. The advantages of the PVQ include its ability to "present respondents with a more concrete and less cognitively complex task than the earlier value survey", or SVS survey (Schwartz, 2007: 273). According to Schwartz (2007:273), this therefore "makes it suitable for use with all segments of the population including those with little or no formal schooling". Another strength of this instrument, according to Schwartz (2007:274), is that "respondents are asked to compare the portrait to themselves rather than themselves to the portrait", where verbal items present a portrait of an individual with certain values types. This is effective because asking respondents "to compare other to self directs attention only to the aspects of the other that are portrayed" and therefore "the similarity judgement is also likely to focus on these value-relevant aspects" according to Schwartz (2007: 274). The PVQ offers a superior method because if respondents are asked to compare "self to other" then attention would be focused on the self and therefore a larger number of self-characteristics might be brought to mind (Schwartz, 2007: 274). The PVQ was developed to use simplified language; the clarity of language was tested in the Ugandan, Canadian and Israeli contexts where 11 year olds were also found to be able to understand the items (Schwartz, 2007). The instrument is also suitable for different forms of administration, including as self-completion questionnaires, and respondents "to the PVQ report no difficulty in making judgements and rarely ask questions or comment on the significance of the research", treating the instrument "as a simple task" (Schwartz, 2007: 274). According to Schwartz (2007:274):

> One or another version of the PVQ has been completed in one of 21 languages by 31 samples from 18 nations. These include representative samples in eight nations-approximately 1000 each in the Czech Republic, France, Germany, Great Britain, Spain and Sweden, 5800 in Italy, and 3123 in South Africa (8 languages). Other samples include adults in Argentina, Germany, Israel, Poland, and Ukraine, adolescents in Germany, Indonesia, Israel, Peru, Russia and Uganda, university students in Chile, Germany, Hong Kong, Indonesia, Israel, Peru, Poland, South Africa, Ukraine and the United States, and handicapped native-American adults in the USA.

According to Schwartz (2007: 275), the PVQ instrument might be more appropriate for use in the South African context, although the SVS has also been used in this context. The PVQ has also been validated against the SVS, both in terms of convergent and discriminant validity (Schwartz, 2007). The scale items cover "different conceptual components" of each value and do not "measure a single concept redundantly" (Schwartz, 2007: 277). The implication of the design of the instrument *will typically be expected to produce low measures of reliability, yet*

this is not problematic because the structure of the values can be checked instead for validity (Schwartz, 2007). The use of Cronbach Alpha measures of reliability are therefore not appropriate for this instrument, and in this research the Circumplex structure of associations was, instead, used as a test of reliability, following Schwartz's (2007) prescriptions. According to Schwartz (2007: 277), the higher order values are a more appropriate structure to use for reliability tests, notwithstanding the relatively low reliabilities expected to be associated with Cronbach Alpha tests of the items. As predicted by Schwartz (2007), the Cronbach Alphas for each of the higher order values dimensions were found to be .57 for the Openness to Change values; .74 for the Self-Enhancement values; .73 for the Conservation values; and .53 for the Universalism values. These values were considered to be acceptable, following Schwartz (2007), because unlike other forms of scales, each scale item did not consist of just one conception. A factor analysis was performed in order to validate the circumplex theoretical structure of the values indicated by Schwartz (2007). The factor analysis was found to reasonably replicate this structure. The results of this factor analysis are reported in Section 8.1.2 of the Appendix. The results of the factor analysis were taken to support the validity of the circumplex structure of values in this context.

3.9.2 HYPOTHESIS B. THERE IS A SIGNIFICANT ASSOCIATION BETWEEN SCHWARTZ VALUES ORIENTATIONS AND RESEARCH PRODUCTIVITY.

Bootstrapped Pearson correlations were used to test associations between the ten Schwartz values orientations and each of the dimensions of research productivity. Following the method bias prescriptions of Podsakoff *et al*. (2003), partial correlation analysis was also used in order to control for the potential effects of both NA and PA. The significant zero-order correlations were interpreted and the influence of affectivity was noted for the purposes of identifying potential bias to the results.

3.10 THE ANALYSIS OF INDIVIDUAL RESEARCH PRODUCTIVITY: INDIVIDUAL PERFORMANCE FACTORS

Unlike in the case of the GLOBE and the Schwartz values dimensions, in this research the individual-level performance factors included for analysis were derived from a qualitative grounded analysis. These factors were then included in the literature review and were included in the quantitative analysis, where the associations of each factor with research

productivity were tested. The factors are each associated with a hypothesis number, preceded by the letter C, which differentiates this analysis from the other analyses (A representing the analysis at the level of the academic school and B representing the analysis of the Schwartz values orientations). The outputs of the qualitative research process were propositions, from which hypotheses were derived, which were, in turn, tested as null-hypotheses. These variables, which were justified for inclusion in the research on the basis of the qualitative analysis, were termed 'individual performance factors' due to their predicted relationships with research productivity, which was conceived of as a form of individual job performance. An exploratory factor analysis was performed, in order to understand how these variables could be classified. With a relatively large number of performance factors predicted (on the basis of the qualitative findings) to be related to research productivity, it was considered to be important to reduce these to underlying categories of related factors. Only continuous variables were included in the factor analysis; binary variables were not included. The anti-image correlation matrix diagonal values were all above .5. The Kaiser-Meyer-Olkin measure value was .748, which was above the required .5. The Bartlett test of sampling adequacy returned an approximate Chi-Squared value of 1300.3 with 171 degrees of freedom ($p<.0001$). A rotation using the Orthogonal Varimax process was applied. The sampling adequacy tests were considered to support the adequacy of the analysis. The communality values were checked in order to see how much variance in each variable was accounted for. Nineteen variables were included. This number was considered to meet the cut-off criterion for exploratory factor analysis; they exceeded the ratio of 1:5. The ratio of included variables to cases was 1:11.8 in the analysis. The component matrix for the exploratory factor analysis is shown in Table 2.

Table 2. Rotated Component Matrix

	Component					
	1	2	3	4	5	6
Job Satisfaction	-.136	**.765**	.067	-.009	.159	-.159
Satisfaction Teaching	-.025	-.040	**-.736**	-.006	-.215	-.031
Satisfaction Research	-.060	.254	**.720**	.033	-.080	.007
Self-Efficacy Research	.132	.256	**.517**	.215	**.430**	.116
Negative Affectivity	-.108	**-.742**	-.063	-.052	.098	-.071
Positive Affectivity	-.069	**.627**	.048	-.141	.332	.271
Locus of Control	.027	**.657**	.086	.025	-.168	-.037
Age	**.885**	.009	-.019	.100	-.060	.172
Full-time work experience	**.878**	.041	-.080	.106	-.025	.150
Years as a researcher	**.783**	-.060	.194	.271	.075	.047
Years working Institution	**.764**	-.026	.010	.210	.008	-.146
Years of Formal Education	.069	-.034	**.579**	-.008	-.084	-.058
Masters Supervised	.368	-.049	.026	**.728**	.032	.133
PhD supervised	.277	.067	.029	**.612**	.306	.192
Coauthored	**.491**	.034	.326	-.004	**.490**	-.117
Preference Quantitative	-.071	-.067	-.049	.005	**.798**	-.067
Dependent Children	.143	.050	-.128	-.040	-.047	**.824**
People reporting	.095	.003	.046	**.750**	-.127	-.127
Other countries lived in >1 year	-.026	-.080	**.419**	.305	-.043	**.562**

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

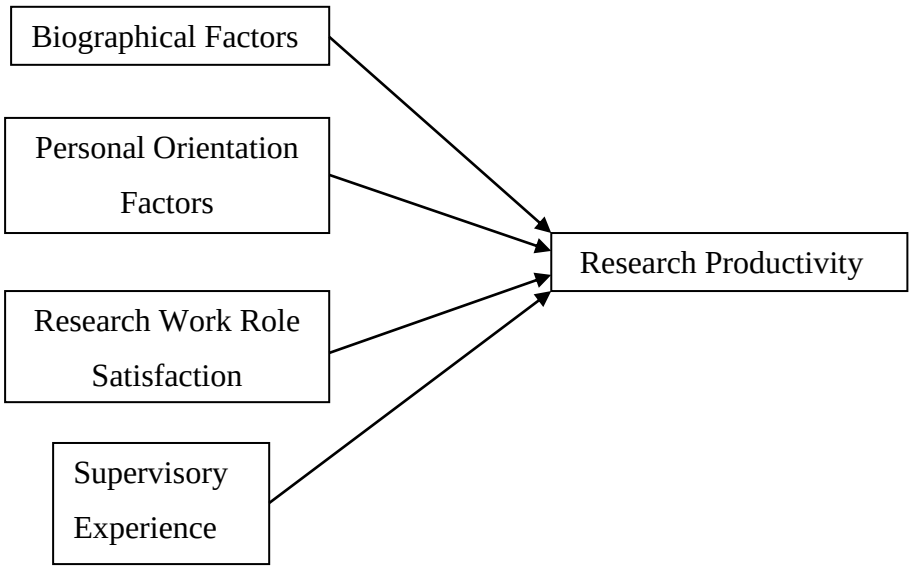
Rotation converged in 6 iterations.

Six components were found to have eigenvalues of over one. Of these, Component 1 was found to have an eigenvalue of 4.12, and to explain 21.68 percent of the variance. Component 2 was found to have an eigenvalue of 2.61 and to explain 13.75 percent of the variance. Component 3 was found to have an eigenvalue of 1.6, with about 8.59 percent of the variance explained. Component 4, with an eigenvalue of 1.3 was found to explain about 6.9 percent of the variance. Factor 5 had an eigenvalue of 1.14 and explained about 6.01 percent of the variance. Component 6 was found to have an eigenvalue of 1.1 and to explain 5.8 percent of the variance. Together, these factors explained 62.75 percent of the variance, both according to the extraction sums of squared loadings and also according to the rotation sums of squared loadings measures. These components were considered to be internally consistent, and to be reasonably well defined by the variables. Component 1 is dominated by loadings on age, full-time work experience, years as a researcher, years working for the institution and co-authored

papers. This factor seems to relate to a biographical component that includes human capital learning investments over time, or experience. This component is termed '*Biographical Factors* '. Component 2 reflected loadings on total job satisfaction, total PA and total internal locus of control, which all contrast with NA. This component is considered to relate to intrinsic psychological, or factors that are personal to the individual, and is termed '*Personal Orientation Factors'*. Component 3 is found to be dominated by a contrast between satisfaction with teaching and satisfaction with research together with research Self-Efficacy, years of formal education and other countries lived in. This component is termed '*Research Work Role Satisfaction*', because the variables that load on this factor are primarily related to the differentiation of work tasks between teaching and research. In the analysis of the associations of these factors with research productivity, years of formal education and countries lived in were tested together with the other biographical factors. This categorisation was used as a useful guide to the categorisation of variables, but the overarching rationale of the categorisation was the relationship of these variables with each other, and not with research productivity. Variables such as masters and PhD students supervised were found to load on Component 4 together with the variable that measured the number of people reporting to an individual. This component was taken to reflect supervisory experience, both in terms of higher degree supervision and in terms of management supervision, or position in the organisational hierarchy, and was termed '*Supervisory Experience'*. Component 5 was considered to represent a singlet, as the other two variables that loaded on this component were previously interpreted under a different component. Similarly, Component 6 was also considered to be a singlet and was not interpreted.

On the basis of this analysis, the performance factors were taken to form four overarching categories of factors: (i) Biographical Factors; (ii) Personal Orientation factors; (iii) Research Work Role Satisfaction; and (iv) Supervisory Experience. On the basis of this categorisation, Figure 3. shows a model of the these factors.

Figure 3. The four categories of individual performance factors differentiated by factor structure: the model.



The factor structure provided by this analysis was used as the basis of the analysis of the potential contribution of individual performance factors to research productivity. This framework was taken to offer an understanding of the differences in variance that dominate in this context; the underlying factor structure of the performance variables. As indicated, these categories of factors are termed 'performance factors', as they were found to emerge from the qualitative analysis as factors that, in this context, might contribute to research productivity, which is framed as a form of job performance. This framework was therefore applied as a general categorisation, and the following four core hypotheses were derived from this general structure:

- *Hypothesis C.A. Biographical Factors are significantly associated with research productivity.*
- *Hypothesis C.B. Personal Orientation Factors are significantly associated with research productivity*
- *Hypothesis C.C. Research Work Role Satisfaction is significantly associated with research productivity.*
- *Hypothesis C.D. Supervisory Experience is significantly associated with research productivity.*

Specific subordinate null-hypotheses were tested in order to allow for the testing of these core null-hypotheses. Table 3. shows the individual hypotheses and null-hypotheses associated with each of the four categories of factors. The tested hypotheses are introduced as follows, in relation to the scales and other information relating to their use.

Table 3. Core Category Hypotheses and subordinate hypotheses: Biographical Factors

Hypotheses: Component 1 Biographical Factors and Research Productivity
Hypothesis C.A. Biographical Factors are significantly associated with research productivity.
Null-hypothesis C. A. There is no significant association between Biographical Factors and research productivity.
Hypothesis C1: There is a significant association between experience and research productivity.
Null-hypothesis C1: There is no significant association between experience and research productivity.
Hypothesis C2: There is a significant association between exposure to the international context and research productivity
Null-hypothesis C2: There is no significant association between exposure to the international context and research productivity.
Hypothesis C3: Levels of formal education are significantly associated with differences in research productivity.
Null-hypothesis C3: Levels of formal education are not significantly associated with differences in research productivity.
Hypothesis C4: There is a significant association between collaboration and research productivity.
Null-hypothesis C4: There is no significant association between collaboration and research productivity.
Hypothesis C5: Preference for either quantitative or qualitative methods is significantly associated with higher levels of research productivity.
Null-hypothesis C5: Preference for either quantitative or qualitative methods is not significantly associated with higher levels of research productivity.
Hypothesis C6: There is a significant association between marriage and research productivity.
Null-hypothesis C6: There is no significant association between marriage and research productivity.
Hypothesis C7: There is a significant association between research productivity and number of dependent children.
Null-hypothesis C7: There is no significant association between research productivity and number of dependent children.
Hypothesis C8: There is a significant difference in research productivity by gender.
Null-hypothesis C8: There is no significant difference in research productivity by gender.

Table 4. Core Category Hypotheses and subordinate hypotheses: Personal Orientation Factors

Hypotheses: Component 2 Personal Orientation Factors and Research Productivity
Hypothesis C.B. Personal Orientation Factors are significantly associated with research productivity.
Null-hypothesis C.B. There is no significant association between Personal Orientation Factors and research productivity.
Hypothesis C9: There is a significant association between job satisfaction and research productivity.
Null-hypothesis C9: There is no significant association between job satisfaction and research productivity.
Hypothesis C10: There is a significant association between Self-Efficacy and research productivity.
Null-hypothesis C10: There is no significant association between Self-Efficacy and research productivity.
Hypothesis C11: There is a significant difference between Affectivity and research productivity.
Null-hypothesis C11: There is no significant difference between Affectivity and research productivity.
Hypothesis C12: Differences in Locus of Control are significantly associated with differences in research productivity.
Null-hypothesis C12: Differences in Locus of Control are not significantly associated with differences in research productivity.

Table 5. Core Category Hypotheses and subordinate hypotheses: Research Work Role Satisfaction

Hypotheses: Component 3 Research Work Role Satisfaction and Research Productivity
Hypothesis C.C. Research Work Role Satisfaction is significantly associated with research productivity.
Hypothesis C.C. There is no significant association between Research Work Role Satisfaction and research productivity.
Null-hypothesis C13: Differences in work-role specific satisfaction are not significantly associated with differences in research productivity.
Null-hypothesis C13: Differences in work-role specific satisfaction are not significantly associated with differences in research productivity.

Table 6. Core Category Hypotheses and subordinate hypotheses: Supervisory Experience and Research Productivity

Hypotheses: Component 4 Supervisory Experience and Research Productivity
Hypothesis C.D. Supervisory experience is significantly associated with research productivity.
Hypothesis C.D. There is no significant association between supervisory experience and research productivity.
Hypothesis C14: There is a significant association between Masters and Doctoral supervision and research productivity.
Null-hypothesis C14: There is no significant association between Masters and Doctoral supervision and research productivity.
Hypothesis C15: There is a significant difference in research productivity by university rank designation.
Null-hypothesis C15: There is no significant difference in research productivity by university rank designation.
Hypothesis C16: There is a significant association between span of control and research productivity.
Null-hypothesis C16: There is no significant association between span of control and research productivity.

3.10.1 HYPOTHESIS C.A. BIOGRAPHICAL FACTORS ARE SIGNIFICANTLY ASSOCIATED WITH RESEARCH PRODUCTIVITY.

Included in the category of biographical factors were factors predicted (on the basis of the qualitative analysis) to be associated with research productivity that were related to biographical differences between individuals. The dominant factor in this category, according to the factor analysis, was the influence of experience. Other demographic factors included in this category were age, exposure to the international context, level of formal education, number of collaborations with others on journal article publications, preference for quantitative versus qualitative research methods, marriage, dependent children and gender. Theory that relates to the mechanisms through which each of these biographical factors was predicted to influence research productivity is discussed in the literature review.

3.10.1.1 **Hypothesis C1. There is a significant association between experience and research productivity.**

In testing this hypothesis, in order to avoid singularity, the work experience and age measures (which were taken to represent compound variables, or variables that were a function of the other time-related variables), were not included in the multivariate analysis of the predictors of the seven dimensions of research productivity. The relationships between the different dimensions of time-related effects and research productivity were, instead, tested using partial correlation analysis. Due to the potential effects of multicollinearity associated with the inclusion of the five different 'time-related' variables within the same multivariate model, the following hypotheses that were derived from the above hypothesis were tested through the application of partial correlation analysis. The influences of other time-related aspects were 'partialled' out of the relationship between each of the following variables and each dimension of research productivity. The net statistical relationships that resulted from the testing of each of these processes are reported in Chapter 5, and discussed in Chapter 6. The five hypotheses derived from the above hypothesis and tested in this research are listed below as follows (the total work experience variable was included in the multiple linear regression model and the results of these tests were used to provide input into the testing of hypothesis C1.c.).

3.10.1.1.1 *Hypothesis C1.a. There is a significant association between age and research productivity.*

3.10.1.1.2 *Hypothesis C1.b. There is a significant association between years spent in South Africa and research productivity*

3.10.1.1.3 *Hypothesis C1.c. There is a significant association between years of full-time work experience and research productivity.*

3.10.1.1.4 ***Hypothesis C1.d. There is a significant association between years of experience as a researcher and research productivity.***

3.10.1.1.5 *Hypothesis C1.e. There is a significant association between years of experience within the institution and research productivity.*

3.10.1.2 Hypothesis C2: there is a significant association between exposure to the international context and research productivity.

In order to provide evidence to support the rejection or the acceptance of Null-hypothesis C2, five subordinate hypotheses were derived: Null-hypotheses C2.a., C2.b., C2.c., C2.d., and C2.e.

3.10.1.3 Hypothesis C2.a. There is a significant difference in research productivity by country of origin.

This hypothesis was tested using Pearson point biserial correlations (Field, 2009). The bootstrapped (1000 iterations) point biserial correlations for the associations between the national origin items and each of the research productivity measures were tested. This item was phrased as follows: 'What country were you born in?' Further bootstrapped t-tests were run in order to confirm the results of the point-biserial tests. Binary variables were created for South African, Zimbabwean and United Kingdom origin because these origins were found to dominate. An item was also included for U.S. origin due to the country's contribution as the location of many international journals. These items were scored one if a respondent reported being from a specific country and zero if not. The South African origin item was also included in the multiple linear regression analysis.

3.10.1.4 Hypothesis C2.b. There is a significant association between the number of countries an individual has lived in for more than a year and research productivity.

A measure was included that sampled the number of different countries an individual had lived in for a period of over a year. This item was phrased as follows: 'Besides your country of birth, how many countries have you lived in for longer than one year?' Pearson correlation tests of association were applied using bootstrapping of 1000 iterations. A further process of partial correlation analysis was applied, in order to ascertain if countries lived in were associated with each of the research productivity items when South African origin was controlled for. The measure for countries lived in for a period of over a year was also included in the multiple linear regression analysis testing.

3.10.1.5 Hypothesis C2.c. There is a significant difference in research productivity associated with differences in home languages.

The measure of home language was phrased as follows: 'What language/s was/were spoken in your home when you were a child?' Measures of English, Afrikaans and a category of other South African languages other than English or Afrikaans were each developed as binary variables. A further measure of home languages of countries on the African continent was also developed as a binary variable. Bootstrapped Pearson point-biserial tests of association were used to test associations between these variables and the research productivity variables.

3.10.1.6 Hypotheses C2.d. There is a significant difference in research productivity by experience in a multinational company.

This item was asked in the following form: 'Have you ever worked for a multinational corporation?' As a binary variable, differences in each of the six dimensions of research productivity by multinational experience were tested using bootstrapped parametric T-tests.

3.10.1.7 Hypothesis C2.e. There is a significant difference in research productivity associated with membership of professional associations or networks.

This item was phrased as follows; 'Do you belong to any professional associations or networks?' This null-hypothesis was also tested as a binary variable for Pearson point biserial

correlations with each of the measures of research productivity. This variable was also included in the multiple linear regression analysis.

3.10.1.8 Hypothesis C3: Levels of formal education are significantly associated with differences in research productivity.

This measure was phrased as follows: 'How many years of formal education do you have?' Pearson correlation tests of association were used to test the associations between this measure and the different measures of research productivity. Further tests using partial correlation analysis were also applied in order to control for the influence of years as a researcher. This further analysis was applied in order to ascertain if the influence of formal education on research productivity existed over and above the influence of years of education.

3.10.1.9 Hypothesis C4: There is a significant association between collaboration and research productivity.

The item used to measure co-authorship was phrased as follows: 'How many of your published Department of Education accredited Local or ISI/IBSS accredited journal articles (including those accepted for publication) have been co-authored with another researcher or other researchers?' This measure was expected to provide ratio data (Stevens, 1946). In order to test this hypothesis, the following measures were used. First, a measure of the ratio of co-authorship was used, of the number of co-authored journal articles divided by the number of total journal articles published. Pearson correlation analysis was used to test the association between this variable and the dimensions of research productivity. A scatterplot was run in order to plot the number of total co-authored journal articles against the total number of journal articles of the respondents. Second, a measure of total journal articles published in the form of co-authorships was also used. The associations between co-authorship and the dimensions of research productivity were tested using partial correlation analysis using Pearson correlation measures. The ratio of co-authorship was tested for associations with DOE and international journal article publication with the total number of co-authored journal articles controlled for using partial correlation analysis. This was done in order to offer insight into the associations between the ratio of co-authorship of an individual and journal article publication net of the influence of high or low journal article publication itself. Due to the potential presence of both a linear and an exponential, or non-linear pattern, in the

scatterplot, a regression model was tested with total journal article publication as the dependent variable and with total co-authored publications as well as total co-authored publications squared as the predictor variables.

3.10.2 Hypothesis C5: A preference for either quantitative or qualitative methods is significantly associated with higher levels of research productivity.

In order to test this hypothesis a measure was included that sampled the extent to which an individual exhibited a preference for either quantitative or qualitative methods. The item was phrased as follows: 'Do you (on average) prefer quantitative or qualitative methods in your research?' This was tested as a binary item, with quantitative methods indicated by one and qualitative methods indicated by zero in the data. Pearson point biserial tests of association were used to test the associations between this variable and the dimensions of research productivity. This measure was also included in the set of variables used in the multiple linear regression analysis.

3.10.2.1 Hypothesis C6. There is a significant association between marriage and research productivity.

The marriage variable was tested as a binary variable. The item was phrased in the following way: 'Are you married?' Pearson point biserial correlation tests of association were used to test associations between this item and the research productivity items. In order to test the influence of marriage on research productivity over and above the influence of certain other factors, partial correlation analysis was also applied. The influence of the variables used to measure the number of dependent children and age were also controlled for in these tests, using partial correlation analysis.

3.10.2.2 Hypothesis C7. There is a significant association between research productivity and number of dependent children.

A measure of the number of dependent children was used in order to test this hypothesis. The measure was expected to provide ratio data that met the requirements of equality, transitivity additivity and having a zero point (Cascio & Aguinis, 2011). Nevertheless, the item was expected to be negatively skewed. Bootstrapping was applied to all of the tests of this item, as well as to all the tests of association carried out in the study. The item was phrased as follows: 'How many dependent children do you support in your family?' The measure was

intended to primarily measure time commitments and so dependent children were the focus of the item. Pearson tests of association were used to test the relationships between this item and the dimensions of research productivity. Partial correlation analysis was also used to test the associations between dependent children and research productivity with age controlled. This measure was also included in the multiple linear regression analysis.

3.10.2.3 Hypothesis C8. There is a significant difference in research productivity by gender.

The gender measure consisted of an item that gave a response option of either male or female. This data was captured as binary data, with male responses scored as one and female responses scored as zero. This item was phrased as follows: 'What is your gender? (please tick)' with an option given for Male and Female. T-tests were used to test the significance of differences between the means of the research productivity items by gender. Bootstrapping was applied to the process. The Levene's test for equality of variances was used to test for equal variances. In the case of significant Levene's test scores, equal variance was not assumed. The gender binary variable was also included in the multiple linear regression models tested in order to provide further insight into the contribution of gender to research productivity with other variables included as covariates.

3.10.3 HYPOTHESIS C.B. PERSONAL ORIENTATION FACTORS ARE SIGNIFICANTLY ASSOCIATED WITH RESEARCH PRODUCTIVITY.

3.10.3.1 Hypothesis C9. There is a significant association between Job Satisfaction and research productivity.

Job satisfaction was measured using seven-point Likert-type scales, derived from the Minnesota Satisfaction Questionnaire scales (Arvey, Bouchard, Segal & Abraham, 1989; Muchinsky, 1983). Three items were used to measure job satisfaction. The items were reversed each time. The Cronbach Alpha obtained for these items was .859. To test this hypothesis, bivariate and multivariate analyses were applied to the data. The bivariate tests were included in order to ascertain the net associations between job satisfaction and each of the seven dimensions of research productivity. The multivariate tests were included in order to test if job satisfaction was associated with all or any of the dimensions of research productivity when covariate variables were controlled for within the model. Typically, the minimum requirement for the amount of predictors used in a multiple linear regression

analysis is ten to fifteen cases of data, or data points, for each predictor in the model (Field, 2005). Firstly, for testing the overall fit of the model by testing the r squared value, Green's (1991) minimum criteria was used, following a more rigorous precedent suggested by Field (2005): 50 + 8*k*, where k represents the number of predictors. Fifteen independent variables were included in the models, their inclusion justified in terms of the literature. The minimum number of data points required on the basis of these criteria was 50 + 8(15) =170. The sample was considered to meet this requirement. According to Green's (1991) minimum criteria for the testing of the individual predictors of 104 + k, the value for the MLR regression models according to this measure was 104 + 32 = 136. The sample was deemed to also meet this requirement for MLR analysis across the entire sample. The steps taken in the multivariate analysis (including the tests of the assumptions of the models) are outlined in Section 8.1.3 of the Appendix. In order to avoid redundancy these steps are not also outlined here.

3.10.3.2 Hypothesis C10. There is a significant association between Self-Efficacy and research productivity.

The Self-Efficacy items were derived from the scales developed by Bandura (2006). These items were designed to reflect perceived capability, using the word 'can' rather than 'will', following Bandura's (2006:308) prescriptions. Bandura (2006:309) differentiates locus of control from self-efficacy, where locus of control "is concerned, not with perceived capability, but with belief about outcome contingencies- whether outcomes are determined by one's own actions or by forces outside one's control" and that high locus of control "does not necessarily signify a sense of enablement and well-being" (Bandura, 2006:309). According to Bandura (2006:309), Self-efficacy beliefs, however, influence both "whether people think erratically or strategically, optimistically or pessimistically" and also:

> influence the course of action people choose to pursue, the challenges and goals they set form themselves and their commitment to them, how much they put forth in given endeavours, the outcomes they expect their endeavours to produce, how long they persevere in the face of obstacles, their resilience to adversity, the quality of their emotional life and how much stress and depression they experience in coping with taxing environmental demands, and the life choices they make and the accomplishments they realise.

The scales were developed according to Bandura's (2006) guidelines in order to capture the theoretical domain relevant to research-related self-efficacy in this context. Graduations of challenge were incorporated into the scale design. The adapted items were developed to specifically relate to each of the self-efficacy dimensions: internationally accredited journal article publication, DOE journal article publication self-efficacy, conference proceedings

publication self-efficacy, conference presentation self-efficacy, postgraduate teaching self-efficacy, statistical analysis self-efficacy and qualitative analysis self-efficacy. The items were piloted before use in the final instrument. Across the sample, the Chronbach's Alpha value for all of the seven self-efficacy items was .783. The items used are shown in the questionnaire, which is included in Section 8.5 of the Appendix.

3.10.3.3 Hypothesis C11. There is a significant difference between Affectivity and research productivity.

The scales used in this research to measure NA and PA were derived from Watson *et al.*'s (1988) affect scales. Watson *et al*. (1988) developed two ten-item mood scales, the Positive and Negative Affect Schedule (PANAS), which have, in previous research, been found to have high internal consistency, to be largely uncorrelated, and to be relatively stable over two month time periods. These factors have emerged from rotated factor analysis as orthogonal dimensions of affect (Watson & Tellegen, 1985). Positive Affect (PA) "reflects the extent to which a person feels enthusiastic, active and alert," and high PA "is a state of high energy, full concentration, and pleasurable engagement, whereas low PA is characterised by sadness and lethargy" (Watson *et al*., 1988:1063). Negative Affect (NA) is a "general dimension of subjective distress and unpleasurable engagement that subsumes a variety of aversive mood states, including anger, contempt, disgust, guilt, fear and nervousness, with low NA being a state of calmness and serenity" (Watson *et al*., 1988:1063). These mood states are related to trait PA and NA which correspond broadly to the "dominant personality factors of extraversion and anxiety/neuroticism, respectively" (Watson *et al*., 1988:1063). The PANAS scales were developed from the testing of up to 67 mood items, and items were developed that did not have a loading greater than .25 or less than .25 in secondary loadings (Watson *et al*., 1988). The correlations between the PA and the NA scales have been found to not be affected by rated time frames, or different temporal instructions (Watson *et al*., 1988). Test-retest reliability of the PANAS scales has been established, and the "stability coefficients of the general ratings are high enough to suggest that they may in fact be used as trait measures of affect" (Watson *et al*., 1988:1065).

The general measure of the PANAS scales is used in this research. In testing with adult employees the alpha reliabilities of the two scales were .86 and .87 for the PA and the NA scales, respectively, with a correlation between these scales of only -.09 (Watson *et al*.,

1988). Median varimax loadings for the PANAS factors have reflected values of above .50 on the appropriate factors whilst loading with reasonably low loadings on the secondary factors (Watson *et al*., 1988). Watson *et al*. (1988:1067) stress that "the PANAS scales provide reliable, precise, and largely independent measures of Positive Affect and Negative Affect, regardless of the subject population studied or the time frame and response format used".

In daily applications of the PANAS scales with 80 respondents over a 5 to 7 week period based on the 'today' temporal instruction, levels of perceived stress were found to be associated with higher levels of NA, and social activity has been found to be associated with higher levels of PA than NA (Watson *et al*., 1988). In applications based on three hour time increments using 123 respondents and the 'at the moment' temporal instruction, a similar relationship between perceived stress and intra-individual variance in levels of NA yet not PA were found, and social interaction was found to be more strongly associated with PA than with NA. A time of day effect was also found, as PA was found to typically rise during the morning then remain steady for the rest of the day before declining during the evening (Watson *et al*., 1988). The NA scales, however, were not associated with such a diurnal effect (Watson *et al*., 1988). Therefore according to Watson *et al*. (1988:1069) "when used with short-term instructions (e.g., *right now* or *today*), they [the PANAS scales] are sensitive to fluctuations in mood, whereas they exhibit trait-like stability when longer-term instructions are used (e.g., *past year or general*.)" The term 'generally' was therefore used in this study, as per these prescriptions based on precedent. This hypothesis was tested through the use of Pearson's correlation and point biserial correlation tests using bootstrapping with 1000 iterations. Following the prescriptions of Podsakoff *et al*. (2003), the influence of Negative and Positive Affect were controlled for in all the tests of associations between organisational culture and the values items in order to control this dimension of potential method bias. The influence of Affect on each of the dimensions of research productivity was also tested using multiple linear regression analysis. The scales were piloted before use. For the entire sample, the Chronbach's Alpha value for the ten NA items was .873 and the value for the ten PA items was .707.

3.10.3.4 Hypothesis C12: Differences in Locus of Control are significantly associated with differences in research productivity.

This research utilised the sixteen measure work locus of control scales developed by Spektor (1988). The scale had demonstrated Validity and reliability in different contexts (Spektor,

1988), and had been found to correlate with a range of factors which supported criterion-related validity. The scale has been used extensively in locus of control studies across the globe (see Botha & Pienaar, 2006; Chen, Goddard & Casper, 2004; Guic, Mora, Rey & Robles, 2006; O'Brien & Allen, 2008; Oliver, Jose & Brough, 2006; Owen, 2006). The items of this scale are in the form of Likert-type scales that give respondents a statement and responses that include 'Disagree very much'; 'Disagree moderately'; 'Disagree slightly'; 'Agree slightly'; 'Agree moderately'; and 'Agree very much'. Certain of the items were reversed. The scale is shown as item 22 in the quantitative questionnaire attached in Section 8.5 of the Appendix. The items were piloted before use. The Cronbach's Alpha value for these sixteen variables was .738 for the sample. This value was deemed acceptable.

3.10.4 HYPOTHESIS C.C. THERE IS A SIGNIFICANT ASSOCIATION BETWEEN RESEARCH WORK ROLE SATISFACTION AND RESEARCH PRODUCTIVITY.

3.10.4.1 Hypothesis C13: Differences in work-role specific satisfaction are significantly associated with differences in research productivity.

Two subordinate null-hypotheses were derived from this null-hypothesis for testing: (i) hypothesis C13.a. which relates to satisfaction with research and (ii) hypothesis C13.b. which relates to satisfaction with teaching.

3.10.4.2 Hypothesis C13.a: Satisfaction with research is not significantly associated with research productivity and hypothesis C13.b: Satisfaction with teaching is not significantly associated with research productivity.

Satisfaction with research versus teaching was measured by three items. An example of one of the items is as follows: 'On the whole I refer teaching to doing research'. Cronbach Alpha scores for these items were found to be .886. The reliability of this item was therefore taken to be acceptable. Another two items were included, which were phrased as follows: 'Most of my satisfaction in my job comes from the teaching work I do', and 'Most of my satisfaction in my job comes from the research work I do'. These two items were tested for associations with the preference for teaching versus research item in order to further establish the reliability of these items. The satisfaction with research item correlated positively and significantly with this item (.570;$p<.0001$) and the satisfaction with teaching item correlated

negatively and significantly with this item (-.754;p<.0001) according to bootstrapped tests of Pearson associations with 1000 iterations.

3.10.5 HYPOTHESIS C.D. THERE IS A SIGNIFICANT ASSOCIATION BETWEEN SUPERVISORY EXPERIENCE AND RESEARCH PRODUCTIVITY.

3.10.5.1 Hypothesis C14. There is a significant association between Masters and doctoral supervision and research productivity.

The two items used to test this hypothesis were phrased as follows: (i) 'How many (completed) Masters students have you supervised?' and (ii) 'How many (completed) PhD students have you supervised?' These measures were expected to yield ratio data. In order to improve the underlying normality of the distribution all testing of these items were subjected to bootstrapping with 1000 iterations.

3.10.5.2 Hypothesis C15: there is a significant difference in research productivity by university rank designation.

University ranks or designations were measured through the use of binary variables. The items were phrased in the following way: 'What is your title? (Please tick)' with the options of Mr/Ms; Dr; Associate Professor; or Professor. Pearson point-biserial correlation tests were used to test the associations between these items and each of the dimensions of research productivity. Further partial correlation tests were run using years as a researcher and years of education as a control variable.

3.10.5.3 Hypothesis C16. There is a significant association between span of control and levels of research productivity.

Span of control was measured as an item that sampled the amount of people that reported to an individual. The measure was phrased as follows: 'At present, how many people report directly to you in the chain of command?' Pearson tests of association were used to test associations between span of control and each of the dimensions of research productivity. This measure was also included in the multiple linear regression analysis. Having discussed each of the tested hypotheses in relation to the measures and tests applied in the study, the chapter is now concluded with a consideration of ethical issues and the limitations associated with the research.

3.11 ETHICAL CONSIDERATIONS

The research proposal was submitted to the University's Ethics Committee for approval. The research followed ethical principles of research. Sensitivity to the protection of anonymity was maintained in both the quantitative and qualitative analysis. Questions were only asked that were relevant to the research questions and informed consent (Anastasi, 1990) in the form of signed consent forms was obtained in both cases. In the case of the qualitative respondents, no biographical details were collected, so as to protect their anonymity. According to the maximum heterogeneity purposive sampling process, although most of the respondents were rated, according to National Research Foundation (NRF) national rankings, as the top in the world in their fields, other productive researchers were also included that were not necessarily NRF rated. No mention of the NRF ranking of respondents was made, so that it would be more difficult for anybody to identify an individual. However, all of the respondents were considered to be research productive in their academic fields. In each and every case it was stressed to the potential respondent that participation was entirely voluntary. Any hint of refusal was unconditionally and immediately respected. The ethical principle of anonymity necessitated the use of self-reports of research productivity. While introducing an element of common method bias, this was considered to be unavoidable, if the ethical imperative of anonymity was to be upheld, unconditionally. Other forms of method bias correction were, however used, such as the use of Affect as a control variable (Podsakoff *et al*., 2003), which was applied to all tests, and Schwartz's (2007) method of control for response bias that, according to precedent, is applied to Schwartz values research. Further, quantitative findings were analysed in relation to the qualitative findings, in order to improve the confidence in findings. The ethical principles were followed in an uncompromising fashion; no details of the academics sampled were divulged to anyone.

Participant consent forms, information sheets in the form of cover letters, and audio recording consent forms were used. These forms are included in Section 8.5 of the Appendix. However, in line with the requirements of anonymity these were not included in the final document. Limitations relating to the research are now considered.

3.12 LIMITATIONS OF THE RESEARCH

The cross-sectional nature (Bryman, 2004) of this research represents a limitation. An attempt was made to mitigate this limitation to some extent by using theory to specify relationships to

test. In this way, theory was tested. However, further longitudinal research in this context is recommended, particularly to strengthen the interpretation of results through the use of temporal data.

The research is also associated with causality limitations. The quantitative testing process was able to demonstrate significant statistical relationships but the causes of phenomena could not be proved by such a process of testing. The nature of this research was primarily exploratory. The research design did, however, attempt to address certain challenges associated with research that seeks to test relationships around research productivity. By using a qualitative process as well as a quantitative process, this research was able to develop theory and to test this theory. It is argued that this approach allowed certain theory to emerge which was not present in the literature. The quantitative testing was found to support the theory developed from the qualitative analysis.

Another methodological limitation of such research relates to the difficulty in modelling phenomena in the social sciences context. It was simply not possible to include each and every factor that might influence research productivity. An attempt was made, however, to justify the inclusion of variables for analysis based on theory developed during the qualitative process of the research. A model was therefore developed that was derived from the specific context itself. Component categories were derived from a process of factor analysis. This research therefore offers an exploratory and holistic perspective of what may be the more salient aspects of research productivity in this context.

It is also acknowledged that the tested measures each represent the 'tip' of a metaphorical 'iceberg' of relationships that act on an individual, in that a range of underlying relationships might contribute to a manifested 'net' effect. Notwithstanding this acknowledged limitation, the testing of these net manifested effects is taken to reflect objective relationships that exist between phenomena, *at the level of analysis.* For example, a range of psychological interrelationships might act on an individual that might in turn underpin a net psychological or cultural effect. At this level of analysis, however, only the net effect is the focus of this investigation. This approach follows the precedent set by the GLOBE studies (House *et al*., 2004) and also that is applied in Schwartz values theory research (Schwartz, 2007).

It is also acknowledged that a range of other internal or external factors might in turn underpin, interact with, and contribute to, each of these psychological interrelationships. Therefore the net tested effects are restricted to a 'similar band' or level of manifested effects, deriving from theory and literature that relate factors at this level of analysis associated with the individual; and institutional organisational factors that act on the individual. The multi-determined nature of social science factors is therefore acknowledged as a limitation to this and other research within the social sciences.

In this research, certain psychological variables are investigated, yet a range of factors 'below this waterline' that might include physiological and biological or other psychological factors are not specifically investigated: they are regarded as beyond the scope of this investigation which is limited as to the level of its analysis. An attempt is made to keep the level of analysis appropriate to the answering of the research questions. The limitation inherent in not including a more exhaustive set of factors due to practical constraints in the analysis has already been acknowledged.

As indicated, a limitation associated with this study is that it was simply not possible to deepen the analysis of its constituent components, and a trade-off needed to be made; between depth and breadth. In other words, it was necessary to cover the entire ambit of tested propositions, and this made it necessary to delimit the size of the thesis. Only the most relevant relationships between the findings and the theory were discussed. At one stage, the document comprised 1200 pages, excluding appendix material. It is argued, however, that the focus on 'breadth' is appropriate, because the research questions required an analysis based on a holistic approach that provided different, and wide ranging, perspectives of the influence of values on research productivity.

Certain limitations might also exist in terms of sampling processes undertaken in this study. Certain individuals might wish to remain obscure (Macmillan and Katz, 1992), because they prefer to not have their research outputs or other information shared with others, notwithstanding assurances of anonymity. This might increase the representativeness of those responding, to the extent that these individuals that wished to remain obscure might represent some segment that is then underrepresented. Individuals with a high need for Achievement might also be more inclined to volunteer as respondents in research studies (McClelland, 1961). Self-selection might represent a challenge for a researcher (Gimento, Folta, Cooper

and Woo, 1997), and only those respondents that continue in the context over time are ultimately sampled in a cross sectional study. This might be an extension of the potential limitation associated with cross sectional studies.

Individuals that are more interested in research might be relatively more highly represented, as staff with offices in the University were sampled, as research assistants provided them with self-addressed envelopes to return via the internal mail system. More research-interested academics might therefore have been more likely to respond. Given that anonymity and confidentially was assured, for ethical reasons, self reports of academic output were necessary. This was taken to be an unavoidable aspect of the research design if confidentiality and anonymity were to be guaranteed to respondents. Ethical priorities were prioritised above other issues in this research, faithfully following the prescriptions of the university in this regard.

Research productivity was measured as total research productivity. The rationale behind this is that the learning present in an individual at a point in time is cumulative, and that this cumulative learning is reflected in the cumulative research outputs of an individual. Nonetheless, it is acknowledged that this is a 'cross sectional' approach, associated with the limitations of cross-sectional approaches in general. Future longitudinal research is recommended to build on these findings.

Attempts were, however, made to mitigate the influence of method bias. The Harmon test for method bias (Podsakoff *et al*., 2003) was applied to the data. This method indicated that no dominance of common method bias was present. One underlying factor was not dominant over the range of included variables. In order to control for other dimensions of method bias, the prescriptions of Podsakoff *et al*. (2003) were followed, and PA and NA were controlled for in the testing, and reported in each case. Schwartz's (2007) tests of response bias were applied in the testing of the Schwartz items, according to precedent in Schwartz values research. Through the use of both qualitative and quantitative components in the research, two separate methods were used, in order to support a holistic analysis. The quantitative results were analysed in relation to the qualitative analysis in order to ensure that findings and recommendations were supported by both before they were taken as supported by the findings of the study.

The limitations discussed above were recognised and a careful process of data collection and analysis was undertaken in order to lessen the impact of these limitations. The chapter is now concluded as follows.

3.13 CONCLUSION

In this chapter, the methodology applied in this research was introduced and discussed. The quantitative and qualitative research components were introduced and the research was located in relation to different paradigms, in terms of ontology and epistemology. Grounded qualitative analysis was introduced as the qualitative method applied in the study. The issues relating to the verification of qualitative research were discussed. The qualitative analysis process was explained in relation to coding, analysis and the qualitative sampling process. The quantitative analysis process was explained. Issues relating to the research design, the scope of the study, the study population and sample and levels of analysis were considered. The sampling process, sample size calculation, sampling protocol and interview process were then discussed. Reliability and validity were also considered. The hypotheses were introduced, in relation to the statistical methods and measures used to test them. The process used to formulate the scales of measurement was also explained. Having introduced and discussed the methodology of the research, the results of the research are now reported. Whereas the literature review chapter offered a review of the extensive values literature, this chapter extended this review into a justification of the methods used in this research. According to the precedent in this field of study, a comprehensive literature review and different research methods were taken to be required, in order to do justice to the holistic perspective required of this research. The following chapter reports and discusses the results of the grounded research process. This chapter will extend the literature review and methodology chapters into an investigation of phenomena previously reviewed, using an inductive process. The qualitative results are reported in Chapter 4 as follows, and the quantitative results are reported in Chapter 5.

CHAPTER 4

GROUNDED RESEARCH FINDINGS

4 GROUNDED RESEARCH: QUALITATIVE FINDINGS

4.1 INTRODUCTION

Having reviewed relevant literature, and having justified the methods used in this study, the results of the grounded analysis are now reported and discussed. The purpose of this chapter is therefore to report the results of the grounded analysis of the qualitative data. A primary purpose of the qualitative analysis was also to uncover evidence to support the choice of factors tested quantitatively as to their influence on research productivity. The other primary purpose of the qualitative analysis was to explore the relationships between research productivity and organisational cultural and individual values. The reporting of the results in this chapter follows the structure of headings that represent the propositions derived from the analysis. Proposition A relates to the relationship between organisational culture and research productivity. Proposition B relates to the relationship between individual values and individual research productivity. Proposition C relates to the relationships between individual performance factors and individual research productivity. A discussion follows, with reference to three tables that summarise overarching themes found to relate to the sciences contexts, the social sciences contexts and the economic, business science and law contexts. The derivation of the propositions is considered as follows.

4.2 PROPOSITION A: ORGANISATIONAL CULTURE

The qualitative data was processed. The coding process was continued until the point of theoretical saturation was reached (Miles & Huberman, 1994). The final codes related to themes, which fell into three basic categories. Themes related to organisational culture were coded with OC as a prefix. Themes that related to values were coded with V as their prefix. Themes that were related primarily with research productivity were coded with RP as their prefix. The codes are reported, in table form, in Section 8.3 of the Appendix. These tables include Table D: Research Productivity Qualitative Codes: Organisational Culture Codes; Table E: Research Productivity Qualitative Codes: Values Codes; Table F: Research Productivity Qualitative Codes: Individual-level Codes; Table G: Research Productivity Qualitative Codes: Individual-level Codes (continued). The analysis reported in this chapter follows a modified form of grounded analysis (Glaser, 1992). The primary objective of grounded analysis is to allow relationships to emerge from the data, without imposing a theoretical framework on the analysis (Glaser, 1992). This principle is applied, using

thematic content analysis, in the sections below. The analysis revealed relationships that were both within and outside of the scope of this study. In the following discussion, however, only relationships and themes relevant to the study are discussed. The overarching theme that emerged from the organisational culture analysis was one of what features a more research-oriented university culture would possess, and which features are typically associated with a poorer context of research productivity. The dominant theme that presented itself in the analysis was that of the tension between the organisational culture associated with research versus the organisational culture associated with teaching. This theme is considered first, as follows.

4.2.1 A Research Organisational Culture versus a Teaching Organisational Culture

Respondents indicated that a dichotomy existed within the organisational culture of the institution. This dichotomy might be driven by stakeholder forces within the environment of the university such as the practitioner communities served by different academic fields.

"*In fields strongly oriented towards professions (the health sciences, for example) organizational culture tends to have little understanding of or interest in research" [OCPROF-R11] [RPPROF-R11]*.

Such a dichotomy reflects the different roles of a university: (i) its role as a training institution that provides human capital in the form of employees to the industry associated with the specific academic field, versus (ii) its role as a creator of knowledge which is used as an input into the training process and also as an input to the creation of further knowledge that is not necessarily an input for any practitioner community. Evidence from a range of other respondents was found to support the notion that research productivity was negatively influenced by the strength of the relationship between the academic field and its practitioner field.

"[The teaching-oriented culture of the organisation] tends to be directed towards producing practitioners who can 'go out there and do the job'. It does not see the need for academic research; if it supports research is must be 'practical' or 'relevant' research [RPPROF-R11] By contrast, more fundamental fields like mathematics, the basic sciences, philosophy, tend to have a much greater appreciation of the need for academic sophistication, scholarship and intellectual depth; they understand better the need for universals as opposed to the narrow particulars that many professions want in their educational programs. [RPPROF-R11]"

This differentiation, therefore, between a teaching culture that prioritises teaching, and a research culture, which prioritises research, seems to be related to the extent to which a practitioner community dominates the academic field. These differences (between practitioner community influences) are also found to reflect in the differences in methodology found to dominate in their academic fields, and also in the relative difficulty of publication, and hence in their gross research productivity.

"The perception is that it is easy to publish in the field of law, because they can just write up a few comments, for instance, about a new law and then it counts as a research output – do not have to do 'real' research [OCDIFF-R16]. In some academic fields it is acceptable to write an 'opinion piece'/literature review [OCDIFF-R16]. In the field of Industrial Psychology, this is not acceptable [OCDIFF-R16]."

The impact of such differences is not lost on academics. A sense of inequality between fields is reflected in the responses of respondents.

"There may be an inherent unfairness in the way in which staff members are rewarded for their academic outputs, e.g., in terms of promotion. Some staff members may feel envious that other staff members need to do so 'little' to achieve research outputs (and be promoted). [OCDIFF-R16]". "When recognition, as in South Africa, is tied to two indices (the local SAPSE list [Department of Higher Education subsidy approved accredited list of journals] and Thomson Reuters ISI) difficulties for literary and other scholars are compounded: the ISI is not favourable to the human sciences." [OCDIFF-R9]

The discourses associated with each of the two cultures (the research dominated culture and the teaching dominated culture) might reflect the tensions between the practical needs associated with individuals that differ by the influences of, and requirements of, these practitioner communities. Another dimension of this dichotomy is reflected in the structure of the institution and the differentiation between undergraduate and postgraduate teaching in terms of research.

"[U]ndergraduate education in many fields is oriented towards practice rather than research [RPRVT-R11]. Thus undergraduates are not being prepared adequately for research [RPRVT-R11]. This is particularly true in the health sciences where the professional bodies play too much of a role in defining the content of undergraduate programs [RPRVT-R11]."

The mechanisms by which the influence of practitioner communities shapes academic culture are multiple.

"The professions see the undergraduate program as a means of producing practitioners and not researchers; thus they tend to force departments to teach current practice at the expense of academic depth; to train rather than educate [RPRVT-R11]."

The domination of practitioner communities can also extend to the constraint of innovative knowledge creation.

"Established professional bodies who are more interested in protecting their professions than in scholarship. [RPPROF-R11]. This is much less the case in fields like mathematics, physics and philosophy where the professions do tend to respect and appreciate academic scholarship for its own sake [RPPROF-R11]. The South African Optometric Association, and the corresponding bodies in pharmacy, dentistry and, perhaps to a lesser extent, medicine, tend to be largely politically oriented organizations [RPPROF-R11]. They spend energy fighting legal battles protecting their turf; the fight to oppose the sale of reading spectacles over the counter at pharmacies and other stores is an example.[RPROF-R11]. Chains and other groups in the profession sometimes succeed in dominating thinking in the profession for their own narrow interests and manage to prevent innovative thinking [RPPROF-R11]. Narrow protectionism becomes more important than the development of the field [RPPROF-R11] [RPINNOV-R11]."

There is a cost to the dominance of practitioner needs, which is borne by researchers that are required to take students forward to postgraduate studies when the grounding of the students has primarily been in non-research oriented undergraduate studies.

"Pressures are placed on productive researchers to take on students for postgraduate study who are not equipped for doing research [RPRVT-R11]. Instead of promoting the productive researcher's research activities they become a drain on his energy [RPRVT-R11]."

These relationships, however, need to be placed within the South African context. Since the advent of democracy the need to provide training and skills to a previously disadvantaged majority off a constrained resource base has not diminished. The relationships around research productivity are therefore nested within a national context, and within the current trends within this context.

"Prospective research students have poorer skills in composition than they used to have. This means that even if they can do the research they lack the ability to put it together in a coherent form [RPCH-R11]. Thus productive researchers end up spending too much energy and time on rewriting theses and papers the students have tried to write [RPRVT-R11]."

Skills deficits are also present in the skills that are required of the schooling system, and which are an important input into the university system.

"Mathematical skills are poorer too than they used to be which is an inhibiting factor in many fields of research [RPCH-R11]. Less than adequately prepared postgraduate students tend to resort to plagiarism which adds to the difficulties with which the researcher has to cope [RPRVT-R11]."

The way in which the organisation reacts to these challenges can result in a change in the culture of the organisation, as many problems are typically addressed through the implementation of more bureaucratic rules and bureaucracy. However, such increasing bureaucracy can result in higher constraints to research productivity.

"Productive researchers often then simply avoid taking on students and prefer to do the work themselves [OCAV-R11]. University administrations recognize many of these problems and attempt to solve them by creating new offices, new committees and more paper work [RPBU-R11]."

These organisational responses can set in motion a process of increasing bureaucratisation, and a vicious circle can result.

"That is the wrong approach. What they need to do is identify their productive researchers, reward them, enable them where they need support, protect them from red tape and administrators who don't understand their needs, do not force students onto them who they don't want [RPREC-R11]. Basically most important is that universities should let their productive researchers do their own thing [RPAUT-R11]."

Over time, the influence of organisational factors, such as an organisational culture that is not supportive of research, or one that is associated with large administrative burdens, including teaching, might lead to cynicism and frustration, and, in turn, lower levels of research productivity, as innovativeness is constrained.

"I think there is a lot of…kind of burnout that happens…especially if you are in a culture that is not supportive…and…some people start out by trying to be innovative in the beginning…and if the culture of the organisation doesn't allow for them to undertake that research...or…you know…give them space or whatever…then you know…cynicism creeps in and…you know…people become…disenchanted…and potentially stop doing research…or something like that…so I think things like...and what contributes to that is large administrative burden…teaching…but you know teaching where it seems like you're not making a difference…or…you come across the same problems again and again…and that type of thing…" [RPBU-R12]

A sense of the divide between researchers and 'management' emerges associated with issues of the prioritisation of teaching over research.

"…in the case of heads of department who have not had research experience there needs to be a mechanism (via the dean perhaps) of informing them of the importance of protecting their active researchers [OCP-R11] and otherwise enabling their activities (too often heads without research experience create a culture in which undergraduate teaching becomes the focus of the departmental activities and research is treated as peripheral [OCRVT-R11]".

Whereas a culture of increasing 'red tape' can constrain researchers and reduce research productivity, an organisational culture differentiation between administration and academics seems to be suggested- where administrative staff need to understand the culture of academics and 'protect' them from 'red tape' and other constraints to their research productivity. The implication of this is that a research culture that prioritises autonomy and the minimisation of bureaucracy would contribute to higher levels of research productivity. An organisational culture that prioritises the removal of constraints to research productivity together with a clear objective and a horizontal governance structure might be best suited to a context of higher organisational research productivity.

"The best example [of a research productive organisational culture] is what happened at Bletchley Park in the Second World War. By putting together all the cleverest people without any constraints other than the desire to win the war produced the desired outcome. There was a horizontal structure of governance [RPREC-R8]. Just don't interfere with good leadership [RPREC-R8]. Provide support not control [RPREC-R8]. Have faith in the people you chose [RPREC-R8]."

However, differences are found to exist between different fields. Having identified an overarching differentiation between academic fields on the basis of the differing influence of their practitioner communities and their primary focus on teaching versus research, other differences between academic fields are now discussed. These differences are considered an important aspect of analysis in order to understand the patterns and themes of research productivity that are common to different academic fields. This issue is considered to be especially important because of the need to include factors in the quantitative analysis that would potentially generalise across different academic disciplines.

4.2.2 Differences between academic fields (beyond practitioner influence and the teaching versus research dichotomy)

One dimension of the differences between academic fields that is most acute between the laboratory-based sciences and the humanities is the collaborative versus the individualist approach to research.

"In my field, it is common to work in fairly large collaborative groupings; for the person who has been responsible for executing most of the work to be the first author on a publication, and for the researcher who has led the research and been responsible for raising the grant funding that supported the research) to be the last, or senior author [RPCOL-R7]. Senior authorship is indicative of being established in one's field. In my field, it is extremely rare to publish a piece of original laboratory-based research as a sole author [OCDIF-R7]. This differs significantly from the field of Humanities in which sole and/or first authorship is most highly valued [OCDIFF-R7]." "In addition, the research culture in the humanities is more individualistic than group, the latter being the science model." [OCDIFF-R9] [OCIVC-R9] "To write a critical study of an author, say, requires an extended, philosophical argument in which expression is a crucial sense-making procedure. There is limited opportunity to involve a team or even student assistants." [OCIVC-R9]

Although the dictum 'publish or perish' might be common across different academic fields, practical realities seem to also dictate different levels of research productivity across different academic fields.

"*Talking from the outside I would say that the organisational culture is…publish or perish …for example would be a culture that is pervasive across the university but is interpreted in different ways*". *[OCPP-R1]*

In terms of the organisational culture dimension of a prioritisation of research, Respondent 1 offers the notion of a "continuum of publish or perish", which is related to notions of quality versus quantity of research.

4.2.2.1 Quality versus Quantity of research: is this a helpful differentiation?

According to this conception, organisational culture differences that influence research productivity can be related to the different requirements of what it means to make a substantive contribution to knowledge. The notion of an antithetical relationship between the culture of 'publish or perish' and knowledge creation is interesting, as it implies a

differentiation between quality and quantity of academic publication. This focus on quality over quantity is (perhaps disparagingly) termed 'elitism'.

"*…in the economics field it is publish within the area that is accepted as being the paradigm of that particular discipline which in our case is a kind of quantitative approach [OCQ-R1][OCDIFF-R1]…I think also that the tendency in economics is to try and publish in high ranking journals and so the organisational culture there is more on elitism if you like [OCE-R1]…that's the perception I get from the outside…producing only in the best journals, publishing very infrequently [OCE-R1]perhaps as a result as a cause or as an effect of that…[OCE-R1]".*

What represents quality of research, then, might, similarly, be a subjective issue that differs between academic fields. There is a sense here that the dominant discourse, of research as knowledge creation, is that it is inherently time-consuming. What seems to be implied, or is not expressly stated, is the underlying assumption that the nature of the quantity requirement for research productivity (which is dominant in the reward structures of the institution, and the measurement systems of the institution) is inequitable.

The data seems to reflect conflict not only around the prioritisation of research in relation to work roles and the demands of different forces within the institution, but also conflict in terms of how such research, in terms of quantity and quality, is perceived. However, there might also be a temporal dimension involved. The context of research productivity is not independent of the history of such a context. Similarly, the historical context of research productivity is not isolated from the tension between the twin goals of such an institution, that have to be reconciled in a context that does not offer a clear path toward such an institutional reconciliation, as research seems to be articulated as the primary goal, yet the demands of context seem to, in practical terms, prioritise teaching and consultancy work over research.

"*The organizational culture I feel here is one which has…I am talking now from very little experience of getting a feel for it but with some isolated cases the…culture has been one of academic holding…in other words it's a job, a secure job but you have to teach [OCAH-R1] and there have been incidents from interviews that people don't regard research as part of the job...the job is teaching...[OCRVT-R1] and I think this may come from a misconception that has been handed down over the years and also a feeling that…its…what is the point of research?…in terms of the cost benefits of doing consultancy work [OCPROF-R1] so…that has been the culture it has been a non-research active culture*".

Another dimension to the theme of conflict between work roles is introduced here. Consultancy work is framed as having a cost-benefit perspective. If consultancy work

provides high returns to academics then the pursuit of such work would be expected to be highly incentivised. If the pursuit of a research culture came at the expense of the rewards of such consultancy, then it would be expected that such a culture would be contested. The notion that an organisational culture can exist that facilitates research productivity is dependent on the extent to which group level influences exist. Themes relating to such cohesion were therefore considered relevant to the analysis.

A theme that has emerged from the data that relates to this notion of group cohesiveness is the theme of not being "*against the grain*", which indicates that the group dynamics of an environment are not independent from the research process, and also indicates that the investigation of culture effects is justified in this context.

"...so I think things that matter [for research productivity] are whether you have a research friendly environment so that the others also research and that you are not alone...that you are not against the grain [OCCON-R2]."

"*Write what your peers already accept as true [OCINNOV-R8]. If you conflict with their dogmas, it becomes increasingly difficult to get the work published [OCINNOV-R8]. But in the end if you persist, then the truth can emerge [RPINNOV-R8]. But it takes endurance [RPEND-R8] and self-belief [RPSEF-R8] to stay the course*."

Innovativeness and new knowledge creation may be constrained by group cohesiveness. A culture that is high in group cohesiveness may constrain the publication of innovative work. Incentives seem to also be important. An environment in which consultancy, for example, yields relatively higher returns, would be expected to incentivise a culture that runs counter to that of a research prioritising culture. The tension between these two forces might be taken to converge on the tension between the demands of (i) the practitioner community, or practitioner stakeholders that are associated with an academic field, which is concerned about practice-based outcomes; and (ii) the academic community, or institutional stakeholder community which is associated with a prioritisation of research productivity. To the extent that the peer-review process might dominate academic processes, the influence of the culture of an academic field might be expected to act through such mechanisms to reinforce itself. The net cultural orientation, therefore, of an academic field, might represent the outcome of a contestation of forces, in which the strongest incentives, or the rewards accruing to a 'dominant coalition' might dominate the shaping of the structures of meaning that comprise a specific academic unit's dominant culture.

Constraints to research productivity, however, can also derive from a prioritisation of research, where the pursuit of 'quality' research is used as a justification for low levels of quantity of output.

"*…there have been recent fairly recent drives to produce research cultures in areas within the school but we do have people for example who have…who for a very long period of time have not been research active and it seems to be quite acceptable to their colleagues…you know…and there are people...in my view…that create a culture of…an aura of elitism with very little coming out of it…there is no…you know…it is a kind of barren excellence…an aura of excellence but nothing being produced…[OCDIFF-R1]*

There seem to be different academic sub-cultures, two of which include a culture of the prioritisation of teaching and a culture associated with this 'barren excellence'.

"...so maybe on the one hand you have this culture of...believing that the academic job is largely a teaching job…on the other hand you have very well qualified individuals who perhaps are fearful of getting their hands dirty in the research process, in other words the productivity may be restrained by the fact that they are fearful of...not being able to get into the best journals or that kind...I don't know but certainly one would expect a high degree of actual product and less of creating new schools…or divisions to deal with different research areas…and there is nothing coming out of it…so what is the purpose of that?" [OCDIFF-R1]

A theme that arises from these responses is the theme of some kind of status constraint to research productivity. Another dimension of the tension between quality and quantity of research is the way in which research output is managed on a nation-wide basis.

"The major problem prevailing today in South Africa is that the "bean-counting" approach to measuring research productivity (i.e. more publications means more research subsidy from government) is at odds with the culture of quality that the best universities recognise must be promoted in order to improve their international standing." [RPDIFQ-R7]

"...government funding of universities in terms of numbers of approved papers needs to be phased out (it has raised awareness of the need for publishing but has the disadvantage of emphasizing quantity at the expense of quality [RPINC-R11]); funding would be better in terms of numbers of rated researchers. An important constraint on research currently is the emphasis on number of publications rather than quality" [RPQVQ-R11].

A problem arises at an intuitive level when one considers the implied recommendation that derives from a criticism of the measurement and subsidisation of research outputs. If research levels are very low in many institutions, then surely such a system is needed. At the highest levels of research productivity (associated with the perspectives of respondents that are

typically at the forefront of their fields on an international basis), such a system might be creating a focus on quantity at the expense of quality. However, given the existence of peer review quality controls of academic publishing, it could be argued that such 'bean counting' can also differentiate between different levels of journal quality output. What, then, are the important aspects of research quality that are not commensurate with such a research management system?

"Such [quantity-oriented] individuals adopt a "salami science" approach to publication, producing least publishable units. [RPDIFFQ-R7] Others value quality and completeness and would rather publish fewer substantive publications rather than larger numbers of papers reporting incremental findings [RPDIFFQ-R7]. A further difference stems from whether one's research is focused on understanding mechanisms or merely making and reporting on observations [RPDIFFQ-R7]. The latter mode of research generates more publications, and yet the former is more highly valued internationally and more likely to be published in the best journals" [RPDIFFQ-R7]

One challenge associated with comparisons between different fields is perhaps the immersion of researchers within their own fields. Comparative analysis might therefore be more difficult in fields that are not, by nature, multidisciplinary.

"*..I know about chemical engineering...all over the world but I don't know about other cultures..."[OCDIFF-R5]."...there are big...cultural differences....it's the ethos of disciplines...that drive that...it's there is big variation...*" [OCDIFF-R3]

An objective of the analysis was to obtain support for the use of measures to be used for the quantitative testing of the influence of organisational values on research productivity. This objective necessitated an analysis of the organisational sub-cultures that exist within this academic context, and the extent to which certain commonalities are present across different disciplines and organisational contexts. A managerial perspective might suggest that research productivity can be 'taught', and that this would be a dominant aspect of university teaching. However, the responses of certain respondents offered an insight into the complexity associated with the transmission of research skills in this context.

"*I am sceptical of the modern trend to introduce courses in research methodology. They are often taught by people who themselves are not active in research and who have simple-minded ideas of what constitutes research [RPREC-R11]. They often seem to think research can be done by recipe [RPREC-R11]. There is sometimes a tendency to attempt to direct research, to tell researchers what sort of research to do. [OCRESIST-R11]"*

These responses seem to convey a sense of a resistance against pressures to direct research. This seems to be confounded with a notion that the 'top-down' pressures to increase research though the teaching of research are not effective because they approach research as if it can be enabled through the transmission of explicit knowledge and not tacit knowledge.

"Really productive researchers do the research they do 'because they cannot help it'; attempts to get them to do other research most likely results in them doing no significant research at all [RPREC-R11]."

The presence of 'resistance' sub-cultures might indicate that efforts are being made to develop research productivity, but that such efforts might be directed in a way that does not gain the support of the most productive researchers in such universities. However, the need for a strong research culture and the development of researchers is recognised.

"The production of researchers and the creation of a strong research culture are much more important in South Africa than attempts to do 'relevant' research; once the researchers and the culture are there 'relevant' research will be undertaken [RPREC-R11]."

Whereas certain sub-cultures seem to exist within the university context, the characteristics of a research-supportive culture might also derive from the individual characteristics of the people within such a culture.

"Not all realize what it takes to produce a successful research culture [OCREC-R8]. It takes people with passion [PRPAS-R8] and drive [RPDRV-R8] and self-belief [RPSEF-R8]. Facilities and resources alone cannot produce success. It is the people who make the difference [RPREC-R8]."

It stands to reason that if a research-supportive culture could contribute to shared values of this nature then research productivity might be enabled. An important aspect of developing an environment that is supportive of research productivity is the availability of support structures and services, and positioning of support systems to prioritise and not to conflict with research productivity.

"[to support research productivity it is necessary to provide] supporting services for research such as writing schools, data analysis, training in research methods [OCSUP-R16]". "Minimizing paper work and red tape [OCB-R11]; an efficient, willing and informed office in the university that helps with interaction with the National Research Foundation [OCSUP-R11]; a departmental culture that recognizes research as an important component of the department's activities [OCB-R11]; free productive researchers up from administrative and other routine departmental activities as much as possible [OCB-R11]."

The management processes of institutions seem to be considered as a constraint to research productivity if research is not prioritised over and above teaching.

[Research productivity is dependent on the] quality and level of administrative and other support available at the laboratory/ unit [RPSUP-R7]; departmental, Faculty and institutional levels [RPSUP-R7]. Infrastructure (laboratory; library; IT); level and quality of support services (procurement and finance; IT, HR; legal/ contract services) [RPSUP-R7];

The causes are practical – most laboratory-based research is based on team (as opposed to individual) effort [OCDIFF-R7].

Interestingly enough, although support structures were considered important for research productivity, the availability of finance was not typically seen as problematic.

"I do not believe lack of money is a significant constraint on productivity in research in most fields (funding is available for the productive researcher) [RPINC-R11]. Nevertheless lack of funds may be a constraint in experimental physics [OCFIN-R11], some fields of engineering and in medicine [RPINC-R11]. Even in such fields a productive researcher is usually able to team up with researchers overseas who do have access to greater funding [OCFIN-R11]. More often than not I believe lack of money is an excuse for not doing research" [RPED-R11].

The organisational culture of the support services is therefore also an important influence on research productivity at the level of the academic discipline.

"*...I get very frustrated...support services are very weak here...I spent eight years in the industry...as head of research at [deleted]...and although it was a semi-parastatal...one doesn't really regard them as being very...efficient...the support I got there from finance...and...just general support for my research...I had 400 staff...was significantly different to what we get here...now I don't believe...I also know what happens at [another South African university]...there's different cultures...in terms of support..." [OCSUP-R4]*

The fundamental impact of different contextual factors is taken to be an important influence on academic staff and their research productivity.

" *...let the academic staff then have more time to do research [RPTIM-R4]...so I think there has been a bit of a mismatch between the intention...which I think has been very positive...and the way of making productivity improve...I think Wits is beginning to come to terms with this...there have been sufficient complaints about this...about service...let me give you an example...when I was in [deleted] and I put in a requisition for procurement for a certain item...and it would bounce because the supplier did not have any...at that stage the procurement division would look around for me to find an alternative...it does not happen*

here...I have to go and search company by company by company myself in order to be able to find an alternative...so it is those sorts of things...Wits support services have a culture of control rather than an culture of support [OCSUP-R4]...I think is it changing…and I am delighted...but it is going to be too late for me...but I see...they are aware of the problem...there are enough pressure points I think... coming from the academic staff in general..." [OCRESIST-R4]

The tension between research and teaching discussed earlier needs to encompass the tension between research and the potential negative influence of bureaucracy and unhelpful support systems. The negative influence of a 'culture of control' of support systems might be most intense in engineering research contexts, but it is interesting to note the acknowledgement of pressures coming from academics as a type of 'resistance' against such a 'culture of control'. To some extent it might be possible that the cultures of certain academic fields might also be shaped by such pressures.

Another aspect of the organisational culture of an academic field was taken to be the influence of the academic field itself, on a global basis. The placement of the South African academic field in relation to the field on a world-wide basis was therefore considered important. The issue of where the 'centre of gravity' of the field was located, or the geographical location of the most influential groupings of academics in the field was also considered to be important.

4.2.2.2 Centre of Gravity of Academic Field: South African or International

The centre of gravity, or the location which dominates an academic field's research output, also emerged as a theme in the data. For example, research into the origins of mankind that focus on caves in Southern Africa for paleontological evidence would be expected to have a centre of gravity that is in this region. However, where most of the advances of a certain field originate outside the region, this would have implications for research practice within such a region.

"*With ours [academic field] the centre of gravity is outside the country as well...in order to have high productivity in South Africa you are limited in what you can do...in the sense that the equipment that you have available due to financial constraints...is much more that it would be...if I was in the US I would have much more money so I have to cut my cloth to fit what I have available so I have to choose my research areas not to get into the very heavy*

cost areas where I need very fancy equipment...so that definitely limits the scope of the kind of research that you can do...". [OCDIFF-R5]

Resource constraints specific to a certain academic field, therefore, might be related to the centre of gravity of such a field. Another dimension of research productivity is the ability to be published in an academic field.

"*...I will tell you what the difference is [between local and international journals] people do not feel bad about publishing in local journals...because you want to support them...or because what you are working on has a specific local audience...but certainly in my field you play in the international arena or die...you're benchmarking against other local people and you're benchmarking internationally and they will not read South African journals...they might pick it up on the...but will tend to disregard...so if you want to benchmark against your peers you need to be in the same arena as they are...*" *[OCDIFF-R3]*.

Different academic fields, therefore, have difference 'centres of gravity', or geographic locations where an academic in such a field needs to publish in. In certain other fields, this 'centre of gravity' is located in the local context instead of the international context.

"... the one that struck me as being the most difficult was law...because law is entirely...it is entirely local...they don't feel the need to benchmark internationally at all, and, by their own criteria, they are exceptionally good...". [OCDIFF-R3]

The tension between different academic fields in terms of organisational culture might stem from the lack of a common 'language of research' between fields.

"*...and there was no common ground there...you could not talk to the lawyers about what they were doing....what they...so there is...even within this university...there is a big difference in culture...*" *[OCDIFF-R3]*

Despite the boundaries of different academic fields, certain respondents considered themselves to operate across what were considered to be 'blurred' boundaries.

"I think in my case you sit on the boundary of being an engineer and being a physicist...you know that becomes a rather blurred boundary in my case...". [OCDIFF-R4]

The culture of an academic field within such boundaries might be shaped by regional effects. In terms of the cultural differences between academic fields, the resources, or the phenomenon under study, might be located in a regional context.

"there are significant differences there...I've always wondered...you know I have sat on a number of NRF committees for a number of years...and you see the outputs from...climatology...very different...now, in a way one must be critical but the climatologists have an advantage...they write about the South African climate...the botanists write about the

South African...and it is good...valuable work...but they have a resource...which is looking at...demanding to be explored...in my area...that's not true...because where the centre of gravity is...is Europe and America...it's not local...so that obviously affects one's culture...and in a way it makes it easier to be productive...because the potential for there to be...work.." [OCDIFF-R4].

The respondents seem aware of the unequal effects associated with different centres of gravity.

"a very good example...you find...is in [deleted]...what a perfect case...five papers in science...yesterday or the day before...because you have got the local resource there...the research just takes off...he's now got collaboration all over the world...because he has got this resource...to work with...". [OCDIFF-R4]

Another aspect of South African academic productivity is its relationship with the political context.

"*...our environment is rather different...but it is interesting in reading [deleted] seeing the different attitudes taken by the CEO of [deleted] from the CEO of [deleted]...now the CEO of [the former] is saying that she is totally committed to the South African business situation and ...so she is strongly supportive of government...although she has problems with nationalisation...and all the rest of it...but [the latter] they regard themselves as an international entity...one does not know to what extent their local company do...so there's differences there...and both of them support our department financially...they...both of them...our academic activity...quite substantial...it's interesting if you look at the NRF statistics...*" *[OCDIFF-R4]*

Government policy changes, such as the debates on issues such as nationalisation, might influence difference practitioner fields, and their associated academic fields, differently.

4.2.2.3 The transmission of organisational culture within academic fields

The mechanisms that underlie the reproduction and transmission of academic culture might include mentorship and leadership processes.

"*I think the university keeps people like me because of the influence they have on younger people...we try and develop the culture to discuss research and what's going on...projects of interest and that kind of thing..." [OCTRA-R4]*

If the University is aware of the specific influence of culture on research productivity then knowledge of these effects might contribute to a better transmission of a research culture in

this context. The importance of mentorship in this process was found to be stressed in responses.

"*this has been my experience…in fact when I first started in a research organization… the Council of Scientific and Industrial Research…the national institute of personnel research which was psychologically orientated…my research interest which was there was nurtured very very strongly by a man a* [deleted] *who was one of the leading researchers there and who assisted me in getting my first articles into* [deleted]*…so…there is no question in my mind that a catalyst is very important…an experienced catalyst is very important" [OCTRA-R1]*

The presence of a developmental leader is a theme that emerges strongly across the respondents. An aspect of this dimension is also found in reference to the theme of collaboration. Respondent 1, however, qualifies this as follows: " *….but that's not enough in itself in other words it links in with what I said earlier you have got to have people that want to be researchers…*"*[RPMOT-R1]*. The implication here is that if such individuals do not have the intrinsic want, or motivation to become researchers, then such mentoring will be ineffective. The implication of such a notion is that selection should be used to select for individuals that have the intrinsic motivation to become researchers.

On the basis of these conceptions, the following proposition is derived: Proposition, A., that organisational culture differences exist between academic fields, and that these differences are associated with differences in the research productivity of these different academic fields. Proposition A is tested as its corresponding Hypothesis A in the quantitative portion of the research. The grounded analysis that relates to the role of individual values in research productivity is considered as follows.

4.3 PROPOSITION B: INDIVIDUAL VALUES

At the Individual level, a range of different relationships were expected to influence research productivity. According to a respondent within the field of industrial psychology, values are an important influence on research productivity.

"[Factors which cause higher levels of research productivity are] intrinsic motivation [RPMOT-R16]; Achievement, self-directedness, power. People may want to maintain their image/standing (achievement). Self-direction: motivation to function on one's own and trust your own judgments. Power: Being promotable; achieving your position of being first/the best. [VSE-R16] Persistence [RPDRV-R16], subject knowledge [RPSPEC-R16]."

Values associated with the prioritisation of the goals of the individual seem to dominate as drivers of research productivity according to this perspective. This perspective, however, contrasts with other responses, which focus on some aspect of the subordination of individual goals to the goals of others.

"Producing a team requires in addition the ability to share and to be egoless; to be a great coach." [RPCOLR8] [VALTR8].

The prioritisation of the needs of others can extend to more abstract needs such as the advancement of knowledge and meeting the needs of others in practitioner fields.

"*If the personal values that you have...some commitment or belief in the advancement of knowledge...and that it is beneficial...and I work in a professional field and I believe very strongly and I believe that that is the motivation....that we can't practice just for practice...there has to be some empirical study there...has to be some reflection and understanding of what the problems of practice are and...so that is what drives my work...*" *[RPMOT-R2]*. "*I think the underlying values* [that dominate in research productive contexts] *are simply the value of wishing to contribute to an area of knowledge…"[RPMOT-R1]*.

Factors at the individual level such as dispositional factors are suggested to be the most important drivers of research productivity.

"*…depends on the personality...to be a good researcher you got to have a lot of perseverance...if you want to do things quickly you are not going to do... you are not going to leave a legacy if you don't have the perseverance..." [RPMOT-R5]*.

Of all the values related characteristics associated with higher levels of research productivity, motivation was offered as a dominant driver.

[Causes of research productivity include…]"Individual: Motivation" [RPMOT-R7] "…intrinsic motivation." [RPMOT-R16]

Motivation, however, despite being the dominant driver of research productivity, cannot override other necessary conditions that are not present in an individual. The differentiation between researchers and non-researchers is also ascribed to individual differences, some being beyond the control of the individual.

"*...everybody is different....and personalities are different so I am not keen to categorise them but I can draw the limits that are there...I don't think...there are I think there are people that can learn to be researchers if they want to...I think that the want is a very large proportion...there are people that can't be researchers even if they want to be...if I want to be the world champion high-jumper I can't be....the world champion...I might want to be very badly but I can't...I don't have the body...I don't have the physique...it is the same...there are*

people that can...there are people that can't and it depends on other factors as well..." [RPMOT-R5].

Research productivity might not only be a function of individual motivational values, but may also therefore be dominated by a range of other 'necessary' conditions. Nonetheless, themes of individual level values and their relationships with research productivity were found to emerge strongly from the data. Ability to be a successful researcher is also, however, a necessary and not a sufficient condition. The relationship between the individual motivation of an academic and the satisfaction that is derived from different task activities is also considered to be important.

"*The fact is that research productivity improvements are...I think...are very much...in my view anyway...based on the motivation of the academic." [RPMOT-R1]*.

A theme that echoes the fundamental differentiation of the university culture into research-oriented and teaching-oriented dimensions is the differentiation of individual academics according to whether they derive their primary work satisfaction from research or, alternatively, teaching.

"*...I believe in fact there're two basic types… there's the academic who essentially is a teacher and who dabbles in research and you have...in other words the satisfaction of the job is in the teaching aspect of academic life. On the other hand you have researcher's that gain their major job satisfaction from producing research output…articles in particular and having them published". [RPMOT-R1]*

The themes of a differentiation between the 'right people' and the 'wrong people' and the 'driven nature' of the researcher are also echoed in other responses which prioritise these factors as the primary drivers of research productivity.

"*…you've got to have the right people...and that means you can't...because you are working with students you have got to have the right decent quality students you've got to have reasonable quality support structures and you yourself have to be driven. That's it*." *[RPMOT-R5]*

The intrinsic nature of research productivity is therefore considered to dominate the relationships around research productivity. Certain constraints that could be taken to relate to individual values that subordinated individual goals to those of others were also identified from the responses.

"Constrainers [of research productivity] are narcissistic leadership which destroy everything. [VSE-R8]. Again it comes down to the quality of the people in the organization and their ability to share and not needing to be the centre of everything [VSE-R8]. Lack of

narcissism and real care for those with whom they work [VSE-R8]. A team can achieve much if no one cares who gets the credit etc [VSE-R8] and desire to make a difference." [VUNI-R8] [VBEN-R8]

The prioritisation of the needs of others is not, however, incompatible with the 'ego' needs of individuals, as recognition can be an important motivator of research productivity at the individual level. The presence of both of these aspects (the prioritisation of individual needs while at the same time meeting the needs of other stakeholders) might necessitate the use of theory that relates to individual dimensions of motivational values if quantitative testing is applied.

"*…values come from …being able to contribute, being seen able to contribute by your peers in a learned journal or article, to the extension of knowledge in a particular field…so the values would be those if I was going to express them would be contribution, recognition of creativity, recognition of extending knowledge areas so it would be…" [RPMOT-R1]*

The motivational influence on research productivity is therefore complex, but seems to be related to ego needs for certain respondents.

"*…there is also personal vanity involved…there is undoubtedly vanity it is like you getting your name up on a board in the same way if you get involved with generating an article you have your name in a learned journal and that gives a sense of achievement which is… if you like… a vanity of a certain kind but you've got to be driven by that…*" *[RPMOT-R1]*

The notion of personal vanity supports the notion that individual needs can motivate research productivity, yet that these needs can be framed negatively, as 'vanity'.

"I mean to frame it as a value it would be a…recognition of one's…of one's products…intellectual products and the … the satisfaction of having produced something which is…publishable…which also is like a kind of craftsmanship you publish something that you make, you make something which is there to be admired, like a table…you designed it…you created it…you have written it down for posterity it is there it always will be there…tucked away in a library or whatever…so it's a piece of creativity…in a respected area of human endeavour, like a craftsman creating a table or an ornate piece of china…whatever it might be…". [RPMOT-R1]

There are two dimensions that seem to exist here; the dimensions of a contribution to others, to peers, a contribution to an extension of knowledge which is a universalistic value, and the recognition that accrues to the individual for such a contribution. This seems to reflect a trade dynamic, where such contributions to the broader collective are incentivised, or rewarded, by recognition. There is also a differentiation here between the ideal, or the idealised notion of a

contribution to broader knowledge creation, and the, perhaps more proximal, aspects of the individual recognition of competence associated with such a contribution. An underlying assumption seems to relate to certain rules of exchange which apply to academic research productivity. In this case, research productivity is represented by the metaphor of craftsmanship. The tacit implication seems to be that such research publication offers a platform for recognition payoffs for such craftsmanship.

"*…the kick I get from getting my name in a journal is a kick no one else gets…put it that way…so in that sense it is a very selfish drive and I think it is the single mindedness is an attribute of value of research...the single mindedness to exclude other things in order to achieve the goal of production*." *[RPMOT-R1]*

The category of selfishness and the category of single-mindedness both imply that there is an opportunity cost involved in the production of research. Such notions also locate research production as an activity that is motivated through a deep and individualistic drive; a form of single-mindedness.

"*…it is very much…it's a selfish thing …research…it is selfish in the sense that you are excluding you're putting a lot of energy into something which has very little beyond your own satisfaction…and obviously the creation of knowledge but that's to a very small select few rarefied area of individuals…it's an activity which is in a sense selfish driven by a drive for one's own personal feelings of achievement and satisfaction…I would not regard it as an altruistic thing" "…research…something you would have to do for your own satisfaction and contentment which makes it very hedonistic". [RPMOT-R1]*

The theme of hedonistic pleasure is echoed in other responses.

"*...hedonism...is gratification for one's self...but...the fun element is hugely important in research...people have got to enjoy it...because it is very difficult to do...if it is a chore...you won't do it....but for me that's...I agree totally with the concept that there are behaviours...or attitudes...which are not immediately...or obviously attached to research but are...in fact...indeed...driving it...*" *[RPMOT-R3]*

A tension seems to be evident; between the motivation to contribute to the development of knowledge, which is a universalistic motivation more distal to the individual, or an ideal, and the reality of proximal motivational forces which are personal. Therefore, to the extent that certain high performing academics might perform because of a single-minded pursuit of such productivity, many more academics might not reflect the same motivational structure.

"*... I think curiosity is a very important factor...if you don't want to know...why would you bother? You know so curiosity is an extremely important thing...and again...that can be*

nurtured...if every time a kid asks a question if you slap him across the ear....there is a chance he is not going to ask questions that often....in which case you are going to kill his curiosity and so all of these have the nature/nurture mixture in them to a greater or lesser extent..." [RPMOT-R5] "*the only reason I am here...is because of my research...and it is primarily driven curiosity wise...I don't need to...I don't have to aspire to...anything additional...so it is mainly curiosity that has driven me...*" *[RPMOT-R4]*

Individual motivational values that are more aligned with curiosity might enable certain individuals to be more research productive. The degree to which such circumstances are aligned with the shaping of such values might also have an influence on research productivity. The needs of an individual are also not unrelated to the development of such values.

"*...I mean if someone is hungry they are not going to be a good researcher...they might be a good scavenger...and may well be...and there are probably some very smart guys that are making money out of waste...you know these guys that drag the stuff through the streets and that but they could be very smart but their drive is to get enough food for the next day...their drive is not like mine...to satisfy their curiosity...". [RPMOT-R5]*

Values related to curiosity, and other values aligned with research productivity, might be shaped by an individual's needs, which might then result in a motivation that is directed at the attainment of those specific needs. The implication that also derives from this is that such a drive will also dictate an individual's activities 'going forward'.

"*particularly long term...I think there definitely are [different behaviours of a researcher that are driven by differences in values]...you can have researchers that are extremely selfish who are extremely...concerned with their own careers...and there was a famous person who was an A rated scientist at the University of [deleted]...an [deleted]...who said "here's the deal...I never take a postgraduate student...they just get on my nerves...and interfere with me...so I just do my own work and everybody else does their own work...stay out of my life... I only publish single author papers....and that's it..." [RPMOT-R3]*

However, the values of individual researchers have an implication for the university in general and for the development of others in particular, because there is no transmission of knowledge across generations.

"*…and he did, but what happened when he retired...or died...the field died...because there was no succession planning...there was nobody to carry that on there...I think that if you...if the university wants to become famous...for something...it has to last more than one generation...in the university...so if a university wants to be known for a research strength it's*

got to be cross-generational...and that requires researchers with a completely different attitude...and it's not an easy attitude to do because it's got to be team-oriented, it's got to be sharing..." *[RPMOT-R3]*

What emerges again here is the need for team-oriented and sharing approaches to research. This discourse of the top researcher as a primary cause of output in an academic field based on collaborative and developmental values is echoed again here. The prioritisation of the goals of others is not without a cost, however.

"*...as people rise to the top in each generation...they have to build the careers of their successors...and that...necessarily happens at the expense of your own career...because...you know...you are making sure that their names go on the papers...that they go to the conferences...and so on...so that the....it does require...not everybody...is happy to do that..." [RPMOT-R3]*

What emerges here is the theme of selfishness versus altruism.

"...so there are different kinds of...individuals...there are the people who...and some of the really successful researchers...as I am saying...are absolutely selfish...we had someone in the faculty of [deleted] who told all postgraduate students when they came in that it was a 'condition of registering with me that my name will be first on all the papers'...so even PhD students were told they would not ever be first authors on their PhD papers... but that he was going to be the first author...he was hugely successful...now that...is complete anathema...by...it just doesn't gel with my value system...at all..." *[RPMOT-R3]*

However, the career costs of such a subordination of individual objectives to those of others are not necessarily without benefits in terms of higher research output.

"*I think that...it is certainly my view...that the people....involved in the research enterprise...are more important than the...physical structures around Wits and so on...it has [enabled my productivity]...it has...it does mean...it enables it in...ways like...if I have a vacant studentship...people want to come and work...so I don't have any difficulty...attracting people but the ones that are coming in will...firstly work their buts off... and then secondly, they pick up the ethos...and will spend time mentoring...and helping this next generation down there...and all of this...and then adds...it adds papers...peer reviewed paper ever day...*" *[RPMOT-R3]*

The ethos of unselfishness also extends to the support other team members can give each other.

"*…the fact that...they will help each other...if somebody has a paper in the formative stages...they can give it to one of their colleagues...and this person will read it and advise*

them...and not expect anything in return...not expect...other than a reversal of that process...but they won't expect their name to go on it...on the paper just because they have read it..." *[RPMOT-R3]*

However, engaging in collaborative, or team based, research is also a function of an individual's ability to work with others. Higher levels of research productivity might be achieved through being less selfish.

[Some people…] "*are more able to work with others... It is a skill but it is also an attitude...because if you are very ambitious you may want to hold everything close to you...you may want to make sure you get all the credit for what you have thought of...if you are more generous in nature you may say when I worked with somebody you will get more out of it...I will actually get more out of it that if I had held it all to myself....It is not a zero sum game at all...it is not a zero sum game...many people play it as a zero sum game...and then [they end up being less research productive] that is my opinion and my impression...and I have worked in many places all over the world...which includes the most selfish through to the most generous..."[RPMOT-R5]*

The theme that emerges strongly here is the relationship between working with others and higher levels of research productivity. Values related to generosity are linked here (causally) with higher levels of research productivity. Less selfish values might develop over time for academics.

"Benevolence and universalism may become more prominent, the more a person becomes older and established, which may lead the person to also be interested in developing other researchers". [VTRA-R16][VUNI-R16][VBEN-R16]

By extension, the theme of self-transcendence by creating a legacy, or creating some form of work product that will 'continue on', emerges.

"*…and it [the research work] is there long beyond the craftsman's lifespan obviously things of great excellence in the knowledge world are things created by…Nobel prize-winners which would be the absolute zenith of creativity and recognition in our field…and these are pieces of knowledge are among the greatest recipients of the Nobel prize and there are people prior to…way beyond their mortal lives…to me it creates a type of immortality…and that value…would express that value of ….craftsmanship". [RPMOT-R1]*

Such a motivation might result from an abstract perspective of individual legacy.

"*…in a transitory situation you create something of value that extends beyond the individual that created it…" [RPMOT-R1]*

Over and above the concept of collaborative or team orientation, the concept of individual drive, or individual work ethic was found to be reported as an important values dimension of research productivity.

"– a clear view of what is required and why – the capacity to work really hard for many decades and not to lose focus [RPDRVR8]. The personal factors producing success are passion [RPPAS-R8] and hard work" [RPHWK-R8]

Honesty and being trusted were also reported as important aspects of high performance research productivity.

"To be absolutely honest and to be trusted [VTR-R8]. To have great moral values – otherwise no one will follow when the going gets tough" [VINT-R8].

The values orientation of an academic might also influence the extent to which fundraising is achieved.

"Ability to attract funds is essential [RPFUND-R8] and this is helped by a strong presence in the public space." [RPPUB-R8].

A values orientation might also relate to an academic's standing in the academic community.

"…being a subject specialist [RPSPEC-R16]; maintaining your academic standing. [RPPEER-R16]

According to these perspectives, the intrinsic aspects of research productivity are an important dimension of research productivity. Certain responses offered strong analogies that supported the conception that strong intrinsic values oriented aspects might dominate research practice by individual academics.

"Research is a little like falling in love; you can't force it; it happens when it happens [RPREC-R11]. All you can do is expose yourself to suitable situations and environments and be receptive [RPREC-R11]. Part of making oneself receptive is reading in and around the field and developing appropriate skills so that one can run with an idea when it suggests itself [RPREC-R11]. [For example…] skills in mathematics, physics and philosophy can be important in the health sciences" [RPMULT-R11].

According to this perspective, the management of such intrinsic aspects is problematic, and the process is located in the individual's own domain of management. However, other, more external, factors might also influence an individual's values orientations.

"The system in which a researcher operates can influence a researcher's values by virtue of the reward system that it employs [RPINCR7]. However, in my experience, a researcher's values are heavily influenced by one's supervisors, mentors and role models [VCOLR7]

[OCHIERR7]. Therefore, departments and institutions tend to take on a culture/philosophy that is promoted and exemplified by its leading researchers [OCHIERR7] [OCRVTR7]."

The relationship between organisational cultural values and individual values orientations might also therefore also be an important aspect of research productivity. The national context might also therefore influence individual values through the management systems implemented as part of national policy.

On the basis of the data analysed in this section, Proposition 13 is derived: *that differences in work-role specific satisfaction are related to differences in research productivity between individuals*. Derived from this proposition, then, are the following propositions related to the *Satisfaction Loci Proposition of Research Productivity*; that research productivity will be significantly associated with the level of satisfaction an individual derives from research as an activity. Implicit in this definition is the fact that such satisfaction will vary according to the nature of the different tasks associated with different forms of research. Also implicit in this definition is the fact that any factor that can influence such satisfaction can also influence research output.

On the basis of the above analysis, *Proposition B* is derived: *that differences in individual values are related to differences in research productivity*.

4.4 INDIVIDUAL PERFORMANCE FACTORS: INDIVIDUAL LEVEL OF ANALYSIS

4.4.1 Proposition C1. Job Satisfaction is related to research productivity.

The 'satisfaction' aspect of research work was found to emerge from responses. The differentiation between research and work and research as a hobby is an interesting differentiation.

"I run a little research unit...I have ten to fifteen postgraduates...and we have fun...it is a hobby..." [RPSAT-R4].

A theme that emerged from the analysis was the importance of satisfaction in research productivity, but not so much the satisfaction of individuals but rather the specific satisfaction that individuals derive from their primary work task. In this context the two primary work tasks to emerge were teaching and research. The issue of 'remoulding' teachers to become researchers, or developing people that derived their primary satisfaction from teaching toward becoming researchers is a problematic notion, according to certain responses.

"...I believe in fact there're two basic types… there's the academic who essentially is a teacher and who dabbles in research and you have...in other words the satisfaction of the job is in the teaching aspect of academic life. On the other hand you have researcher's that gain their major job satisfaction from producing research output…articles in particular and having them published". [RPSAT-R1][RPMOT-R1]

According to this perspective, the source of an individual academic's job satisfaction is a key differentiator between individuals that are research productive that those that are less research productive.

"to remould people...as the vast majority of academics are essentially teachers...into a research mode…and may be problematical… in my view. And in that case research productivity may not be enhanced by that method by bringing these people on board. My personal experience has been that you can take a horse to water but you can't make it drink..."[RPSAT-R1] "...there are some people who…I've got personal experience of it….years of this…tangible examples, which will remain nameless…of individuals who have been given this option and have been indicated how to go about it...and there's no passion to take it forward...once the project is over there is no self…drive to continue with the research process...so after a flurry of activity everything regresses back to a normal state of inactivity."[RPSAT-R1]

On the basis of this differentiation of research productivity by individual locus of satisfaction, *Proposition C.1.* is derived, *that job satisfaction is positively related to research productivity.* A further proposition is also derived from this analysis, and the discussion that relates can be found in the section that relates to Proposition C.13.

4.4.2 Proposition C2. Self-Efficacy is related to research productivity.

Constraints to research productivity can be associated with a lack of Self-Efficacy, or self-belief.

"…In addition the best researchers also need self-belief"[RPSEFR8] "Success re-enforces the positive behaviours and beliefs e.t.c." [RPVCR8] "… strong self-esteem[is positively related to research productivity] " [RPSEF-R16].

Self-Efficacy might increase over time, as a result of increased research confidence derived from experience.

"...fear of failure is...huge in the early years of your career and...fear of embarrassment...fear of...it is the fear of failure...making mistakes there...as you get older...I

am making mistakes all the time now...and it doesn't actually worry me anymore...so you know...nothing would delight me now...more than to have one of my papers proven wrong...if someone can come along and have better data and proves it wrong that would be great...but early career...for you to get back referee's reports on a paper...and they said...this is clearly wrong...it's very devastating..." *[RPSEF-R3]*

The implication of this is that developing confidence in beginning researchers might enable research productivity for such individuals. This supports the notion that Self-Efficacy, or the belief that individuals have that they are able to do a task contributes to their ability to do such a task. Higher levels of Self-Efficacy are expected to be a function of age and experience in this context.

"*I think it is the rare person who has so much self-belief that they can operate comfortably in the early part of their careers...it's much easier and much more profitable for the institution to have you know...the family members saying...you're ok....you're...don't worry that you screwed up on this...everybody breaks in different...everybody gets papers rejected...[RPSEF-R3]*

Mechanisms that can enhance research productivity include processes that reduce the fear associated with research, and that offer support.

"...it shouldn't be the end of your life...because of what's happening there...and maybe you should spend a little more time doing this and less doing that...so to have somebody in a parent role...transactional analysis...somebody who's...who's the parent role...is...I think...very enabling....because I think...I...think the early career of researchers...spend a lot of their time being terrified...they are not going to get tenure...they are not going to publish...they don't know where to get the money from...they do not know what to do...they don't know how to actually gather data...and just to leave them on their own...it both makes them progressively unhappy...or scared...and at the same time deprives the university of productivity..." [RPSEF-R3]

What emerges here is the researcher as 'family member' metaphor, and the almost parental role of a research leader. According to this perspective, self-belief or Self-Efficacy is achieved through reassurance and guidance. The emotional stress, or fear and uncertainty associated with beginning research roles, is also highlighted. The implications of these conceptions are that some form of membership of a research unit, or team, is very important in order to enable Self-Efficacy in research productivity. What emerges from these responses is a sense that Self-Efficacy is positively related to research productivity. Proposition C2 is therefore offered: *that Self-Efficacy is positively related to research productivity*.

4.4.3 Proposition C3. Individual affectivity is related to individual differences in research productivity.

Personal disposition reflects individual differences, and might be related to differences in research productivity. Certain respondents placed personal disposition as the most important factor that influences individual research productivity.

"...factors that enhance research productivity are obviously personal disposition…that would be the most important thing…" [RPDIS-R2][RPAFF-R2]

According to Respondent 5, research productivity "*depends on the personality...to be a good researcher you got to have a lot of perseverance...if you want to do things quickly you are not going to do… everybody is different....and personalities are different so I am not keen to categorise them but I can draw the limits that are there..." [RPDIS-R2]*

Disposition that relates to behaviours that influence how an individual relates to others might be related to research productivity.

"...if you are more generous in nature you may say when I worked with somebody you will get more out of it...I will actually get more out of it that if I had held it all to myself...."[RP-DIS-R2]

To some extent it might be possible that personality types that are more inclined toward working with others, such as Extroversion might be more aligned with positive systemic effects that result in more collaboration between researchers. Conversely, dispositional orientations that are more aligned with neuroticism might be expected to be related to the opposite effect. To the extent that PA mirrors Extraversion in its association with a greater inclination to working with others, and NA reflects Neuroticism, which might be associated with a lesser inclination to working with others, and due to the methodological advantages associated with using the Affect factors instead of their corresponding personality dimensions, the following Propositions were adopted: (i) Proposition *C3.a. Negative Affectivity is related negatively to research productivity; and (ii) Proposition C3.b. Positive Affectivity is related positively to research productivity*.

4.4.4 Proposition C4. Experience is related to differences in research productivity.

The influence of time as a cause of changes in an individual researcher was a theme that emerged from the responses. The changes of a researcher over time can also extend to risk-aversion.

"*...so there are...as you age...as with time...as with experience...you get much more...much less risk averse...*" *[RPTIM-R3]*

Risk aversion might influence research productivity, to the extent that lower risk aversion might be associated with more innovative research projects. The temporal aspect of goals can also change with time.

"*...you get...immediate short term goals become not so important any more...long term goals become much more important...as you get older...the willingness to share grows...you know when there...when you start it is 'this is my idea'...won't let anyone else use it...because I can't think of another idea....now...when you get to...down the track...you just wish there were more people around that could pick up your ideas...because you are generating so many more ideas...than you could possibly...ever use...so you want to share them out...so there definitely are...well you'd have to work it out whether it is time related or age related...it's variance related...you can't divorce them really...I mean experience comes with time...it comes with age...*" *[RPTIM-R3]*

According to this conception, differences in age and experience might be associated with differences in collaboration, or the extent that knowledge, and the knowledge creation process itself, is shared with others. The theme of motivation in relation to age seems to also relate to such a career cycle.

"*I think as a career reaches its zenith or it becomes if you like a middle aged issue of a middle aged angst you begin to realise that you have got if you want to get anything done you get it done now or not all…*" *[RPTIM-R3]*

Age and experience are therefore expected to be related to differences in research productivity, and research productivity might actually rise at certain points in an academic's career and decline across other periods. A life-cycle of research productivity might exist.

"*…other researchers might have their own particular drive…which are very individual but I would say the factors that influence a researcher's values over time would be…the...well…the research you could have a life cycle in a sense that at certain times the research output and…this personal vanity becomes less important than the realities of the situation which we are faced with for example your productivity may become lesser when you are going through the stage of...growing family you have to provide so you do more consulting work". [RPFAM-R1] [RPTIM-R1]*

If a research 'life-cycle' does reflect the dynamics of family interaction, then such productivity might be expected to vary across an individual's career according to family commitments. What also emerges here is the notion that individualism is moderated by the

needs of a group; the family. In a sense, the motivational structure that motivates research productivity has been premised (in the above sections of the analysis) as highly individualistic, yet these motivational values can change over time.

"*…I think researchers' values could change over time in a kind of life cycle situation where certain things become more important. I know from my point of view you have a middle stages of career I did not produce a great deal because I had so many other things to concern myself with…" [RPMOT-R1] [RPFAM-R1] [RPTIM-R1]*

The change in the motivational values of academics might also be reflected in work roles, including the tension between the roles of teaching versus research, and perhaps income generating activities versus research.

"*...it became important to teach after time after hours…a lot of energy was spent in teaching because you could accentuate your income that way…actually I think… I don't think there is any accident between the finding that professors at the end of their careers are actually at their most productive if they are competent researchers because they are becoming free of perhaps the load…" [RPRVT-R1] [RPTIM-R1]*

A change in the values of an individual academic might occur as a function of time-related effects such as experience and age.

"Benevolence and universalism may become more prominent, the more a person becomes older and established, which may lead the person to also be interested in developing other researchers." [VSE-R16][VUNI-R16][VBEN-R16][RPTIM-R16]

A fundamental change in meaning structures might therefore occur over time, as a switch occurs in an individual's intrinsic motivations and behaviour along the dimension of the self versus the subordination of the self to the goals of others in order to achieve a legacy, or a 'long term mark'.

"...it requires...a conscious switch in your own attitude in research...when you move from building your own career to building others' careers...if you want that long term succession...if you want to leave that long term mark...". [RPTIM-R3]

The context of the experience accrued by an individual, however, might influence such changes, and the extent to which experience does lead to greater Self-Efficacy and self-confidence might be an important aspect of how time-related effects influence research productivity.

"...yes...they [values] certainly do [change over time]...I know mine have and I have seen other people's doing it too..."[RPTIM-R3]"....fear of failure is...huge in the early years of your career and...fear of embarrassment...fear of...it is the fear of failure...making mistakes

there...as you get older...I am making mistakes all the time now...and it doesn't actually worry me anymore...[RPTIM-R3]

Derived from the above analysis, *Proposition C.4.* is derived, *that differences associated with the passage of time, or experience in the form of time-related effects, will influence research productivity*. On the basis of the above analysis, the following sub-propositions of Proposition 4 are also offered: (i) Proposition *C4.a. Differences in age related to differences in research productivity; (ii) Proposition C4.b. Differences in years spent in South Africa are related to differences in research productivity; (iii) Proposition C4.c. Years of full-time work experience are related to research productivity; (iv) Proposition C4.d. Years of experience as a researcher are positively related to research productivity; and (v) Proposition C4.e. Years of experience within the institution are related to research productivity.*

4.4.5 Proposition C5. Differences in gender are related to research productivity.

The role of family commitments was indicated to be a potential constraint to research productivity through its influence on time available for research. *"…Your productivity may become lesser when you are going through the stage of…growing family you have to provide so you do more consulting work and you have less time…"[RPFAM-R1][RPTIM-R1]*

Similarly, the role of family commitments can result in a prioritisation of family needs over research productivity.

"…The young person that comes in and is determined to make a splash has got different values from the one that has just had two young kids and you know really just wants to keep a job to support that...so those will be the personal issues..."[RPFAM-R6][RPTIM-R1]

The notion that research requires a prioritisation of research over and above other priorities was found to emerge from the qualitative data.

"The researcher lives for his/her work -- the ideas, insights are part of the researcher's life experience. Hence, measures such as a 40-hour week or free weekends are meaningless…"[RPTIM-R9]

A tension seems to exist; between the 'pull' to do research and the practical demands of family life.

"…I try hard not to let it [work spill over into non-work life]...and I just notice...if I start doing that...if I bring out my laptop on vacation...or even just when I get home...with my kids and my wife...things don't go well...I can't concentrate...there are interruptions...my kids

want my attention...I can't get what I want done because of the interruptions so its just a bad idea to even try. So I try not to. But I feel the pull..."[RPTIM-R10]

To the extent that gender-roles might not be equitable, and women might be exposed to more time constraints associated with family commitments, Proposition C5. is suggested for testing, that there are differences in research productivity related to differences in gender.

4.4.6 Proposition C6. Differences in exposure to the international context are related to differences in research productivity.

Differences in research productivity might also be a function of differences in language and of different experiences of the international context.

"We have found...we have people from all countries, particularly from African countries where the language problems are quite severe...people coming to us have severe language problems..." [RPINTER-R5]

Individuals from countries that do not speak English are expected to be disadvantaged in a context in which the primary language of Journal article and other forms of research presentation and publication is English.

Proposition C.6.a. is therefore offered: *that differences in country of origin are related to differences in research productivity*. The dominance of English, for example, as a language of research publication, is expected to advantage individuals that have English as a home language. Therefore, Proposition C.6.c. is also posited: *that differences in home language will be related to differences in research productivity*.

Respondent 4 stresses that he developed "*technology which relates to [deleted]...which are not a national priority...so I tended to find my relationship was international rather than national...that is an issue which you could address in your summary...if you look at the government's setting up international relationships as it does...if you look at the NRF website...they've got programmes...in Germany...in Switzerland...the rest of it...but they tend to confine them...to what they call national priorities...and they don't allow more Blue Sky stuff...although NRF does have the Blue Skies programme...but my field...my relationships are predominantly international...they are not national.." [RPINTER-R4]*.

Exposure to such an international context in terms of the amount of years spent living in different countries might facilitate the international linkages necessary to produce research as part of an international community of researchers. However, also present here is the tension

between the local and the global, in the form of government stipulations as to what areas of research enjoy more support than others.

"...this two way worries me...because I would get more interaction locally if it was within the national sort of priority area...which it isn't...and yet at the same time its...'let's bring in international students' and its 'let's get international partners'...so government should not constrain the areas in which you can work...which I think is a real problem....you see every time it comes out...that you work on green technologies...or sewerage...or water research...or something that is regarded as a national priority...and yet on the other hand they're supporting astronomy...and space science...so you sometimes...I don't know who drives these things... a perspective of what research is all about..."[RPINTER-R4]

The influence of working in different countries is expected to influence an individual's development over a career in research.

The focus of academic productivity also differs between countries. In some countries it might be relatively more important to be able to raise research funding.

"*I think one has to fall into [journal articles being the dominant form of research productivity measure]...I mean if you look at the American model...where they want to appoint you as a researcher...they don't...I am not even sure research articles become the prime measure...its how much grants you collect...[laughs]...[RPINTER-R4]*

International differences, such as the need to align research areas with funding might, however, be a source of differences between models of research.

"its [the ability to raise research funding] never been a driver in my case...in the States that becomes very important...money for research contracts...and again that could be very good...because funding the research structures is very good...I have had three or four of my students go to MIT...the last two they got their degrees there...they work on a contract basis...so there might be six or so students on the one contract...and you 'dare not move sideways'...[RPINTER-R4]

In contrast, the South African funding context might support less 'bounded' research directions.

"...my research...we just...go where it takes us...and sometimes it falls flat on its face...and sometimes it works out....and so...part of the strength of my group is that we've looked...we're experimenting...we've looked at rather novel and unique facilities...these have popped out of the blue...nothing drives them...it's not because I have searched the literature...you know...you just get involved...and say 'there's a question to be answered'...generating...and that's why the NRF incentive funding is so valuable...because it is not bounded...you get a

hundred thousand rand a year and you can do with it what you like...and that suits me ideally...I don't chase...which is unusual..." *[RPINTER-R4]*

Exposure to the globalised context of research publishing is not, however, without its negative influences, in what seems to have become a 'frenzied' industry of academic research publication.

"*I get very disturbed...the way that publishers are manipulating the system...I had a very strange experience just the other day...one of my colleagues...submitted a paper...it was accepted...it came back with the editor saying...'please include more papers of mine'...in your references...some of them don't go that far...some say 'please refer to papers from this journal'...it's becoming weird...its becoming very weird...distorted...never mind the journals peer review...the Chinese are going mad...conferences and journals...I get invitations all the time...crazy...*" *[RPINTER-R4]*

The practical applications of papers might contribute to their chances of being published, particularly if practitioners also read the research, but to be published internationally, the issues need to be relevant to international stakeholders. An important aspect of international publication might be the practical application, or practical relevance of such papers to international audiences.

From the above discussion, it seems that exposure to different contexts might shape an individual's approach to, and personal definition of, academic productivity. To the extent that different international experiences might be associated with different learning experiences, *Proposition C.6.b.* is offered: *that international experience of countries lived in is positively associated with research productivity*, or that the number of countries an individual has lived in for over a year will be positively related to research productivity. Similarly, experience in other contexts, such as the multinational corporate context, might expose an individual to more globalised values and practices. *Proposition C6.d.* is therefore also offered; *that differences in research productivity are related to differences in experience in a multinational company.*

Differences in the international precedent, or the extent to which practitioner communities might have international linkages, will also be expected to be reflected in differences between academic fields and differences in research productivity.

"This [the influence of practitioner communities on academic fields and practice] is particularly true in the health sciences where the professional bodies play too much of a role in defining the content of undergraduate programs [RPRVT-R11]. In the health sciences, and in many other professions, publication tends to be easy if the paper is narrowly clinical in

application [RPPROF-R11]. A case study is often easy to put together and be accepted for publication [RPPROF-R11]. This is very different from mathematics, the hard sciences and philosophy where there is no place for 'trivial' papers like these [RPPROF-R11]. Thus, on the face of it, research productivity may look better in the case of the former group of fields [with dominant practitioner communities] than in the latter group whereas the reverse is the actual case" [RPPROF-R11].

Similarly, derived from the above discussions on the influence of practitioner fields on their academic counterpart fields, *Proposition C6.e.* is also posited, *that differences in research productivity are related to differences in membership of professional associations or networks.*

4.4.7 Proposition C7. Formal education is related to research productivity.

Levels of formal education are a requirement for further studies, and evidence of such further studies is a requirement for entry into work as an academic. However, many academics continue with their formal studies, and in this context not all staff have doctoral qualifications. Within the South African context there is a sense, from the respondents, that formal education prior to the university level does not currently prepare students adequately for research, which has implications for the development of academics, and, hence, their future research productivity.

"Prospective research students have poorer skills in composition than they used to have.[RPED-R11] This means that even if they can do the research they lack the ability to put it together in a coherent form [RPCHR11]. Thus productive researchers end up spending too much energy and time on rewriting theses and papers the students have tried to write [RPRVT-R11]. Mathematical skills are poorer too than they used to be which is an inhibiting factor in many fields of research." [RPCH-R11][RPED-R11]

These responses stress the importance of formal education in preparing students for more advanced levels of study. To the extent that formal education at the postgraduate level is expected to differentiate academics into those with doctoral qualifications and those without, it is expected that years of formal education will be positively related to higher levels of research productivity. *Proposition C.7.* is therefore posited, *that levels of formal education are positively related to levels of research productivity.*

4.4.8 Proposition C8. University rank is related to research productivity.

To the extent that professorial designations are typically awarded to academics that have attained a certain level of research productivity, the relationship between these designations and research productivity is expected to clearly indicate a progression of strength of relationships, from the weakest associated with the Mr./Ms. designation and the strongest associated with the professorial designation. Proposition C.8. is therefore suggested, that research productivity is related positively with university designation rank.

4.4.9 Proposition C9. Time-constraints are related to research productivity.

A theme that emerged from many responses was the issue of resource constraints to research along the dimension of time.

"Serious research takes a lot of time...requires conceptual thinking...lots of reading...so it takes time for ideas to evolve..."[RPTIM-R2] "% time able to devote to research" [RPTIM7]; "providing staff members sufficient time to do research"; [RPTIM-R16] "Time [is] necessary to write/do research" [RPTIM-R16]

The source of time constraints in this context can include the taking up of management positions within the university.

"…a productive researcher should not be made head of department; ideally a head of department should be appointed who has been an active researcher but is no longer active in research" [RPMAN-R11]

Proposition C.9.a. is proposed, that *the greater the span of control of an individual the lower the research productivity of such an individual*.

Research productivity, however, at the level of the organisation, unlike at the level of the individual, might be enhanced by a horizontal structure of governance.

"*…a horizontal structure of governance" [RPRECR7]*

Family commitments might impose a limit to the extent to which work commitments might spill over into non work life. Work-life balance might be enhanced through marriage. However, work-to-family spill-overs associated with high levels of research productivity will be expected to be constrained. *Proposition C.9.b.* is proposed; *that research productivity is negatively related to marriage.*

The more dependent children an academic has, the more likely the academic is to experience family-to-work spill-overs, and not work-to-family spill-overs. *Proposition 9.c*. is therefore

offered, *that research productivity is negatively related to the number of dependent children a researcher has.*

4.4.10 Proposition C10. Research collaboration is related to research productivity.

Levels of collaboration can be positively related to research productivity.

"...if you don't find a location in a community then I think if hampers your productivity in the sense of not in terms of what you can yourself produce but in terms of what gets out there..."[RPCOL-R2]

The tension between the individualistic nature of research production and more collective research production might not be independent of a life-cycle conception of research productivity.

"*…at a professor level you have a responsibility to help others and their energy is transferred into products in our case who have done the teamwork type products…*" *[RPCOL-R1]*

The notion of responsibility to help others is framed here as a function of the seniority of an academic's position. Certain constraints, or practical realities might, however, exist which make working in teams difficult.

"*…but of course you want to have people who are who can work together and not everybody can work in a team...so I have this metaphor of what I call generous researchers and selfish researchers...and I believe that the students and the teamwork with the generous researchers are much more inventive than the selfish researchers. .. they leave a legacy where the selfish researchers don't leave a legacy...the selfish researchers make be just as smart as the generous researchers but the effect on the system and what they achieve and leave behind is very different...*" *[RPCOL-R5]*

The collaborative nature of highly research productive research is a theme that emerged strongly from the data. Collaborative research is also able to be used to overcome barriers to research productivity.

"a research friendly environment so that the others also research and that you are not alone" [RPCOL-R2]; "*We have found...we have people from all countries, particularly from African countries where the language problems are quite severe...people coming to us have severe language problems...one of the ways we deal with this is arranging our research into groups....and the groups then help each other...so instead of having individuals working where you have no one to talk to they are in a group of five, six, seven people, and they*

can...then you get peer group learning which is very important in an environment where people are second language initially...things like that...so though one of the reasons...one of the organisational reasons for our success we believe is the teamwork we engender into the people so we work as a team and we expect the students to work as a team...".

A theme that emerges here is that of collaborate learning which has been applied as a response to a problem (different languages). Another property of collaborative learning is its success in promoting research productivity through bringing more people into the research process.

"...you raised the issue...how difficult it is for people to get into research...early career people to get into research...I think....when people try to do it on their own...so....so...we it's much easier for people to get into research if they attach themselves to a flourishing, operating research organisation...a research entity" [RPCOL-R3]

Such collaborative membership of a research entity can be used to develop individuals, particularly when funding can be a constraint to such development.

"*...where there are people around to mentor and where the infrastructure is in place and where the funding is in place...so that they can get into research using someone else's funding, I think that's an absolute essential...for getting into research...you should always be able to get into research using someone else's funding..."[RPCOL-R3]*

In academic fields that require funding it might be imperative to ensure that beginning researchers are supported to join collaborative research groups that already have such funding.

if you have to raise your own funding at the beginning of a career...its hugely difficult...so I think the university should be discouraging, or no...you can't discourage it because you can have...you know...a brilliant mathematician who doesn't need any....kind of...anything else...doesn't need money...and can operate perfectly on their own....but I think the university should be encouraging people....when they come into the university...in their early careers...to look around...for flourishing research enterprises...to which they can attach themselves for their early careers at least...they can leave them afterwards...they can go elsewhere afterwards...they don't have to stay...once they're on their feet, but it's...it's like asking a baby to get going without a family...so it's what you need to do...".

The metaphor of the new researcher being similar to a baby echoes other respondent's conceptions; of research being difficult for new academics that are entirely new to it. The 'family' conception is particularly salient, as it implies a wholehearted commitment to the development of such researchers on the part of more established researchers.

The following factors were found to be considered important factors related to higher levels of research productivity.

"quality of research team [RPCOLR7]; percentage of postdoctoral fellows (higher % facilitates high-level productivity) [RPCOLR7]; strength of one' academic department/Faculty (i.e. availability of colleagues – this is why research institutes, in which expertise is concentrated, typically have the highest research productivity)" [RPCOLR7]

Clearly evident from these factors is the notion that the concentration of expertise might create a synergistic effect which may 'amplify' research productivity. On the basis of the above analysis, *Proposition C.10.* is posited, that *higher levels of collaboration are related to higher levels of research productivity*.

4.4.11 Proposition C11. Research approaches are related to research productivity.

Differences in academic fields might be reflected in the differences in the value ascribed to quantitative versus qualitative research methods.

"Quantitative fields do not really attach value to qualitative research" [RPQVQ-R16]

Notwithstanding these differences, both methods are considered important in the university context.

[Research productivity is facilitated through] "thorough knowledge o[f] quantitative/qualitative research" [RPQVQ-R16]

Nonetheless, clear differences in the preference for certain types of methodology are found to be associated with different academic fields.

"...physiology...at least the physiology that I do is...is completely empirically driven..." [PRQVQ-R3]

Different academic fields are typically associated with different methodological orientations. Differences between fields also extend to different paradigms of research. For Respondent 3, in an empirical field

"...there is no paradigm behind it at all...it's always been intriguing...and difficult for me...when you talk to psychologists...and they say well...we come from this school...and it is driven by all the paradigm...that you are talking about from the social sciences...there...this is our base...and this is our framework...and then we latch on to that...because in physiology we work the opposite way around...we are empirically driven...and out of that come frameworks...but if there is no reason to stick with a framework...you can abandon it at any time...it's much more empirical..."[PRQVQ-R3]

There is a sense here that the more empirically-oriented an academic field is, the less beholden it might be to the influence of 'paradigms' or the dictates of sub-cultural frameworks of practice that exclude other forms of research practice that are different. The use of different methods associated with different fields, however, has different implications for the use of resources, such as time.

"...for empirical work to get done...if you are working empirically...there is a lot of time in collecting the data...if you are working qualitatively there is a lot of time in analysing the data...so I think time is the most significant factor...and time has become less and less of a resource...and so I think that these increasing pressures on people's time" [PRQVQ-R2]

Quantitative research, therefore, differs in its time-related aspects from quantitative research. The use of quantitative methods is also found to be related to the need to make a difference in terms of 'real problems'.

"...I think educational research requires...it's conceptual work that you need to do but it requires empirical study...not make any difference to schools unless we find out what is happening inside them...so if you are not going to make any difference as to how kids learn if you do not actually study kids learning..." [RPQVQ-R2]

The implication of this conception is that in order to serve practitioner communities, or to solve their problems', empirical methods are necessary. If research output is to some extent a function of the needs of such practitioner communities then such demand might also shape research productivity. On the basis of these differences, Proposition C.11. is proposed, that differences in preferences for qualitative versus quantitative research methods are related to differences in research productivity.

4.4.12 Proposition C12. Locus of Control is related to research productivity.

According to certain respondents the issue of independent self-motivated behaviour is prioritised as an important aspect of research productivity.

"[Factors which cause higher levels of research productivity are] intrinsic motivation [RPMOT-R16]; Achievement, self-directedness, power. People may want to maintain their image/standing (achievement). Self-direction: motivation to function on one's own and trust your own judgments. Power: Being promotable; achieving your position of being first/the best. [VSE-R16] Persistence [RPDRV-R16], subject knowledge [RPSPEC-R16]."

To the extent that an internal locus of control is associated with the extent to which circumstances, and the outcomes of one's actions, are a function of the location of agency

within the self, Proposition C12 is offered: *that a higher level of internal locus of control (which is expected to reflect self-empowering intrinsic forces) is related to higher levels of research productivity*.

4.4.13 Proposition C13. Work-role specific satisfaction is related to research productivity.

In the context of an institution with an explicit goal of increasing its research productivity, an overarching theme that emerged from the analysis of the responses was the conception of two types of academics, differentiated by the extent to which primary job satisfaction was derived from two roles: teaching and research.

"...The fact is threat research productivity improvements are I think are very much, in my view anyway based on the motivation of the academic and I believe… I have started this before but I believe in fact there're two basic types… there's the academic who essentially is a teacher and who dabbles in research and you have, in other words the satisfaction of the job is in the teaching aspect of academic life.[RPTSAT-R1] On the other hand you have researcher s gain their major job satisfaction from producing research output...articles in particular and having them published."[RPRSAT-R1][RPRVT-R1]

A typology differentiation between work roles therefore also emerges, of teacher-satisfied academics versus researcher-satisfied academics. Another typology is also identified; the hybrid, who is both teaching-satisfied and also research-satisfied.

[Despite] "*this fundamental difference of motivation between two basic types of academics...there are hybrids in between…there are hybrids but they are rarities…"[RPHYB-R1][RPRVT-R1]*

If two fundamentally different types of academics do exist in this context, then certain implications arise from this notion.

"...to remould people...as the vast majority of academics are essentially teachers...into a research mode…and may be problematical… in my view. And in that case research productivity may not be enhanced by that method by bringing these people on board. My personal experience has been that you can take a horse to water but you can't make it drink..."[RPRVT-R1]

This differentiation, also according to research productivity, is premised on the intrinsic motivation of individual academics according to two roles: the 'teacher role' and the 'researcher role', and an implication of this differentiation is that the sustainability of

research productivity is dependent on this intrinsic motivation, which in turn is dependent on the satisfaction an individual derives from the specific job task (teaching versus researching).

"...there are some people who…I've got personal experience of it….years of this…tangible examples, which will remain nameless…of individuals who have been given this option and have been indicated how to go about it...and there's no passion to take it forward...once the project is over there is no self…drive to continue with the research process...so after a flurry of activity everything regresses back to a normal state of inactivity."

The trend, however, in the current higher education context, might be to develop everybody to become researchers, where no differentiation is acknowledged of individual satisfaction loci of satisfaction.

"*...a great deal of effort has been made by the university, not just this university but other universities, to increase research productivity, not so much by milking the cash cows they have...more assiduously...but by trying to get more people into the research field…*" *[RPRVT-R1]*.

The notion that role conflict might exist seems also to emerge.

"*...to remould people...as the vast majority of academics are essentially teachers...into a research mode" [RPRVT-R1]*

This theme, of a role conflict between effective teaching and effective research seems to also dominate at the level of the institution. The institution, as an entity, might effectively exist as a producer of culture. However, such an objective, of cultural change, might contribute to the weakening of the typical rules of behaviour that have dominated in such an institution, because a conflict between institutional goals is introduced.

"*...you cannot run a research university and a community college on the same campus...and we are attempting to do that at the moment..." [RPRVT-R3]*

This theme seems to be mirrored, in different ways, across the individual and the organisational levels of the institution. The tension between these two roles, of teaching versus research, is evident in the data.

"*...we profess to be an elite research oriented university that wants to get into the top 100 in the world but we're serving a community college purpose at the same time..*" *[RPRVT-R3]*

This theme is also echoed in the conflict between the strategic goals of certain institutions which emphasis a differentiation by research productivity, and the practical goals of increasing student numbers.

"*…Wits is already saying...it wants to raise itself to be one of the top 100...and that is great...but I don't see that they have examined sufficiently what it needs to do to make the*

staff more productive...because we have this overlay of increasing number of students...less prepared students...no increase in staff to cater for it..." [RPRVT-R3]; [There are] "...far too many undergraduate students that need a lot of help" [RPRVT-R3]

This tension, therefore, seems to reflect a tension between these two work roles, but a tension that arises from different sources. One dimension of this tension is the dichotomy between (i) intrinsic forces that are dominant in the differentiation between the roles of teachers versus researchers, and (ii) forces that are extrinsic to the individual researcher, that act through mechanisms of institutional origin, such as the pressures associated with taking into the system "too many undergraduate students" that need such help. According to Respondent 3, such a focus on teaching more students that need more assistance was *"of course....necessitated by history" [RPRVT-R3]* There is an acknowledgement here of the undemocratic history of the country prior to 1994, and the need for large student numbers in order to address the legacy of the past.

The theme of massification, or the prioritisation of the teaching of large numbers of students, is, however, stressed as policy which is incommensurate with a goal of significantly increasing research productivity.

"…*that* [in] *massification you get situations where you pack them in…economics is a good example of that… you become a mulch cow for the university…not a research one… for second channel income from subsidy from the government…so were not looked toward contribution to knowledge...were looked towards…packing them in making money for the university…and I think that is a huge constraint because that affects academic members even those that are motivated*…" *[RPRVT-R1]*

The pressures for teaching are driven by the institution itself, at the expense of research productivity.

"...the younger people now...they get pushed quite hard...and the push is coming harder from the institution itself...and that is frustrating...it has caused a lot of frustration...because the...additional pressures due to our additional intake of students...has off-set this quite a lot...so productivity...at the lower levels...is difficult to achieve.."[RPRVT-R4]

Interestingly, a differentiation is made between the levels of experience of staff. The cost of, or burden of, higher levels of undergraduate teaching is considered to impact more junior staff more than senior staff.

"...a productive researcher should not be made head of department; ideally a head of department should be appointed who has been an active researcher but is no longer active in research and otherwise enabling their activities (too often heads without research experience

create a culture in which undergraduate teaching becomes the focus of the departmental activities and research is treated as peripheral [OCRVT-R11]".

The practical pressures to emphasise teaching (at the expense of research) might reflect the broader social needs that exist within the Southern African society, as the twin goals of the institution; to produce research and also provide teaching, are not independent of the societal context. The tension between these two goal dimensions of the institution, however, seems to underpin a dichotomy of goals within the institution. Both of the aspects of differentiation of the institution: teaching and research, seem to represent two fundamentally different work contexts. For highly productive researchers, such as the respondents sampled in this qualitative research, the perceptions of the extent of the constraint provide an interesting perspective, because from although teaching is identified as a primary constraint to research productivity, teaching is not expected to necessarily "negate" research productivity.

"*...heavier loads, more classes, more marking…I strongly I must say I strongly doubt the juxtaposition always made between load and productivity where workload negates productivity...I am not sure about that one...I have always found that researchers always find the time to do research and they always want to do research whatever their workload and I would say that there is no clear correlation between work load and low productivity...in fact there may even be a positive correlation sometime*s…"*[RPRVT-R11]*

A 'researcher-type' might perhaps therefore to some extent be robust to the influence of heavier teaching loads, according to this conception. There are differences, however, between the extent to which teaching dominates in different academic fields.

"but the thing is there are constraints for example if I was a member of…or paleontologist or something of that kind I would have very little teaching and would be able to spend less of my time, there would be a strong correlation between rarefaction of the area of study...like we have A grade scientists paleontologists and we have A grade scientists in the area of rock cave or rock painting now these areas are highly specialized with very low teaching demands…." [RPRVT-R1]

Certain academic fields might be used to create income opportunities in the form of student numbers. There are downstream implications of this, such as the alignment of selection policies within such Schools with a prioritisation of teaching.

"...and clearly the teaching aspect and the whole whether we are treated as a mulch cow for students vis-a-vis we are treated as a primary research area affects the culture of that particular school and affects the kind of people that are selected to come in. In the areas of massification I think like economics and management were often more concerned with

someone who can teach this subject than someone who can research…the very fact that we have to deal with this primary area of concern that the university has placed on our shoulders. So we are a mulch cow and that affects us and the type of people we can afford to take on board...for example…I am talking now…for example…is a research prof. We cannot afford many of those research people here because of huge numbers of people that we have to teach…" [RPRVT-R1]

What clearly emerges here is the acknowledgement of the tension between the two goals of the institution; between teaching and research goals. Importantly, perhaps, is the point that A graded scientists do not feature in this particular institution at all in the Schools which provide the greatest throughput of the university, such as the School of Economic and Business Sciences; the School of Accountancy and the School of Law, which fall under the Faculty of Commerce, Law and Management. The theme of massification, therefore, might vary in its relationship to research productivity according to the academic field involved. According to Respondent 1's perceptions, this is a factor that might constrain research productivity both at an individual level (through heavier workloads) and also at the academic school level, where the social system and School-level academic culture is expected to 'take its cues' from the institution and its prioritisation of one goal over the other that is specific to a specific academic school.

The strategic intent of the institution also seems to be reflected in the allocation of student facilities between undergraduate and postgraduate students. Despite the strategic plan of this particular university; to increase postgraduate student numbers, the practical realities suggest that undergraduate students are prioritised at the expense of postgraduate students.

"[there are] *far too many.... ....students...and...all the ramifications of that...within our residences more than half of all the residence places should be for postgraduate students and not for undergraduate students...*" *[RPRVT-R3] "A big constraint for lecturers is large teaching numbers and, hence, limited time for research." [RPRVT-R9]* "*South African universities, whether or not they claim to be research directed, are actually undergraduate institutions, in which research is an add-on." [RPRVTR9]*

Another theme that emerges is that of the synergy between research and teaching and the transmission of a research-oriented culture to undergraduate students in order to increase postgraduate enrolments.

"...certainly I believe that all our undergraduate students deserve to be taught, even in first year, by people who are active in the field there…" [RPRVT-R3]

This notion reflects the 'ideal type' discourse, of highly productive researchers sharing their knowledge and contributing to knowledge transmission more effectively than teachers that are not researchers. Another dimension of this ideal is the inculcation of a research culture in such students.

"…it is also certainly the case that if you are an enthusiastic researcher you do spark some interest in undergraduate students but the yield is extremely low....here we teach two hundred and fifty medical students...and ...medical students per year...none of those are going into research...maybe one, or two are going into research...so...and a lot of them are needing hours of extra help...but it is fulfilling a societal need…" [RPRVT-R3]

The tension between the ideal type of university which fulfils its societal needs both through knowledge creation and through producing practitioners to meet practical societal needs is clearly evident in this data. It seems that in medically oriented academic schools the pressures to meet societal needs are more acute along the dimension of teaching.

"Because the university is currently structured around undergraduate teaching...its not actually structured to support research...research is an add-on activity...its structured around undergraduate teaching...so...because there's...you have schools...and faculties which are committed to undergraduate teaching loads there...all your physical structures...and your organisational structures are all structured around that undergraduate teaching.." [RPRVT-R3]

The implication of this response seems to be that in order to achieve higher research productivity the university should, including in terms of its physical structures, be structured around research instead of teaching. Such a notion calls to mind a questioning of the role of universities as institutions of training versus institutions of research. The comparative advantage of a focus on one or the other would be expected to yield more effective teaching and research output. Short of separating such institutions, such a differentiation might be possible if the differentiation of tasks between teaching and research did occur within the institution, and academics with a preference for teaching had the opportunity to teach more, and academics with a preference for research were able to spend more time researching. In short, the responses seem to indicate a tension between the 'ideal type' of university where teaching and research are complementary, and the practical realities associated with such institutions that need to do both, when there are certain costs to research productivity associated with having to do both.

Two fundamentally different 'strategic' cultures might dominate institutional relationships between teaching and research in the institution; the culture of research oriented academics

and the ‘administrative’ or ‘institutional’ culture associated with the attainment of the university’s objectives. These might not necessarily be aligned. These different strategic cultures again reduce to the dichotomisation of the institution along the lines of the prioritisation of teaching versus the recognised need to do research.

“*...there are things like...the university is judged on how rapidly...it introduces postgraduate students based on their quantity...so it is better for the university in terms of its financial status...to produce a lot of quick...low grade postgraduate students...but...people who are most in research...don’t want to do that...if it takes an extra year to do it...that’s what they want to do...to get the output right...and not the time course right...so there’s....an immediate conflict in that...I think there’s this conflict that...the university wants research to be handled as an...add on...they want...they realise that the university’s reputation rests on it...but it must be done in the slots between the other activities...*” *[RPRVT-R3]*

The ‘administrative’ culture of goal attainment is perhaps a function of the incentives that drive the management of such an institution. The primary function of the institution might be teaching and not research, from the perspective of the ‘administrative’ culture that drives the management of universities.

“*...and it’s interesting isn’t it...there’s no requirement in the university to find third stream income for teaching undergraduate students...but there is for research...why...it says that somehow in terms of the university that undergraduate teaching has as higher priority...than research...[RPRVT-R3]*

Central to the issue of the prioritisation of research versus teaching is the notion of funding.

“...why not say to schools…‘listen...if you want to take in a thousand five hundred undergraduate students go find the funding’...because the university’s funding subsidy should just be spent on research...if you raised that to the administrators down there...but there are these cultural...there are conflicts between individual research origin culture and structure university institutional cultures, yes...” *[RPRVT-R3]*

The conflict between an ‘administrator culture’ and an ‘individual research origin culture’ might represent another cultural grouping within the institution that echoes the differentiation of academics as teachers versus researchers. The implication inherent in this excerpt is that if research productivity is the primary goal of the institution, then such a strategy needs to be reflected in a fundamental re-alignment of systems that are presently tailored to teaching so that the focus is changed to that of research. Given that the systems of these institutions might be tailored to teaching, it might be possible to significantly increase research productivity if these systems were also aligned with research.

Derived from the discussions above, *Proposition C.13*. is proposed, that *differences in research productivity are related to differences in individual loci of satisfaction.* The following subordinate propositions are derived from Proposition C.13.: (i) *Proposition C13.a*: *Differences in satisfaction with research are positively related to differences in research productivity*; and (ii) *Proposition C13.b: Differences in satisfaction with teaching are negatively related to differences in research productivity*.

4.4.14 Proposition C14. Academic supervision is related to research productivity.

Although supervision and research training for students might occur in different ways across institutions, there seem to also be differences in the extent to which research training is available for students.

Supervision and training does not occur in any systematic way. [RPSUPERV-R9][RPSUP-R9] [RPREC-R9]

Students are usually not exposed to a sound or systematic course in research preparation. [RPSUPERV-R9]

In these contexts it might therefore rest on the research supervisor to develop the research skills of research students. To the extent that supervising research might expose academic staff to research as a process, the more students an individual supervises, the more their research productivity might be enabled. Furthermore, their publication record might be bolstered by work contributions of such students.

Given that experience obtained through the supervision of other research might improve the research productivity of academics, *Proposition C.14*. is offered, that *masters and PhD supervision experience is positively related to research productivity.*

4.5 SUMMARY OF THE QUALITATIVE FINDING

The qualitative analysis discussed in the previous sections was focused on deriving propositions that were ‘grounded’ in the context (Glaser, 1992). In this section, the overarching, or dominant relationships around research productivity that emerged from respondent’s grounded responses are summarised. Because these relationships were found to ‘emerge’ with no prompting, they are regarded as ‘basic’ primary causal structures that relate to an academic context in each case. These first responses were considered to be ‘unprompted’, as they came from the first question of the qualitative interview, which, according to the qualitative questionnaire guideline, was phrased as follows “According to

your perception, what factors (in order of importance) cause higher levels of research productivity and what factors constrain levels of research productivity, (i) at the individual level and (ii) at the organisational level?" As such, respondents provided what effectively represented a grounded model of the most significant relationships around research productivity that was considered to be grounded in contextual experiences. At the risk of oversimplifying the complex relationships around research productivity in this context, the following tables (Tables 7, 8 and 9.) summarise what have been interpreted as the dominant one, two or three factors associated with research productivity in three overarching contexts: (i) the sciences, (ii) the social sciences and (iii) in the context of Economics, Business Sciences and Law. Table 7. reports relationships found to be related to respondents who worked in the sciences; Table 8. reports relationships related to the humanities; and Table 9. reports relationships related to economics and the business sciences. Following the precedent of qualitative research, rich descriptive information was prioritised at the expense of an exhaustive sampling of different disciplines and university contexts. Nonetheless, a brief summary of the dominant themes is offered as follows.

4.5.1.1 The Sciences

The intrinsic nature of individual motivation dominates as a transferable theme across the responses of 'sciences' researchers (Table 7). The need for a 'critical mass' of human capital team-based collaboration and a need for the 'protection' of research as an activity from the pressures of high volume teaching seem to dominate as themes in this context. Of note, however, are the differences between the stress placed on these two dominant themes, as respondents from the University of Cape Town stressed the former theme and respondents from the University of the Witwatersrand and the University of Johannesburg stressed the negative influence of bureaucratic forces that prioritise a larger focus on teaching at the expense of research. Further research is suggested into the differences in strategic management linkages with research productivity between different universities. Although the objective of this research was to validate the use of certain factors in a quantitative analysis, the more detailed analysis of these relationships was beyond the scope of the research, and further research is recommended that can build on these basic findings.

Table 7. Dominant Themes: The 'Sciences'

Academic Field	Respondent Number	Dominant Themes		University
Sports Science	7	Self-belief and desire to make a difference Absolute honesty and great moral values	Team dynamic Non-selfish leadership Horizontal leadership structures	University of Cape Town
Medical Science	8	Individual motivation	A critical mass or concentration of (quality) human capital in the form of postgraduate students , post doctorates and researchers	University of Cape Town
Mechanical Engineering	4	Curiosity	Goal incompatibility between achievement of 'top 100' research status and the prioritisation of undergraduate numbers of students at the expense of research	University of the Witwatersrand
Chemical and Metallurgical Engineering	5	Personal drive	Too much bureaucracy and poor support structures	University of the Witwatersrand
Health Sciences	11	Intrinsic forces 'really productive researchers do the research because they 'cannot help it'	Researchers need to be protected from administrative and bureaucratic forces oriented toward training at the expense of research	University of Johannesburg

4.5.1.2 The Social Sciences

'Hunger', 'personal disposition' and 'to live for one's work' are responses from top researchers in the social sciences context that seem to reflect an underlying commonality associated with individual characteristics as drivers of research productivity. At the organisational level, differences seem to emerge, as a multidisciplinary research context that draws from the social sciences is primarily associated with a need for an 'entrepreneurial' research process concerned with obtaining grant funding and the delivery of research which is, to some extent, tied to the objectives of such funding, although with a significant focus on societal outcomes.

Table 8. Dominant Themes: the 'Social Sciences'

Academic Field	Respondent Number	Dominant Themes		University
		Individual level	Organisational level	
Multidisciplinary context	6	'Hunger' Finding ways to support your work Entrepreneurial development as a researcher	'Entrepreneurial' funding orientation	University of the Witwatersrand
Education	2	Personal disposition Time as most significant factor in constraining research productivity	An enabling environment Being 'with the grain'	University of the Witwatersrand
Literary Studies	9	'To live for one's work- time measurements are meaningless'	SA universities are actually undergraduate institutions in which research is an add-on. Time pressures related to large undergraduate numbers of students dominate the academic project	University of KwaZulu-Natal
Industrial Psychology	16	Being a subject specialist Maintaining your academic standing	Organisational research support in the form of writing schools, data analysis, and training in data methods Providing sufficient time for research	University of South Africa

The education context reflects a normative influence, as top researchers might need to not be 'against the grain', while in the literary context the need to be connected to societal events and to resist the university's dominant strategy of undergraduate teaching is highlighted. The distance learning context reflects a need for more university support for research, to the extent of providing data analysis support and courses for staff on research methods as well as providing structured time for academics to do research.

4.5.1.3 Economics, the Business Sciences and Law

The Business Sciences and Finance contexts are found to both stress the differences between 'teachers' and 'researchers' in terms of intrinsic motivations. In the Economics contexts and in the Law context the issue of time is stressed, as is the need for collaborative linkages (although less so for law). Time constraints to research productivity seem to be the dominant

factor at the individual level for almost all of these respondents, and is framed as a factor that 'negates' research activity according to the respondent from macroeconomics.

Table 9. Dominant Themes: Economics and the Business Sciences

Academic Field	Respondent Number	Dominant Themes		University
		Individual level	Organisational level	
Business Science	1	Teacher satisfied versus research satisfied Role of intrinsic satisfaction as key driver of research productivity	Selection and development of research-satisfied individuals for research and teacher-satisfied individuals for teaching	University of the Witwatersrand
Microeconomics	16	Choice between quantity and quality Time	The environment – a need for mentors and colleagues to support quality	University of the Witwatersrand
Macroeconomics	13	Time 'is the biggest factor' at the individual level	Collaborative environment Teaching negates research	University of the Witwatersrand
Finance	14	Self-drive- a passion to do research 'Some love to be teachers' 'Some love to be researchers' Time as a dimension of resources	Resources Level of education of teaching staff Incentives and recognition	University of the Witwatersrand
Law	15	Self-confidence Need to make a difference Time	High levels of undergraduate students Time	University of the Witwatersrand

The notion that teaching is incommensurate with research seems to dominate in this context, either because individuals are primarily satisfied by either one or the other (Respondent 1); or that they have a passion for one or the other (Respondent 15); or that research needs to be separated entirely from teaching because the latter will 'crowd out' the former (Respondent 13).

The nature of these academic fields, with large practitioner communities that require 'training' might reflect the pressures on these academics to 'train' which may conflict strongly with research goals. Law is an outlier because the skills needed for research are considered to be no different from the skills that undergraduates receive in their undergraduate law studies.

The tables of the final hypotheses to be tested in the qualitative research that relate to the individual 'performance factors' are again shown in Tables 10, 11, 12 and 13. These tables illustrate the set of hypotheses that are derived from the propositions that emerged from the analysis in this chapter. The numbering reflects the influence of the factor analysis, and each table is ordered according to the component category that it relates to. The process through which these propositions were developed into Hypotheses A, B, and into the four categories of factors tested as Hypothesis C and its constituent sub-hypotheses has been discussed in the preceding chapter, Chapter Three. In the following chapter, Chapter Five, the quantitative results are reported, and in Chapter Six these results are discussed.

Table 10. Summary: Hypotheses derived from the Qualitative Grounded Analysis (after Factor Analysis) Biographical Factors

Hypotheses: Component 1 Biographical Factors and Research Productivity
Hypothesis C.A. Biographical Factors are significantly associated with research productivity.
Null-hypothesis C. A. There is no significant association between Biographical Factors and research productivity.
Hypothesis C1: There is a significant association between experience and research productivity.
Null-hypothesis C1: there is no significant association between experience and research productivity.
Hypothesis C2: there is a significant association between exposure to the international context and research productivity
Null-hypothesis C2: there is no significant association between exposure to the international context and research productivity.
Hypothesis C3: Levels of formal education are significantly associated with differences in research productivity.
Null-hypothesis C3: Levels of formal education are not significantly associated with differences in research productivity.
Hypothesis C4: There is a significant association between collaboration and research productivity.
Null-hypothesis C4: There is no significant association between collaboration and research productivity.
Hypothesis C5: Preference for either quantitative or qualitative methods is significantly associated with higher levels of research productivity.
Null-hypothesis C5: Preference for either quantitative or qualitative methods is not significantly associated with higher levels of research productivity.
Hypothesis C6: There is a significant association between marriage and research productivity.
Null-hypothesis C6: There is no significant association between marriage and research productivity.
Hypothesis C7: There is a significant association between research productivity and number of dependent children.
Null-hypothesis C7: There is no significant association between research productivity and number of dependent children.
Hypothesis C8: There is a significant difference in research productivity by gender.
Null-hypothesis C8: There is no significant difference in research productivity by gender.

Table 11. Summary: Hypotheses derived from the Qualitative Grounded Analysis (after Factor Analysis) Personal Orientation Factors

Hypotheses: Component 2 Personal Orientation Factors and Research Productivity
Hypothesis C.B. Personal Orientation Factors are significantly associated with research productivity.
Null-hypothesis C.B. There is no significant association between Personal Orientation Factors and research productivity.
Hypothesis C9: There is a significant association between job satisfaction and research productivity.
Null-hypothesis C9: There is no significant association between Job Satisfaction and research productivity.
Hypothesis C10: There is a significant association between Self-Efficacy and research productivity.
Null-hypothesis C10: There is no significant association between Self-Efficacy and research productivity.
Hypothesis C11: There is a significant difference between Affectivity and research productivity.
Null-hypothesis C11: There is no significant difference between Affectivity and research productivity.
Hypothesis C12: Differences in Locus of Control are significantly associated with differences in research productivity.
Null-hypothesis C12: Differences in Locus of Control are not significantly associated with differences in research productivity.

Table 12. Summary: Hypotheses derived from the Qualitative Grounded Analysis (after Factor Analysis) Research Work Role Satisfaction Factors

Hypotheses: Component 3 Research Work Role Satisfaction and Research Productivity
Hypothesis C.C. There is a significant association between Research Work Role Satisfaction and research productivity.
Null-hypothesis C.C. There is no significant association between Research Work Role Satisfaction and research productivity.
Null-hypothesis C13: Differences in work-role specific satisfaction are not significantly associated with differences in research productivity.
Null-hypothesis C13: Differences in work-role specific satisfaction are not significantly associated with differences in research productivity.

Table 13. Summary: Hypotheses derived from the Qualitative Grounded Analysis (after Factor Analysis) Supervisory Experience Factors

Hypotheses: Component 4 Supervisory Experience and Research Productivity
Hypothesis C.D. There is a significant association between supervisory experience and research productivity.
Hypothesis C.D. There is a significant association between supervisory experience and research productivity.
Hypothesis C14: There is a significant association between Masters and Doctoral supervision and research productivity.
Null-hypothesis C14: There is no significant association between Masters and Doctoral supervision and research productivity.
Hypothesis C15: There is a significant difference in research productivity by university rank designation.
Null-hypothesis C15: There is no significant difference in research productivity by university rank designation.
Hypothesis C16: There is a significant association between span of control and research productivity.
Null-hypothesis C16: There is no significant association between span of control and research productivity.

4.6 CONCLUSION

In this chapter the results of the grounded qualitative analysis were reported and interpreted. This chapter extended the work of the literature review and the methodology chapters, where theory and previous findings were reviewed and an appropriate methodology was derived for this study. In this chapter, a grounded analysis allowed for an understanding of relationships that was independent of the constraints of pre-existing theory; of relationships grounded in this specific context. Using thematic content analysis, themes were analysed and propositions were derived. On the basis of the derived propositions, a rationale was provided for the testing of these propositions as hypotheses in the quantitative portion of the research. First, Proposition A was derived, which related to the relationship between organisational culture and the research productivity of academic fields. Second, Proposition B was derived, which related to the relationships between individual values and research productivity. Third, Proposition C was derived, that certain individual level 'performance' factors were related to individual research productivity. The dominant themes associated with the sciences, the social sciences and the business and professional fields were then outlined in the form of three tables (Tables 7, 8 and 9), and briefly summarised. At this point, the analysis is extended further; into the reporting of the quantitative results of the study. This chapter builds on the previous chapters, as the results of further analyses add different perspectives of the phenomena under investigation. The quantitative results are reported in the chapter that follows. These results then form part of the holistic analysis undertaken in Chapter Six, from which recommendations are derived that are offered in Chapter Seven. The results of the quantitative research are now reported.

CHAPTER 5

QUANTITATIVE FINDINGS

5 QUANTITATIVE RESULTS

5.1 INTRODUCTION

In this chapter, the results of the statistical testing are reported. This chapter extends the work of the previous chapters further; into the reporting of the results of the empirical testing of the hypotheses. The contents of each chapter now build on the material developed in previous chapters. In the previous chapter, qualitative findings were used to derive propositions for testing quantitatively. The qualitative research provided insight into the relationship between organisational culture and research productivity and the relationship between individual values and research productivity. In the quantitative analysis, two 'comprehensive' bodies of theory, namely GLOBE organisational cultural values theory (House *et al*., 2004) and Schwartz individual values theory (Schwartz, 2007) were tested empirically, in order to provide quantitative insight that could add to the qualitative analysis and provide a holistic perspective of research productivity and its relationships with organisational culture and individual values. The results of the testing of hypotheses that relate to GLOBE theory (Hypothesis A) and Schwartz values theory (Hypothesis B) are reported in this chapter. The results of the testing of hypotheses that relate to each of the four categories of individual performance factors (Hypothesis C), which were derived from the qualitative analysis and grouped together based on the results of factor analysis results, are also reported in this chapter. In the following sections, the bivariate and multivariate results are reported under the headings that represent the hypothesis tested. Firstly, the results of the univariate analysis are presented. Bivariate characteristics of the data that have implications for the interpretation of results are then reported, under the headings of each tested hypothesis. Thirdly, the results of the multivariate tests are reported, and the tests of the assumptions of these statistical methods are also reported, according to each hypothesis tested. The structure of the reporting of these results, therefore, also follows that of the tested hypotheses. The results of tests against the hypotheses are therefore reported in this chapter and discussed in the following chapter. The reporting of the results of the univariate analysis is undertaken as follows.

5.2 UNIVARIATE ANALYSIS

A comprehensive univariate analysis was performed on the data. The data were checked for missing variables or capturing mistakes. Measures of location, central tendency and statistical dispersion were applied, and are reported for each of the tested variables. The means,

medians, mode values, standard deviations (std. deviations) and variance were derived and these are reported in the following sections. The univariate analysis measures of normality are also reported, and measures of skewness, kurtosis and Shapiro-Wilk statistics are also provided. On the basis of the central limit theorem, the assumption is made that if the data sampled approximate normality then the sampling distribution is also expected to be normal (Field, 2009). However, the sampling distribution tends to be normal in samples of more than thirty data points (*ibid*.). The typical test of normality in terms of skewness and kurtosis is to convert scores to z-scores by subtracting the mean of the distribution (in this case the standard error) and then dividing by the standard deviation, and taking these to be significant if their values are greater (in absolute value) than 1.96 for significance at the $p<.05$ level and 2.58 for significance at the $p<.001$ level (Field, 2009). However, as samples become larger the standard errors decrease and tests of significance of skewness and kurtosis are no longer useful (Field, 2009). Therefore for samples of 200 or more data points a visual inspection is more effective than tests of the significance of the values of skewness and kurtosis (Field, 2005). In terms of the analysis of skewness and kurtosis, because this was a relatively large sample, the shape of the distribution was therefore also examined as an indicator of these due to these problems associated with formal inference tests (Field, 2005; Tabachnik & Fidel, 2007). The increase in the standard errors of skewness and kurtosis values that are typically associated with samples of over a hundred respondents can result in the incorrect rejection in the null hypothesis of no significant difference from normality when only minor deviations from normality are evident (Tabachnik & Fidel, 2007). Hence, additional analyses were performed. The reporting of the univariate results is now undertaken. The univariate statistics that relate to the GLOBE measures are first reported. Then the results of the univariate analysis for the Schwartz values measures are considered. After this, the univariate results of the individual level biographical and contextual factors are reported.

5.2.1 GLOBE measures: Univariate Analysis

The previous chapter reported the findings of the qualitative analysis of the relationships between 'organisational culture' and research productivity. The 'grounded' qualitative analysis was found to justify the use of a quantitative study to investigate the relationships between organisational culture and research productivity at the level of the academic field. The quantitative analysis tested a comprehensive theory of organisational culture; GLOBE theory (House *et al*., 2004). As previously discussed, this comprehensive theory, which has

been tested in over sixty countries, posits that the universe of cultural dimensions loads primarily on nine dimensions, or orientations (House *et al*., 2004). The qualitative analysis reported in the previous chapter was not, however, used to derive individual dimensions or orientations, but just to provide insight that could be related to the quantitative findings of the testing of the GLOBE theoretical dimensions. Further grounded analysis findings, using the GLOBE theoretical framework 'imposed' on the analysis, are discussed in the following chapter, as a holistic perspective of the relationships between organisational culture and research productivity is provided. The measures of location, central tendency and statistical dispersion of the GLOBE measures across the entire sample (n=225) are reported in Table 14.

Table 14. GLOBE measures: location, central tendency and statistical dispersion (entire sample)

Variable	Mean	Median	Mode	Std. Deviation	Variance
Uncertainty Avoidance	9.96	10	12	4.03	16.26
Future Orientation	12.74	12	12	3.34	11.12
Institutional Collectivism	16.81	18	21	3.62	13.09
In-group Collectivism	10.81	11	12	3.82	13.3
Assertiveness	12.27	12	12	4.05	16.2
Power Distance	5.88	5	3	3.23	10.44
Performance Orientation	14.21	15	15	4.33	18.78
Humane Orientation	16.86	17	18	3.05	9.27
Gender Egalitarianism	11.26	12	12	2.24	5.02

Entire sample (n=225)

Table 15. GLOBE measures: location, central tendency and statistical dispersion (at the level of the academic school)

Variable	Mean	Median	Mode	Std. Deviation	Variance
Uncertainty Avoidance	9.81	10	5.5	1.71	2.91
Future Orientation	12.79	12.3	14.5	1.4	1.95
Institutional Collectivism	16.78	16.8	13.3	1.37	1.88
In-group Collectivism	10.64	10.4	8.8	.97	.94
Assertiveness	12.10	11.8	10.2	1.28	1.64
Power Distance	5.78	5.6	4.1	1.15	1.32
Performance Orientation	14.14	13.6	10.7	2.22	4.93
Humane Orientation	16.67	17.1	14.3	1.19	1.41
Gender Egalitarianism	11.18	11.1	10.5	.68	.4610

Academic Schools (n=13)

On the basis of the results of the Kolmogorov-Smirnov and Shapiro-Wilk tests performed on the full sample, which were all significant, according to both tests, the normality of the underlying data of the GLOBE dimensions was not assumed, and bootstrapping using 1000 iterations was implemented for all appropriate analyses from this point onwards. The descriptive statistics of the GLOBE dimensions aggregated at the level of the academic school are reported below in Table 15.

The results of the Kolmogrov-Smirnov and Shapiro-Wilk tests of normality for the sample aggregated at the level of the academic school were not significant for any of the dimensions except for Gender Egalitarianism. This suggested that except for this item the distribution of these items was normal in terms of skewness.

Table 16. GLOBE organisational culture Means per School: Uncertainty Avoidance (UA), Future Orientation (FO), In-group Collectivism (IGC), Assertiveness (Assert.) and Institutional Collectivism (IC)

School	UA	FO	IGC	Assert.	IC
Accountancy	9.7	11.8	11	11.8	17.5
Animal, Plant & Environmental Sciences	8.9	11.4	10	11.9	13.3
Architecture & Planning	9.1	13.7	11.5	11.1	17.3
Chemical & Metallurgical Engineering	11.1	14.5	10.2	13.9	16.6
Economic and Business Sciences	11	15	11.8	13.5	17.8
Education	10	12	12.7	10.2	15.6
Geog. Archaeology & Environmental Sciences	5.5	14.5	8.8	10.7	16.2
Geosciences	11.3	12.3	10.7	14.6	19.3
Human & Community Development	9.1	12.8	10.1	11.6	17.1
Law	12.4	11.7	10.3	12.6	16.8
Literature & Languages	10	11	10.2	11.4	17.3
Social Sciences	8.6	11.5	10.5	11.5	16.6
School of Arts	10.5	14.1	10.4	12.6	16.7

Notes. Bootstrapping with 1000 iterations was performed.

Thirteen different academic schools met the criteria for inclusion into the sample. These were the Schools of: Accountancy; Animal, Plant and Environmental Sciences; Architecture and Planning; Chemical and Metallurgical Engineering; Economic and Business Sciences; Education; Geography, Archaeology and Environmental Sciences; Geosciences; Human and

Community Development; Law; Literature and Languages; Social Sciences; and the School of Arts. Table 16. reports the means of the different endowments of Uncertainty Avoidance, Future Orientation, In-group Collectivism, Assertiveness and Institutional Collectivism for each different academic school. Table 17. reports the different means of Power Distance, Performance Orientation, Humane Orientation, Humane Orientation and Gender Egalitarianism for each of the academic schools.

Table 17. GLOBE organisational culture Means per School: Power Distance (PD), Performance Orientation (PO), Humane Orientation (HO) and Gender Egalitarianism (GE)

School	PD	PO	HO	GE
Accountancy	5.3	12.3	14.3	11.2
Animal, Plant & Environ. Sc.	6.3	10.7	15.7	11.1
Architecture & Planning	4.1	13.4	17.8	11.3
Chem. & Metal. Eng.	7.3	13.6	17.3	10.9
Economic and Business Sciences	7.5	17.9	16	12.9
Education	7.2	12.9	17.8	12.2
Geog. Arch. & Env.	4.8	12.5	16	10.5
Geosciences	5.3	17	15.4	10.6
Human & Com. Dev.	6.3	11.7	17.1	10.7
Law	5.6	14.4	15.9	11.2
Literature & Languages	4.2	15.4	17.6	11
Social Sciences	4.8	14.9	17.6	11.1
Wits School of Arts	6.4	17.1	18.2	10.6

Notes. Bootstrapping with 1000 iterations was performed. Standard Deviation (std.dev.) is abbreviated.

Having considered the univariate statistics that relate to the GLOBE measures, the univariate statistics of the Schwartz items are now reported.

5.2.2 Schwartz values measures: Univariate Analysis

As in the case of the testing of the GLOBE dimensions of organisational cultural values, the testing of the associations between individual values and research productivity was considered to be justified on the basis of the findings of the qualitative 'grounded' analysis reported in the previous chapter. As in the case of GLOBE theory, Schwartz (2007) values theory is also a comprehensive theory, which posits that the universe of individual

motivational values load onto a structure of ten values. The results of the testing of the associations between Schwartz's (2007) values dimensions and research productivity are reported in this chapter and discussed in the next chapter. The univariate measures of location, central tendency and statistical distribution for the Schwartz value measures are reported in Table 18.

Table 18. Schwartz values: Location, central tendency and statistical dispersion

Variable	Mean	Median	Std. deviation	Variance
Self-direction	10.36	11	1.45	2.097
Power	6.75	7	2.07	4.288
Universalism	14.94	15	2.19	4.78
Achievement	8.68	9	2.17	4.73
Security	8.74	9	2.42	5.84
Stimulation	8.15	8	2.32	5.37
Conformity	7.05	7	2.35	5.5
Tradition	7.76	8	2.23	4.96
Hedonism	7.34	7	2.54	6.45
Benevolence	9.63	10	1.55	2.4

The univariate results of the Kolmogorov-Smirnov and Shapiro-Wilk tests for the Schwartz values measures were all significant. Bootstrapping was therefore applied to all testing of these items. The univariate results of the testing of the Schwartz values items are discussed in the following chapter. The univariate analysis of the individual performance factors tested in this research is now reported in the section that follows.

5.2.3 Individual Performance Factors: Univariate Analysis

In this section, the univariate descriptive statistics for the individual Performance Factors tested in this research are reported. In order to improve the manageability of the process, these statistics are reported in four tables. The univariate descriptive statistics for job satisfaction, research versus teaching, satisfaction with teaching, satisfaction with administration, satisfaction with research, and the self-efficacy items are reported in Table 19. This is the first of the four tables included in this section. None of the skewness or kurtosis values were found to be greater than plus or minus two. Nevertheless, bootstrapping was used in all tests.

Table 19. Descriptive Statistics: individual Performance Factors 1

Variable	Mean	Standard Deviation	Variance	Skewness	Kurtosis
Job Satisfaction	15.07	4.03	16.2	-.836	.854
Research versus Teaching	12.44	4.646	21.6	-.223	-.253
Satisfaction with Teaching	4.24	1.58	2.5	-.128	-.561
Satisfaction with Administration	2.23	1.53	2.34	1.16	.515
Satisfaction with Research	4.87	1.55	2.4	-.586	-.013
Self-Efficacy (SE) Research	425.25	106.36	11311.9	-.586	-.013
SE DOE journal publication	74.29	25.18	633.9	-.847	.186
SE ISI/IBSS publication	71.9	25.2	632.9	-.587	-.408
SE Proceedings Publication	76.39	23.8	567.07	-1.09	.920
SE Conference Presentation	81.5	21.38	457.3	-1.291	1.444
SE Statistical Analysis	49.88	33.4	1115.8	-.087	-1.217
SE Qualitative Analysis	71.33	27.47	754.7	-1.026	.417
SE Teaching Postgraduate	84.9	20.5	421.9	-1.464	1.327

*means of binary variables are instead reported as percentages. SE = Self-Efficacy

The descriptive statistics of NA, PA, locus of control, age, gender, years spent in South Africa, other countries lived in, full-time work experience, years as a researcher, years working at the institution, multinational experience, membership of professional associations and years of formal education are reported below in Table 20. This is the second of the four descriptive statistics tables for this category of items.

Table 20. Descriptive Statistics: individual Performance Factors 2

Variable	Mean	Standard Deviation	Variance	Skewness	Kurtosis
Negative Affectivity	17.75	6.63	43.9	1.33	1.85
Positive Affectivity	38.13	6.87	47.2	.954	11.22
Locus of Control	69.56	10.6	112.8	-.398	.649
Age	40.67	10.56	111.4	.420	-.337
Gender 1=male*	47%	-	-	-	-
Years in South Africa	27.85	17.16	294.4	.077	-.945
Other countries lived in	1.21	1.45	2.11	1.66	3.19
Full-time work experience	14.6	10.69	114.3	.769	-.086
Years as a researcher	10.2	8.84	78.18	1.6	2.79
Years working for the institution	6.39	6.74	45.39	2.44	8.4
Multinational experience*	21%	-	-	-	-
Membership of professional associations*	81%	-	-	-	-
Years of formal education	19.3	4.39	19.28	-1.242	2.58

*means of binary variables are instead reported as percentages

In certain cases, the skewness and kurtosis values were above plus or minus two, indicating that boostrapping in the tests of these variables was indicated. The descriptive statistics reported below in Table 21. relate to the following variables: the Mr./Ms. designation, the Dr. designation, the associate professor designation, the professor designation, people reporting (span of control), number of masters students supervised, number of PhD students supervised, number of DOE accredited journal articles, number of accredited ISI/IBSS accredited journal articles, number of co-authored journal articles, number of conference proceedings published, number of conference presentations, number of books published, number of book chapters published and total units (gross research output) published. This is the third of the four tables that report the descriptive statistics of the individual Performance Factors tested in this research.

Table 21. Descriptives: Individual Performance Factors 3 and Research Outputs

Variable	Mean	Standard Deviation	Variance	Skewness	Kurtosis
Mr./Ms. designation*	48%	-	-	-	-
Dr. designation*	32%	-	-	-	-
Associate Professor designation*	14%	-	-	-	-
Professor designation*	8%	-	-	-	-
People reporting (span of control)	2.7	6.4	41.54	4.623	26.31
Masters supervised	6.19	9.55	91.27	2.561	8.11
PhD supervised	.95	2.7	7.46	5.1	35.61
Accredited DOE journal articles	4.27	10.1	102.8	5.83.4	43.36
Accredited ISI/IBSS journal articles	7.19	14.69	215.8	3.4	13.33
Co-authored	4.78	10.95	119.94	3.6	13.8
Conference proceedings	3.42	6.05	36.62	3.29	12.56
Conference presentations	8.82	16.67	278.7	4.66	28.9
Books	1.05	6.8	46.27	13.9	202.38
Book chapters	1.7	3.27	10.7	4.99	33.6
Total units: gross research productivity	21.97	35.67	1272.48	3.233	11.95

*means of binary variables are instead reported as percentages

The skewness and kurtosis values greater than plus or minus two were taken to indicate that bootstrapping was indicated in all of the analyses for these variables. The fourth and final table in this section reporting the descriptive statistics for the individual Performance Factors is Table 22. This table reports the descriptive statistics for the following variables: preference for quantitative versus qualitative methods, marriage, dependent children, respondents from Africa but not from South Africa, South African origin, English as a home language, Afrikaans as a home language, and an African home language local to South Africa.

Table 22. Descriptive Statistics for individual Performance Factors 4

Variable	Mean	Standard Deviation	Variance	Skewness	Kurtosis
Preference for quantitative methods=1*	45.6%	-	-	-	-
Married*	57%	-	-	-	-
Dependent children	1.09	1.28	1.64	1.33	.324
Africa non-SA home language*	22%	-	-	-	-
South African origin (by birth)*	56%	-	-	-	-
English home language*	52%	-	-	-	-
Afrikaans home language*	10%	-	-	-	-
SA but not English/Afrikaans language*	10%	-	-	-	-

*means of binary variables are instead reported as percentages

Results reported in these tables are, where appropriate, discussed in the following chapter under the specific hypotheses involved. These results are not discussed here. Having reported the univariate statistics relating to the variables tested in this research, the bivariate and multivariate findings are now reported. In the following sections, the results of the process of statistical testing are reported under the heading that represents each hypothesis tested.

5.3 BIVARIATE AND MULTIVARIATE ANALYSIS: REPORTING OF RESULTS ACCORDING TO TESTED HYPOTHESES

Whereas the previous sections reported the univariate results, in the following sections the results of the bivariate and multivariate testing are reported, according to the hypotheses tested. First, the results of the testing of hypotheses that relate to the GLOBE measures of organisational culture are reported. Second, the results of the testing of the hypotheses associated with the Schwartz values items are reported. Finally, the results of the testing of the hypotheses associated with the individual performance factors are reported. The results of the testing of the hypotheses related to the GLOBE dimensions are reported as follows.

5.4 GLOBE ORGANISATIONAL CULTURE: TESTED INFLUENCE ON INDIVIDUAL OUTCOMES

Whereas the qualitative analysis investigated the influence of culture on research productivity, a fundamental characteristic of culture is that it influences relationships at the group, or collective level (House *et al*., 2004). Hence, the GLOBE responses of individual respondents are typically aggregated for groups, and associations are tested; between the

levels of group endowments of GLOBE values and outcomes that are also aggregated at the group level (House *et al*., 2004). However, following the precedent of Aycan *et al*. (2000), an individual's endowment of values which derive from his or her experience or membership of groups are also considered to potentially influence individual behaviour, and, hence, research productivity. Therefore this analysis; of the associations between individual reported endowments of GLOBE values and individual research productivity, was also performed. The results of tests of associations between individual endowments of GLOBE organisational culture dimensions and individual research outputs are shown in Table 23., below. These results are discussed in the following chapter. These results are not used in the testing of the hypotheses (below) because the testing of the hypotheses is at the level of the academic school. The hypotheses that relate to the testing of the associations between the GLOBE organisational cultural values endowments (that were aggregated at the level of the academic division, proxied by the academic school), and the measures of research productivity (also aggregated at the level of the academic school) are introduced in the section that follows.

Table 23. Correlations: GLOBE organisational culture and Research Productivity (Individual Level)

GLOBE dimension	DOEJ	IJ	CPP	CP	Books	Book Chapters	Gross RP
Uncertainty Avoidance	-	-	-	-.226**/-.239***	-	-.217**/-.216**	-.165*/-.172*
Future Orientation	-	-	-	-	-	-.137*/-.129^	-
In-Group Collectivism	-	-	-	-	-	-.167*/-.162*	-
Assertiveness	-	-	-	-	-	-	-
Institutional Collectivism	-	-.116^/-.123^	-	-.139*/-.151*	-	-	-
Power Distance	-	-	-	-	-	-.160*/-.167*	-
Performance Orientation	-	-	-	-	-	-	-
Humane Orientation	-	-	-	-	-	-	-
Gender Egalitarianism	-	-	-	-	-	-	-

Notes. n=225. Bootstrapping with 1000 iterations was performed. Standard Deviation (std.dev.) is abbreviated. Zero order correlations are shown before slash/Partial correlations with PA and NA controlled are shown after slash. Abbreviations: Education accredited journal publication (DOEJ), Department of Education ISI or IBSS journal publication (IJ), conference proceedings publication (CPP), conference presentation (CP), book publication (B), the publication of book chapters (BC) and gross research productivity (GRP).

5.5 GLOBE ORGANISATIONAL CULTURE: GROUP LEVEL OF ANALYSIS

Following GLOBE precedent (House *et al*., 2004), bivariate measures of association were used to test the hypotheses. Following this precedent, the individual responses were aggregated for individuals by membership of the institution's academic schools. The research

outputs for these schools were also aggregated, and associations between these were tested. In the following sections, the results of the tests of the hypotheses are reported under the relevant headings as follows (each hypothesis is used as a heading).

Null-hypothesis A.: There is no significant association between the GLOBE dimensions of organisational culture and research productivity. Each of the GLOBE dimensions were tested for zero-order Pearson correlation associations with each measure of research productivity. In order to increase the scientific rigour of the process, further tests were run and the results of these tests are reported. The tests were all run again whilst controlling for both measures of affectivity, in order to control for method bias associated with the potentially confounding influence of Affect in responses, as suggested by Podsakoff *et al*. (2003). All these tests applied bootstrapping with 1000 iterations. The results of these tests are reported in Table 24. The use of bootstrapping was also considered necessary due to the relatively low number of samples, as each academic school was the unit of analysis. Only associations found to be significant after Affect was controlled for used to test the hypotheses.

Table 24. Correlations: GLOBE organisational culture and Research Productivity (Academic School Level)

GLOBE dimension	DOEJ	IJ	CPP	CP	Books	Book Chapters	Gross RP
Uncertainty Avoidance		-	-	-		-.506^/-.802**	-
Future Orientation	-	-	-	-	-	-	-
In-Group Collectivism	-	-	-	-	.548^/-	.-.486^/-	-
Assertiveness	.598*/-	-	-	-	-.490^/-	-	-
Institutional Collectivism	-	-	-/-.561^	-/-.701*	-	-/-.566^	-/-.565^
Power Distance	-	-	-	-	-	-.535^/-.594^	-
Performance Orientation	-	-	-	-	-	-	-
Humane Orientation	-	-	-	-	-	-	-
Gender Egalitarianism	-	-	-	-	-	-	-

Notes. n=13. Bootstrapping with 1000 iterations was performed. Standard Deviation (std.dev.) is abbreviated. Zero order correlations are shown before slash/Partial correlations with PA and NA controlled are shown after slash. Abbreviations: Education accredited journal publication (DOEJ), Department of Education ISI or IBSS journal publication (IJ), conference proceedings publication (CPP), conference presentation (CP), book publication (B), the publication of book chapters (BC) and gross research productivity (GRP).

The testing at the individual level (Table 23) was not used to test the hypotheses, which specifically relate to relationships at the level of the academic school. The individual-level results, however, are discussed in the following chapter in order to provide a more holistic analysis.

Hypothesis A.1. There is a significant association between Uncertainty Avoidance and research productivity. At the level of the academic school, Uncertainty Avoidance (Table 24) was found to be significantly and negatively associated with book chapter publication when partial correlation analysis was used to control for the effects of PA and NA. The controlling of affectivity followed the prescriptions of Podsakoff *et al*. (2003) in order to control for method bias. The null-hypothesis was rejected and the alternative hypothesis was accepted.

Hypothesis A.2.: There is a significant association between Future Orientation and research productivity. None of the measures of research productivity were found to be significantly associated with Future Orientation. On the basis of the net association, the null-hypothesis was accepted and the alternative hypothesis was rejected.

Hypothesis A.3.: There is a significant association between In-group Collectivism and research productivity. In-group Collectivism was also not found to be associated with any of the measures of research productivity at within the five percent level of significance (Table 24). The null-hypothesis was accepted and the alternative hypothesis was rejected.

Hypothesis A.4.: There is a significant association between Assertiveness and research productivity. Assertiveness was found to be positively associated with the publication of DOE accredited journal articles according to the zero-order tests of association yet when Affect was controlled for the association was no longer found to be significant (Table 24). The null-hypothesis was rejected and the alternative hypothesis was accepted.

Hypothesis A.5.: There is a significant association between Institutional Collectivism and research productivity. Institutional Collectivism was found to be significantly and negatively associated with conference presentations after Negative and Positive Affect were controlled for using partial correlation analysis (Table 24). The null-hypothesis was rejected and the alternative hypothesis was accepted.

Hypothesis A.6.: There is a significant association between Power Distance and research productivity. Power Distance was found to be negatively associated with the publication of Book Chapters yet at just outside of the five percent level of significance, both in terms of zero-order correlation and also when partial correlation analysis was used to control for the effects of NA and PA (Table 24). The null-hypothesis was accepted and the alternative hypothesis was rejected.

Hypothesis A.7.: There is a significant association between Performance orientation and research productivity. Performance orientation was not found to be significantly associated with any of the dimensions of research productivity. The null-hypothesis was accepted and the alternative hypothesis was rejected.

Hypothesis A.8.: There is a significant association between Humane orientation and research productivity. Humane orientation was not found to be significantly associated with any of the dimensions of research productivity (Table 24). The null-hypothesis was accepted and the alternative hypothesis was accepted.

Hypothesis A.9.: There is a significant association between Gender Egalitarianism and research productivity. Gender egalitarianism was not found to be significantly associated with any of the dimensions of research productivity (Table 24). The null-hypothesis was accepted and the alternative hypothesis was rejected.

5.6 SCHWARTZ INDIVIDUAL VALUES: INDIVIDUAL LEVEL OF ANALYSIS

As opposed to the GLOBE theory (House *et al*., 2004), which is specifically focused on relationships at the grouped level of analysis, Schwartz (2007) values theory relates to the influence of individual motivational values on individual behaviour and individual-level outcomes. The overall measure of research productivity quantity was considered to be gross research productivity, but in order to understand the relationships with different 'levels' of research outputs, six other measures were used. Table 25. reports the bootstrapped Pearson bivariate associations between each of the Schwartz values dimensions and each dimension of research productivity. In this table the value before the slash is the zero-order coefficient. The value after the slash is the coefficient after PA and NA have been controlled for. The value in the squared bracket before the slash is the zero-order coefficient after Schwartz's (2007) adjustment for response bias was applied; with the mean individual response controlled for, using partial correlation analysis. The value in the squared bracket after the slash is the zero-order coefficient after Affect and response bias were controlled for using partial correlation analysis. The results of the testing of the subordinate Hypotheses derived from Hypothesis B., that there is no significant association between Schwartz values and research productivity, are reported as follows.

(i) Openness to Change Values

Hypothesis B.1. There is a significant association between Openness to Change values and research productivity.

Hypothesis B.1.a. There is a significant association between Self-Direction values and research productivity. Self-Direction values were not found to be significantly associated with any of the measures of research productivity, in terms of zero order correlations nor

when NA and PA were controlled for through the use of partial correlation analysis (Table 25). The null hypothesis was accepted and the alternative hypothesis was rejected.

Table 25. Correlations between Schwartz Individual Values and Research Productivity

Schwartz dimension	DOEJ	IJ	CPP	CP	Books	Book Chapters	Gross RP
Self-Direction	-	-	-	-	-	-	-
Stimulation	-	-	-	-	-	-	-
Hedonism	-.126^/-.125^ [-.147*/-.155*]	-.235**/-.234**[-.196**/-.193**]	-.131^/-.130^[-.153*/-.152*]	-.232**/-.238**[-.197**/-.181**]	-.115^/-.115^[-/-.122^]	-.181*/-.174*[-.148*/-.157*]	-.257**/-.258**[-.229**/-.222**]
Power	-	-.137*/-[-/-]	-.112^/-[-.128^/-.114^	-	-	-	-
Acheivement	-	-	-	-	-	-	-
Security	-	-	-	-	-	-	-
Tradition	-	-	-	-	-	-	-
Conformity	-	-	-	-	-	-.137*/-.124^[-/-]	-
Benevolence	-.126^/-.123^ [-.135*/ -.131^]	-.141*/-.129^[-/-]	-	-	-.118^/-[-/-]	-	-
Universalism	-	-	-	-	-	-	-

Notes. N=225. Zero order correlations are shown before slash/Partial correlations with PA and NA controlled are shown after slash. The results of tests after both affectivity and response bias have been controlled for are shown in square brackets. The value before the slash in the square brackets is the value that is controlled for response bias but not for Affect. The value after the slash in the squared bracket represents a value that has response bias as well as Affect controlled. Bootstrapping with 1000 iterations was applied. Abbreviations: Department of Education accredited journal publication (DOEJ), Department of Education ISI or IBSS journal publication (IJ), conference proceedings publication (CPP), conference presentation (CP), book publication (B), the publication of book chapters (BC) and Gross Research Productivity (GRP).

Hypothesis B.1.b. There is a significant association between Stimulation values and research productivity. No significant association was found between Stimulation values and any of the dimensions of research productivity (Table 25). The null hypothesis was accepted and the alternative hypothesis was rejected.

(ii) Self-Enhancement Values

Hypothesis B.2. There is a significant association between Self-Enhancement values and research productivity.

Hypothesis B.2.a. There is no significant association between Hedonism values and research productivity. Hedonism values were found to be negatively associated with DOE journal article publication, ISI/IBSS journal article publication, conference proceedings publications, conference presentations, book chapter publication and gross research productivity after response bias and effect were controlled for (Table 25). The negative zero-order correlations

between Hedonism values and DOE journal article publication and conference proceedings publications were significant at just outside of the five percent level of significance. Book publication was also negatively associated with Hedonism values, yet at just outside of the five percent level of significance for both the zero-order association and for the associations with Affect and response bias controlled. The null hypothesis is rejected and the alternative hypothesis is accepted.

Hypothesis B.2.b. There is a significant association between Power values and research productivity. Power values were found to be negatively and significantly associated with international journal publications, at within the five percent level of significance, and with the publication of conference proceedings, at just within the ten percent level of significance (Table 25). Both of these associations were, however, not found to be significant when Affect and response bias were controlled for. The null hypothesis is rejected and the alternative hypothesis is accepted.

Hypothesis B.2.c. There is a significant association between Achievement values and research productivity. Achievement values were not found to be significantly associated with any of the measures of research productivity (Table 25). The null hypothesis is rejected and the alternative hypothesis is accepted.

(iii) Conservation Values

Hypothesis B.3. There is a significant association between Conservation values and research productivity.

Hypothesis B.3.a. There is a significant association between Security values and research productivity. No significant association was found between Security values and any of the dimensions of research productivity (Table 25). The null hypothesis was accepted and the alternative hypothesis is rejected.

Hypothesis B.3.b. There is a significant association between Conformity values and research productivity. According to the zero-order correlations, conformity values were found to be negatively associated with the publication of book chapters (Table 25). However, when Affect and response bias were controlled for, the association failed to attain significance. The null hypothesis was rejected and the alternative hypothesis was accepted.

Hypothesis B.3.c. There is a significant association between Tradition values and research productivity. Tradition values were not found to be significantly associated with any of the measures of research productivity (Table 25). The null hypothesis was accepted and the alternative hypothesis was rejected.

(iv) Self-Transcendence Values

Hypothesis B.4. There is a significant association between Self-Transcendence values and research productivity.

Hypothesis B.4.a. There is a significant association between Benevolence values and research productivity. Benevolence values were found to be negatively and significantly associated with DOE journal article publication according to the zero-order tests of association but this association was not found to be significant after affect and response bias were controlled for (Table 25). The null hypothesis was rejected and the alternative hypothesis was accepted.

Hypothesis B.4.b. There is a significant association between Universalism values and research productivity. Universalism values were found to not be associated with any of the dimensions of research productivity (Table 25). The null hypothesis was accepted and the alternative hypothesis was rejected.

5.7 INDIVIDUAL PERFORMANCE FACTORS: INDIVIDUAL LEVEL OF ANALYSIS

The hypothesised model of the individual level effects associated with research productivity that was derived from the qualitative analysis (Figure 3.) formed the basis for the quantitative testing of these factors. The rationale that underlies the inclusion and testing of these factors was therefore primarily based on the qualitative research findings. In the following sections, the results of tests of each of the hypotheses are reported. As in previous sections, the results of the statistical testing of each hypothesis are reported under each hypothesis as a heading. In the first section, the multivariate results of the testing of the associations between individual performance factors and gross research productivity and the subordinate measures of research productivity are reported in more detail to explain the processes undertaken. The other sections, indicated by tested hypotheses as headings, report the bivariate results and a summary of the multivariate results in support of the decision to either reject or accept the null-hypothesis tested in each case.

5.7.1 Bivariate Analysis

The bivariate analysis was expected to reveal 'net' relationships between items, or the empirical factual relationship between variables. The multivariate analyses were applied to establish the relationship between items when the influence of other factors, or covariates, were taken into account (Tabachnik & Fidel, 2007). By using both methods, a more fine-

grained understanding of the relationship between factors was enabled. The correlation tests were run with bootstrapping applied using 1000 iterations. Further, partial correlation analysis was used to control for the potential method bias contributed by the influence of Negative and Positive Affect (Podsakoff *et al*., 2003). The process of multivariate testing is discussed as follows.

5.7.2 Multivariate Analysis

Performance factors were tested as predictors of Gross Research Productivity, and as predictors of each of the subordinate measures of research productivity. In Section 8.1.3. of the Appendix, the testing that relates to the testing of the assumptions of the multiple linear regression models, and the processes followed, are outlined. Seven multiple linear regression models were therefore used in order to test the multivariate associations of a range of variables with each of the dimensions of research productivity. Certain variables were not included in these multiple linear regression (MLR) models (out of the set of variables that were derived from the qualitative analysis), in order to avoid the influence of singularity and multicollinearity (Tabachnik & Fidel, 2007). These variables; that were not included in the MLR, were tested in other ways, such as by using tests of partial correlations in a process that was guided by theory. The seven MLR models were therefore tested using the following independent variables; (i) job satisfaction; (ii) the specific self-efficacy item that related to the specific dependent variable (which was used for all of the research items except book chapter publication, book publication and gross research productivity, in which case the total research self-efficacy item was included); (iii) total NA and PA, which were included according to the method bias prescriptions of Podsakoff *et al*. (2003); (iv) locus of control; (v) gender; (vi) a measure of other countries lived in for a period of more than a year; (vii) full time work experience; (viii) membership of professional associations; (ix) span of control; (x) masters degree students supervised; (xi) dependent children; (xii) preference for quantitative versus qualitative methods; (xiii) South African origin; and (xiv) English as a home language. These variables have all been discussed in the literature review chapter. The variables in the model were included on the basis of a theoretical rationale (Field, 2009). A full model with all these variables included was tested for gross research productivity and the six other subordinate measures of research productivity. Due to the fact that the inclusion of insignificant variables in the model can result in the inability of the model to detect significant relationships (Field, 2009), a process of backward elimination was also applied in

order to detect these. The stepwise process was followed manually, where all the variables were entered and the variable with the lowest significance was removed and the model re-run each time until only variables significant at the ten percent level of significance were left in the equation. Only variables significant at within the five percent level of significance, however, were interpreted and discussed. Bootstrapping was applied at each step. This process was taken to be acceptable because all of the variables included in the analysis had been justified for inclusion in the analysis on the basis of theory (Field, 2009). As such, this was taken to be the 'best possible' model that could be used with multiple linear regression analysis. This was the process followed for the analysis of all the other multiple linear regression models. Each of the multiple linear regression models is discussed as follows.

5.7.2.1 Gross Research Productivity as Dependent Variable

The measure of total research productivity included both locally and internationally accredited journal article publication together with total conference presentations and total book chapter publication. As indicated previously, the rationale behind the exclusion of book publication was that any weighting given to book publication would have been arbitrary. Conference proceeding publications were taken to be a function of conference presentations, and these were therefore not included in this measure. By using these four measures it was possible to obtain a measure of units of research productivity that were relatively equal in size and a measure of quantity of research output that was relatively independent of quality of research output. This contrasts with the individual measures, which represent measures differentiated by quality. A measure of total productivity was taken to be important because research productivity has both a 'quantity' and a 'quality component'. It was also acknowledged that in order for learning to occur, mistakes, or lower quality units, are expected to be produced. This measure was therefore taken to be an important indicator of gross research productivity. According to the bootstrapped multiple linear regression model (Table C.1.1.) with all the tested factors included, total research Self-Efficacy, male gender and full time work experience were all found to be significantly associated with gross research productivity. The model was found to have an r squared value of .346 and an adjusted r squared value of .302, with a Durbin-Watson statistic of 2.009. According to this model, over a third of the variance associated with gross research productivity was explained within the model. According to the standardised coefficients (Table C.1.2.), full time experience or total work experience was found to have the largest effect, followed by Self-

Efficacy and then gender. In the model with backward elimination applied (Table C.1.3.), the significance of these three variables was also found to be supported.

5.7.2.2 Department of Higher Education (DOE) journal article publications as Dependent Variable

The model with DOE publications as the dependent variable was found to be significant ($p<.0001$), with an R value of .466, an R squared value of .217 and an adjusted R squared value of .207. This indicated that the model explained about 22 percent of the variance associated with DOE journal article publication. The model had a standard error of the estimate of 9.043 and a Durbin-Watson statistic value of 1.999 which indicated that serial correlation was not a problem for the model. The F value for the model was 20.28. The coefficient values (B), their significance (Sig.) and Standard Error (Std. Error) values for the model are reported in Table C.1.4. The tables in the Appendix that are referred to in the main body of this document are numbered according to the hypothesis that they relate to. The variance inflation factors and tolerance values indicated that serious multicollinearity was not a problem for this model. The process of managing the assumptions and other aspects of the testing process is explained as follows.

The bootstrapped model with DOE journal article publication as the dependent variable and all the predictor variables included is reported in Table C.1.4. The highest of the condition indices of the model was found to be 39.8, the highest of the variance inflation factors was found to be 1.538 and the lowest of the tolerance values was .650 (Table C.1.5.). This model was found to be significant, with an r squared of .129 and an adjusted r squared of .066. This indicated that just less than seven percent of the variance associated with DOE publication was explained within the model.

None of the variables in this particular model were found to be significantly associated with DOE article publication. This was expected as a possible outcome of the inclusion of all these factors that were predicted by theory to be associated with research productivity, because with too many irrelevant variables included in the model the ‘true’ associations between certain of the variabls and the dependent variable can be undetectable (Field, 2009). The final model obtained through the use of backward elimination (Table C.1.6.) indicated that two factors were associated with DOE article publication; *DOE journal article Self-Efficacy and*

full time work experience. The collinearity diagnostics of this model indicated that multicollinearity was not a serious problem, with a highest condition index value of 7.17, and variance inflation factors and tolerance values all reasonably close to the value of one. With a Durbin-Watson value of 1.988, the model was viewed as not being faced with serial correlation. The r squared value for the model was 0.118 and the adjusted r squared value was 0.11. This indicated that just over ten percent of the variance in numbers of DOE publications was explained by the model. The results of the testing of the models with international journal article publication as the dependent variable are reported as follows.

5.7.2.3 ISI/IBSS Accredited Journal Article Publications as Dependent Variable

According to the model with all the factors included (Table C.1.7.), international journal article Self-Efficacy, male gender and total working experience were found to be significantly associated with international journal article publication. Dependent children were found to negatively associated with international journal article publication, albeit at within the ten percent level of significance. The highest values, according to the standardised coefficients, were found for full-time work experience (.385) and for the Self-Efficacy item (.308). The Variance Inflation Factors and Tolerance values were considered to be acceptable (Table C.1.8.). The model was significant ($p<.0001$), with an F value of 6.35. The Durbin-Watson statistic for the model was 2.02, which indicated that serial correlation was not a significant problem. The model was found to have an r squared value of 0.315 and an adjusted r squared value of .265 which indicated that about a quarter of the variance of international journal publications was explained by the model. After the application of the backward elimination process (Table C.1.9.), international journal publication Self-Efficacy, Gender and total working experience were found to be significant and positive predictors of international journal publication and dependent children are found to be a negative predictor of this dependent variable. These were the same factors that were significant in the full model. There was, therefore, no change in the variables found to be predictors when a bootstrapped process of backward elimination was applied. The tested models with conference proceedings publications as the dependent variable are reported as follows.

5.7.2.4 Conference Proceedings Publication as Dependent Variable

Conference proceeding publication Self-Efficacy, male gender, and total work experience were found to be significant predictors of conference proceedings publication (Table C.1.10.)

in the model with all variables included. According to the standardised coefficients values, total work experience accounted for the highest standardised coefficient, followed by gender and then the Self-Efficacy item (Table C.1.11.). The Durbin-Watson statistic for the model was found to be 1.874, the r squared value was .253 and the adjusted r squared value for the model was .199. After applying the bootstrapped backward elimination process (Table C.1.12), the same items were present in the model, yet an additional variable was also found to be significant: a negative value for South African origin. The latter model was found to have an r squared value of .215 and an adjusted r squared value of .201. The testing of the models with conference presentations as the dependent variable is reported as follows.

5.7.2.5 Conference Presentations as Dependent Variable

According to the model with all the variables included (Table C.1.13.), conference presentation Self-Efficacy, gender, total work experience and masters degree supervision were all found to be positive predictors of conference presentations, although the latter variable was found to be significant at just outside of the five percent level of significance. Total work experience was found to have the highest standardised coefficient, followed by male gender, the Self-Efficacy item, and then master degree supervision (Table C.1.14.). The model had an r squared value of .278 and an adjusted r squared value of .226, which indicated that with all the variables included a little less than a quarter of the variance associated with conference presentations was explained by the model. The Durbin-Watson statistic for the model was 1.853, which was taken to indicate that serial correlation was not a problem for the model. The final backward elimination model was found to include conference presentation Self-Efficacy, male gender, total work experience, and masters degree supervision (Table C.1.15.). The backward elimination process was therefore found to support the findings of the model with all the variables included. The Durbin-Watson value for the latter model was 1.966 and the r squared value was .229 with an adjusted r squared value of .215. The adjusted r squared values indicated that, after adjustment for the number of predictor variables, the former model explained more variance in the dependent variable than the latter model. The collinearity diagnostics were found to indicate no serious multicollinearity problems for these models.

5.7.2.6 Book Publication as Dependent Variable

None of the variables justified for inclusion into the full model with book publication as the dependent variable was found to be significantly associated with this dependent variable according to the bootstrapped results (Table C.1.16). The model was not significant (p<.197). According to the results of the process of backward elimination, the bootstrapped final model also revealed no significant predictor of the dependent variable. According to the model with all the variables included, the non-bootstrapped results indicate that total work experience, membership of professional associations and span of control are associated with higher levels of book publications (Table C.1.17.). However, the bootstrapped results were considered to be the correct results to interpret, and no association was recognised.

5.7.2.7 Book Chapter Publication as Dependent Variable

According to the model with all the variables included with book chapter publication as the dependent variable (Table C.1.18.), masters supervision was found to be a positive predictor of book chapter publication. This model was significant (p<.0001), and was found to have an r squared of .289 and an adjusted r squared of .238. The masters supervision item was found to have a standardised residual value of .317 (Table C.1.19.). The other diagnostics were not found to indicate any problematic multicollinearity or serial correlation. The final model that resulted from the bootstrapped backwards elimination process (Table C.1.20.) indicated that locus of control, professional associations, masters degree supervision and English as a home language were significant predictors of book chapter publication, although the latter variable was found to be significant at within the ten percent level of significance. South African origin was found to be a significant and negative predictor of book chapter publication according to this model. The r squared statistic of this latter model was found to be .248 and the adjusted r squared value was .231. The null hypothesis is therefore accepted and the alternative hypothesis is rejected.

In the above sections, the multivariate associations of gross research productivity and each of the subordinate measures of research output were reported. The bivariate associations between each of the performance factor variables and each of the research output variables, including research productivity, are now reported, together with a summary of the multivariate results, and a justification is provided for the acceptance of, or the rejection of, the tested null-hypothesis in each case. Whereas for the multivariate results each research

output was used as the dependent variable, in the following sections the individual hypotheses are used as headings. The outcome of the testing of the hypothesis is reported in each of the following sections, which was premised on the results of both the bivariate and multivariate testing. All of these results are discussed in the following chapter.

5.7.3 HYPOTHESIS C.A. BIOGRAPHICAL FACTORS ARE SIGNIFICANTLY ASSOCIATED WITH RESEARCH PRODUCTIVITY.

5.7.3.1 **Hypothesis C1: There is a significant association between experience and research productivity**.

In order to avoid singularity, the work experience and age measures which were taken to represent compound variables, or variables that were a function of the other time-related variables, were not included in the multivariate analysis of the predictors of the seven dimensions of research productivity. The relationships between the different dimensions of time-related effects and research productivity were, instead, tested using partial correlation analysis. These results are reported as follows.

5.7.3.1.1 Hypothesis C1.a: There is a significant association between age and research productivity.

Age was found to be significantly associated with gross research productivity (.405;p<.0001); DOE journal article publication (.326;p<.0001), international journal article publication (.380;p<.0001); conference proceeding publication (.271;p<.0001); conference presentation (.295;p<.0001); book publication (.150;p<.025); and book chapter publication (.194;p<.003) according to the zero-order tests of association. According to the results of tests of partial correlations, however, the significant and positive zero order correlations for all of the research productivity variables with age were no longer found to be significant when years as a researcher were controlled for, with the exception of book publication (.189;p<.005) and book chapter publication (-.143;p<.032). When total work experience was used as the control variable, DOE article publication (.166;p<.083) and international journal article publication (.129;p<.053) were found to be weakly associated with age. The other variables were found to not be significantly associated with age when total working experience was the control variable in the partial correlation analysis process. When years of experience working for the institution were used instead as the control variable, age was found to be significantly

associated with DOE journal publication (.134;p<.045); international journal article publication (.201;p<.002); conference proceedings publication (.154;p<.021); conference presentations (.159;p<.018); book publication (.176;p<.008); and gross research productivity (.209;p<.002) but not with the publication of book chapters. On the basis of this analysis, the null hypothesis was rejected and the alternative hypothesis was accepted.

5.7.3.1.2 Hypothesis C1.b: There is a significant association between years spent in South Africa and research productivity.

Years spent in South Africa were found to be positively associated with the publication of locally accredited journal articles, both in terms of zero-order correlation (.168;p<.012) and also with South African origin controlled for (.254;p<.0001). Years spent in South Africa were not found to be significantly associated with any of the other research productivity items according to the zero-order correlation analysis. However, when age and South African origin were controlled for, years in South Africa were then found to be negatively associated with international journal article publication (-.170;p<.011) and also weakly and negatively associated with conference presentations (-.112;p<.096) and gross research productivity (-.118;p<.078). When age was the control variable, years in South Africa were found to be negatively associated with international journal publication (-.138;p<.039); conference proceedings publication (-.215;p<.001); and weakly and negatively associated with conference presentations (-.121;p<.072), book chapter publication (-.131;p<.05) and gross research productivity (-.124;p<.064). On the basis of these results the null hypothesis is rejected and the alternative hypothesis is accepted.

5.7.3.1.3 Hypothesis C1.c: There is a significant association between years of full-time work experience and research productivity.

Years of full-time experience, or years of total work experience, were found to be significantly associated with gross research productivity (.411;p<.0001); the publication of DOE journal articles (.309;p<.0001); international journal article publication (.364;p<.0001); conference proceedings publication (.310;p<.0001); book publication (.132;p<.048) and book chapter publication (.132;p<.0001). However, when the influence of age was controlled for, total work experience was found to be positively associated with conference proceedings (.157;p<.018); conference presentations (.141;p<.034) and book chapter publication

(.138;p<.039), and weakly associated with gross research productivity (.118;p<.079). However, total work experience was not found to be significantly associated with either of the journal article publication items or for book publication when age was controlled for. When years as a researcher were controlled for, total work experience was found to be significantly associated with book publication, yet with no other research productivity measure. According to the multiple linear regression analyses, total work experience was found to be associated with DOE journal article publication in the backward elimination model; with international journal article publication in the full model and also the model with only variables significant at within the ten percent level of significance included; with conference proceedings publication according to both models; with conference presentations according to both models; and with gross research productivity according to both models. On the basis of these results the null hypothesis was rejected and the alternative hypothesis was accepted.

5.7.3.1.4 Hypothesis C1.d: There is a significant association between years of experience as a researcher and research productivity.

Years of experience as a researcher were found to be significantly associated with gross research productivity (.411;p<.001), the publication of locally accredited journal articles (.482;p<.0001), internationally accredited journals (.587;p<.0001), conference proceedings publication (.432;p<.0001), conference presentations (.446;p<.0001) and the publication of book chapters (.445;p<.0001) according to zero-order correlation analysis. The publication of books, however, was not found to be associated with years as a researcher. After the influence of age was controlled for, gross research productivity (.526;p<.0001); DOE journal article publication (.375;p<.0001); international journal article publication (.484;p<.0001); conference proceedings publication (.350;p<.0001); conference presentations (.351;p<.0001); book publication (-.117;p<.08) and book chapter publication (.429;p<.0001) were all found to be positively associated with years as a researcher. When years of working for the institution itself was included as a control variable in the partial correlation analysis, years as a researcher was found to be significantly associated with gross research productivity (.500;p<.0001); DOE journal article publication (.322;p<.0001); international journal article publication (.467;p<.0001); conference proceedings publication (.355;p<.0001); conference presentations (.346;p<.0001) and book chapter publications (.379;p<.0001). Book publication, however, was not found to be significantly associated with years of experience as

a researcher when years of working for the institution were controlled. On the basis of these findings the null hypothesis is rejected and the alternative hypothesis is accepted.

5.7.3.1.5 Hypothesis C1.e: There is a significant association between years of experience within the institution and research productivity.

According to the zero-order tests of correlations, years of experience of working in the institution were found to be significantly associated with gross research productivity (.445;p<.0001); DOE journal article publication (.400;p<.0001); international journal article publication (.406;p<.0001); conference proceedings publication (.264;p<.0001); conference presentations (.302;p<.0001); and book chapter publication (.254;p<.0001); yet not with book publication. When years as a researcher were controlled for, years of working for the institution were found to be significantly associated with DOE article publication (.142;p<.034) yet not significantly associated with any of the other measures of research productivity. The null hypothesis was rejected and the alternative hypothesis was accepted.

5.7.3.2 Hypothesis C2: there is a significant association between exposure to the international context and research productivity.

5.7.3.2.1 Hypothesis C2.a: There is a significant difference in research productivity by country of origin.

This hypothesis was tested using Pearson point biserial correlations (Field, 2009). The bootstrapped (1000 iterations) point biserial correlations for the association between South African origin and conference proceedings publications (0,217;p<.001) and book chapters (-.193;p<.004) were found to be significant. These results were confirmed by bootstrapped t-tests. According to the results of Levene's test for equality of variance conference proceedings publication (F=16.56;p<.0001) and book chapters publication (F=17.597;p<.0001) were found to be significant. For these the t-test with equal variances assumed was used. For the other items, the test without equal variance assumed was used. According to the bootstrapped t-test results, conference proceedings publication (p<.007) and book chapter publication (p<.028) were found to differ significantly by South African origin. It was confirmed that individuals of non-South African origin were found to publish significantly more conference proceedings and book chapters. According to the bootstrapped Pearson point-biserial correlation analyses, being of Zimbabwean origin was found to be weakly and positively associated with DOE article publication (.124;p<.062). United

Kingdom origin was found to be associated with international journal article publication (.192;p<.004), conference proceedings publication (.150;p<.025); conference presentations (.320;p<.0001) and gross research productivity (.224;p<.001). Being of USA origin was not found to be significantly associated with any of the dimensions of research productivity. Based on the results, the null hypothesis was rejected and the alternative hypothesis was accepted.

5.7.3.2.2 Hypothesis C2.b: There is a significant association between the number of countries an individual has lived in for more than a year and research productivity.

According to the Pearson point biserial correlation tests of association, which were applied using bootstrapping of 1000 iterations, the number of other countries lived in for over a year were found to be significantly and positively associated with conference presentations (.234;p<.0001) and the publication of book chapters (.156;p<.019). These results reflect the same significant associations as when South African origin was the tested variable. Partial correlation analysis was applied in order to ascertain if countries lived in were associated with conference presentations and book chapter publication if South African origin was controlled for. When South African origin was controlled for, conference proceedings (.148;p<.027) but not book chapter publication (.069;p<.302) was significantly associated with countries lived in for over a year. Notwithstanding the lack of a multivariate association, on the basis of the Pearson point-biserial correlation results, which indicate a net association, the null hypothesis was rejected and the alternative hypothesis was accepted.

5.7.3.2.3 Hypothesis C2.c: There is a significant difference in research productivity associated with differences in home languages.

According to bootstrapped Pearson point-biserial tests of association, English as a home language was found to be significantly associated with gross research productivity (.141;p<.034), conference presentations (.135;p<.043), and book chapter publication (.149;p<.025) yet not with any of the other measures of research productivity. Other home languages such as Afrikaans and Zulu were not found to be significantly associated with any of the measures of research productivity. According to the multivariate analysis, a weak association between English as a home language and book chapter publication was found for the model with only variables significant at within the ten percent level of significance included. No significant association was found between English as a home language and any

of the other measures of research productivity according to the multiple linear regression tests. On the basis of these results the null hypothesis is rejected and the alternative hypothesis is accepted.

5.7.3.2.4 Hypotheses C2.d: There is a significant difference in research productivity by experience in a multinational company.

According to the Pearson point-biserial tests of association, multinational experience was not found to be significantly associated with any of the measures of research productivity. The null hypothesis is accepted and the alternative hypothesis is rejected.

5.7.3.2.5 Hypothesis C2.e: There is a significant difference in research productivity associated with membership of professional associations or networks.

According to the results of the Pearson point-biserial tests of association, membership of professional associations was found to be significantly and positively associated with gross research productivity (.200;p<.003); DOE article publication (.132;p<.047); international journal article publication (.161;p<.016); conference proceedings (.167;p<.012); conference presentations (.169;p<.011) and book chapter publication (.188;p<.005). According to the multiple linear regression analysis results, the professional associations' variable was found to be weakly associated with book chapter publication in the model with all tested variables included and significantly associated in the model tested with all variables significant at within the ten percent level of significance. Professional association membership was not found to be associated with any of the other measures of research productivity according to the multiple linear regression analysis process. On the basis of these results, the null hypothesis is rejected and the alternative hypothesis is accepted.

5.7.3.3 Hypothesis C3: Levels of formal education are significantly associated with differences in research productivity.

According to the Pearson tests of association, years of formal education were found to be weakly associated with higher numbers of conference presentations (.119;p<.074), yet not with any of the other measures of research productivity. When years as a researcher are controlled for, the association between years of education and each of the research productivity measures is found to not be significant. On the basis of these findings, the null hypothesis is accepted and the alternative hypothesis is rejected.

5.7.3.4 Hypothesis C4: There is a significant association between collaboration and research productivity.

According to the results of the bootstrapped Pearson correlation analyses, the ratio of co-authorship, or the amount of co-authored journal articles divided by the amount of total journal articles, is found to be significantly associated with international journal article publication (.175;p<.008) and weakly associated with total journal article publication (.131;p<.05) yet not with DOE journal article publication. Co-authorship was found to be significantly associated with journal article publication (.740;p<.0001). However, when controlling for the total number of co-authored journal articles published, the ratio of co-authorship was found to be negatively and significantly associated with total journal article publication (-.276;p<.0001); DOE article publication (-.276;p<.0001) and international journal article publication (-.263;p<.0001).

On the basis of these results, it was decided that further investigation of this relationship was necessary, as it was not clear what the net linear relationship between co-authorship and journal article publication was on the basis of these results. From the linear scatterplot of these items it appeared that there were possibly two patterns in the data: (i) a linear pattern, and (ii) an exponential pattern. In order to test this relationship, a regression model was used with total journal article publication as the dependent variable and total co-authorship as one independent variable and with total co-authorship squared as the other dependent variable.

The adjusted r squared value for the model was .551, which indicated that co-authorship explained over half of the variance in total journal article publication. Co-authorship was found to be associated with total journal articles in positive and linear and not in an exponential manner. When co-authorship and co-authorship ratio are included in the equation, the former was found to be significantly and positively associated with total journal article publication and the latter is found to be significantly and negatively associated with total journal article publication. The variance inflation factors, tolerance values and values of the condition indices suggested that this difference in the signs between these two items was not due to multicollinearity. This result suggests that as individuals increase their output of total journal publications they might reduce their proportion of collaboration. On the basis of these results, the null hypothesis is rejected and the alternative hypothesis is accepted.

5.7.3.5 Hypothesis C5: Preference for either quantitative versus qualitative methods is significantly associated with higher levels of research productivity.

According to the Pearson tests of association, a preference for quantitative versus qualitative methods was not found to be significantly associated with any of the research productivity measures at within the five percent level of significance. A preference for quantitative methods was found to be weakly associated with conference proceedings publication (.123;p<.066), yet according to the multiple linear regression results, this item was not found to be significantly associated with conference proceedings publication. The null hypothesis is rejected and the alternative hypothesis is accepted.

5.7.3.6 Hypothesis C6: There is a significant association between marriage and research productivity.

According to the Pearson tests of association, marriage was found to be positively and significantly associated with DOE journal publication (.195;p<.003) and conference proceedings publication (.156;p<.019), and was weakly associated with gross research productivity (.115;p<.086), yet was not significantly associated with any of the other research productivity variables. When dependent children were included as a control variable, gross research productivity (.140;p<.037) was found to be significantly associated with marriage, and DOE journal article publication was still found to be significantly associated with marriage (.174;p<.009) yet the conference proceedings publication item is no longer found to be significant (.085;p<.20). When age is controlled for, marriage is found to not be associated with any of the measures of research productivity except book publication, negatively and weakly (-.120;p<.073). On the basis of the results of the tests of association, the null hypothesis was rejected and the alternative hypothesis was accepted.

5.7.3.7 Hypothesis C7: There is no significant association between research productivity and number of dependent children.

According to the results of the Pearson tests of association, dependent children are found to be positively associated with conference proceedings publication (.164;p<.014) but not with any other of the research productivity items. To the extent that this association might have captured the effects of time, or age, partial correlation analysis was used in order to control for age as a covariate variable. After controlling for age, dependent children are found to be negatively associated with international journal article publication, yet positively and weakly

associated with conference proceedings publication (.116;p<.084). According to the results of the multiple linear regression analysis, dependent children are found to be negatively associated with international journal publication in the model with variables included that are within the ten percent level of significance, and also negatively yet weakly associated according to the model with all tested variables included. This was the only significant association of dependent children found according to the multiple linear regression analysis process. The null-hypothesis was rejected.

5.7.3.8 Hypothesis C8: There is a significant difference in research productivity by gender.

T-tests were used to test the significance of differences between the means of the research productivity items by gender. Bootstrapping was applied to the process. The Levene's test for equality of variances was found to be significant for DOE journal article publication (F=3.066;p<.081); international journal article publication (F=29.951;p<.0001); conference proceedings (F=29.43;p<.0001); conference presentations (F=19.04;p<.0001); book publication (F=2.8;p<.095) and gross research productivity (F=25.9;p<.0001). For the items found to be significant, equal variances were not assumed. For the items with significance over the five percent level of significance and for book chapters, which were found to not be significant according to Levene's test (F=.720;p<.397), equal variances were assumed. On the basis of these tests, DOE journal publication (equal variances assumed p<.282/not assumed p<.288); book publication (equal variances assumed p<.421; equal variances not assumed p<.419); and book chapter publication (equal variances assumed p<.500 [independent samples test]) were found to not differ significantly by gender. However, international journal article publication (equal variance not assumed p<.003); conference proceeding publication (equal variance not assumed p<.009); conference presentations (equal variance not assumed p<.019) and gross research productivity (equal variances not assumed p<.004) were all found to differ significantly by gender. Males are associated with significantly higher research outputs of internationally accredited journal articles, conference proceedings publication, conference presentations and gross research productivity. These associations were analysed further using partial correlation analysis. In addition to the zero order Pearson point biserial correlations tests that were found to support the t-test findings, when dependent children and, in turn, marriage, were controlled for using partial correlation analysis, these significant associations were not found to change. In terms of the multivariate

analysis, male gender was found to be significantly associated with international journal article publication according to both the full model and the model with only variables significant at within the ten percent level of significance included; with conference proceedings publication according to both models; with conference presentations according to both models; and with gross research productivity according to both models. On the basis of Pearson point biserial tests of association, being male was found to be significantly and positively associated with a preference for research over teaching (.194;p<.004) and weakly associated with satisfaction for research (.130;p<.051), or a research locus of satisfaction. Being female was also found to be significantly and positively associated with satisfaction with teaching, or a teaching locus of satisfaction. On the basis of these results the null hypothesis is rejected and the alternative hypothesis is accepted.

5.7.4 HYPOTHESIS C.B. PERSONAL ORIENTATION FACTORS ARE SIGNIFICANTLY ASSOCIATED WITH RESEARCH PRODUCTIVITY

5.7.4.1 Hypothesis C9: There is a significant association between Job Satisfaction and research productivity.

According to the bivariate results of the zero order correlations between job satisfaction and the seven measures of research productivity, there were no significant associations. The correlation tests were run with bootstrapping applied using 1000 iterations in order to check the significance of these associations. According to the bivariate analysis, bootstrapped zero-order associations between gross research productivity and job satisfaction were not found to be significant (-.045;p<.506). When Negative and Positive Affect were controlled for, this association also failed to attain significance (-.089;p<.187). According to the results of the multivariate testing, job satisfaction was not found to be associated with any of the dependent variables. The null-hypothesis was accepted, and the alternative hypothesis was rejected.

5.7.4.2 Hypothesis C10: There is a significant association between Self-Efficacy and research productivity.

The Pearson tests of zero-order correlations between (i) total research Self-Efficacy and gross research productivity (.392;p<.0001); (ii) DOE article publication Self-Efficacy and DOE publication (.204;p<.002); (iii) international journal article publication Self-Efficacy and international journal article publication (.348;p<.0001); (iv) conference proceedings publication Self-Efficacy and conference proceedings publication (.251;p<.0001); and (v)

conference presentation Self-Efficacy and conference presentations (.285;p<.0001) were all found to be significant and positive. The zero-order correlation between total research Self-Efficacy and: (i) book publication was not found to be significant (.001;p<.985); (ii) book chapter publication was found to be positive and significant (.218;p<.001). The method bias check in the form of a control for NA and PA was found to make no difference to the significance of these results when Affect was controlled for using partial correlation analysis. On the basis of the bivariate and multivariate findings, the null hypothesis is rejected and the alternative hypothesis is accepted.

5.7.4.3 Hypothesis C11: There is a significant difference between Affectivity and research productivity.

According to the zero-order Pearson correlation tests, none of the research productivity measures is significantly associated with NA. Conference presentations are found to be significantly associated with PA yet only at just outside the five percent level of significance (.119;p<.075). On the basis of the bivariate and multivariate results, the null hypothesis is accepted, and the alternative hypothesis is rejected.

5.7.4.4 Hypothesis C12: Differences in Locus of Control are significantly associated with differences in research productivity.

According to the results of the Pearson tests of association, an internal locus of control was not found to be significantly associated with any of the measures of research productivity. When partial correlation analysis was used to control for the potential influence of PA and NA, locus of control was also not found to be significantly associated with any of the measures of research productivity. On account of this variable being a significant predictor of book chapter publication in the multiple linear regression analysis, this null-hypothesis was rejected and the alternative hypothesis is accepted.

5.7.5 HYPOTHESIS C.C. THERE IS A SIGNIFICANT ASSOCIATION BETWEEN RESEARCH WORK ROLE SATISFACTION AND RESEARCH PRODUCTIVITY.

5.7.5.1 Hypothesis C13: Differences in research work role satisfaction are significantly associated with differences in research productivity.

In order to test this hypothesis, bootstrapped Pearson correlation tests were run between the items representing (i) satisfaction with research, or a research locus of satisfaction, and (ii) satisfaction with teaching, or a teaching locus of satisfaction, against the seven measures of research productivity.

5.7.5.2 Hypothesis C13.a: Satisfaction with research is significantly associated with research productivity.

According to the bootstrapped Pearson association tests, satisfaction with research, or a research locus of satisfaction, was found to be significantly and positively associated with gross research productivity (.202;p<.002), international journal article publication (.202;p<.002), DOE journal article publication (.140;p<.035) and conference presentations (.156;p<.02). A research locus of satisfaction, however, was not found to be significantly associated with the publication of conference proceedings, books or book chapters. Satisfaction with research was found to be negatively associated with satisfaction with teaching (-.411;p<.0001) and positively associated with the satisfaction with research versus satisfaction with teaching item (.657;p<.0001). The null-hypothesis is rejected.

5.7.5.3 Hypothesis C13.b: Satisfaction with teaching is significantly associated with research productivity.

According to the bootstrapped Pearson correlation analysis, a teaching locus of satisfaction is found to be negatively associated with gross research productivity (-.290;p<.0001); DOE journal article publication (-.187;p<.005); international journal article publication (-.281;p<.0001); conference proceedings publication (-.240;p<.0001); conference presentations (-.227;p<.001) and the publication of book chapters (-.160;p<.016). Satisfaction with teaching was found to be negatively associated with satisfaction with research (-.411;p<.0001) and negatively associated with the satisfaction with research versus

satisfaction with teaching item (-.593;p<.0001). On the basis of these results, the null-hypothesis is rejected and the alternative hypothesis is accepted.

5.7.6 HYPOTHESIS C.D. THERE IS A SIGNIFICANT ASSOCIATION BETWEEN SUPERVISORY EXPERIENCE AND RESEARCH PRODUCTIVITY.

5.7.6.1 Hypothesis C14: There is a significant association between Masters and Doctoral supervision and research productivity.

According to the bootstrapped Pearson tests of association, the number of masters degree students supervised is found to be associated with gross research productivity (.289;p<.0001); DOE journal article publication (.161;p<.016); international journal article publication (.145;p<.03); conference proceedings publication (.271;p<.0001); conference presentations (.304;p<.0001) and book chapter publication (.452;p<.0001). However, when years as a researcher were controlled for, masters degree supervision is found to be significantly and negatively associated with international journal article publication (-.173;p<.01) and positively associated with book chapter publication (.313;p<.0001). Unlike in the case of the zero order correlations, when years as a researcher were controlled for, masters degree supervision was not found to be significantly associated with gross research productivity (.003;p<.962); DOE article publication (-.073;p<.280); and conference proceedings publication (.09;p<.180); yet was weakly associated with conference presentations (.125;p<.062).

According to the zero-order tests of association, doctoral supervision was found to be significantly associated with DOE journal article publication (.202;p<.002); international journal article publication (.314;p<.0001); conference proceedings publication (.271;p<.0001); conference presentations (.304;p<.0001) and book chapter publication (.452;p<.0001). However, when years as a researcher were controlled for, doctoral students supervised were found to be significantly associated with gross research productivity (.388;p<0001); conference proceedings publication (.190;p<.004); conference presentations (.231;p<.0001) and the publication of book chapters (.216;p<.001) yet weakly and positively associated with the publication of international journal articles (.119;p<.075) but not significantly associated with the publication of DOE journal articles (.024;p<.720). When the doctoral supervision item was run in the multiple linear regression models for each of the measures of research productivity instead of masters degree supervision, the item was found

to be significantly associated with book chapter publication, both in the model with all tested variables and in the model with only variables included that were significant at the ten percent level of significance. This, however, was the only measure of research productivity found to be associated with doctoral supervision in all the multiple linear regression models.

5.7.6.2 Hypothesis C15: There is a significant difference in research productivity by university rank designation.

According to the Pearson point-biserial correlation tests, the full professor and associate professor designation items were found to be significantly associated with all of the research productivity items except for the publication of books. The doctoral designation item was not found to be significantly associated with any of the research productivity items and the Mr./Ms. designation item was found to be negatively associated with all the measures of research productivity except book publication. When controlling for years of experience as a researcher, using partial correlation analysis, the professor designation item was still found to be significantly associated with all the measures of research productivity except conference proceedings (.014;p<.832), and was still not significantly associated with book publication (.025;p<.711). After controlling for years of experience as a researcher, the associate professor designation was no longer found to be significantly associated with gross research productivity (.109;p<.104), DOE journal article publication (.051;p<.448), international journal article publication (.057;p<.397), conference proceedings (.035;p<.60) and book chapter publication (.042;p<.535); and was found to be less significantly associated with conference presentations (.119;p<.079). After controlling for years of experience as a researcher, book publication was found to still not be significantly associated with the Associate Professor designation (.012;p<.860). After controlling for years as a researcher there was no change in the significance of the zero-order associations between the doctoral designation item and the measures of research productivity; these were all found to remain not significantly associated. After controlling for years as a researcher, the Mr./Ms. designation was no longer found to be negatively and significantly associated with DOE journal article publication (-.053;p<.426), conference proceedings publication (-.08;p<.235) and less negatively significantly associated with book chapter publication (-.114;p<.089). This designation was found to remain not significantly associated with book publication (.02;p<.771) after years as a researcher were controlled for. After controlling for years as a researcher, the Mr./Ms. designation was found to remain significantly negatively associated

with gross research productivity (-.172;p<.01). On the basis of these results the null hypothesis was rejected and the alternative hypothesis was accepted.

5.7.6.3 Hypothesis C16. There is no significant association between span of control and levels of research productivity.

Span of control, or the number of people that report to an individual in the organisation, according to the Pearson tests of association, were found to be significantly associated with gross research productivity (.171;p<.01), conference presentations (.153;p<.022), book publications (.134;p<.045), and book chapter publications (.335;p<.0001), yet was found to not be significantly associated with DOE journal publication (.066;p<.323), conference proceedings publication (.064;p<.338) and weakly associated with international journal article publication (.122;p<.064). Span of control was also found to be significantly associated with the Professor designation (.156;p<.019) and weakly associated with the Associate Professor designation (.125;p<.062) whilst being negatively associated with the Mr./Ms. designation item (-.202;p<.002). When tested in the multiple linear regression analysis, span of control was not found to be significantly associated with any of the measures of research productivity in any of the models. However, based on the bivariate analysis, the null hypothesis was rejected and the alternative hypothesis was accepted.

5.8 CONCLUSION

In this chapter the results of the quantitative research were reported. The univariate, bivariate and multivariate results were reported for the tests of associations between gross research productivity together with each of the subordinate measures of research productivity and (i) the GLOBE dimensions of organisational cultural values at the level of the academic School, (ii) the Schwartz measures of individual values at the individual level, and (iii) for the performance factors derived from the qualitative analysis. The acceptances or the rejections of the null hypotheses on the basis of the results of the testing of the hypotheses relating to the GLOBE dimensions of organisational culture are reported in Table 26. The results of the testing of the hypotheses relating to the Schwartz values dimensions are reported in Table 27. The results of the testing of the hypotheses relating to the performance factors are reported in Tables 28, 29, 30 and 31. These results are discussed in the following chapter.

Table 26. The Results of the testing of Null-hypothesis A. There is no significant association between the GLOBE dimensions of organisational culture and research productivity

Null-hypothesis/Sub Null-hypothesis	Accepted	Rejected
Null-hypothesis A.: There is no significant association between the GLOBE dimensions of organisational culture and research productivity		√
Null-hypothesis A.1.: There is no significant association between Uncertainty Avoidance and research productivity.		√
Null-hypothesis A.2.: There is no significant association between Future Orientation and research productivity.	√	
Null-hypothesis A.3.: There is no significant association between In-group Collectivism and research productivity	√	
Null-hypothesis A.4.: There is no significant association between Assertiveness and research productivity.	√	
Null-hypothesis A.5.: There is no significant association between Institutional Collectivism and research productivity.		√
Null-hypothesis A.6.: There is no significant association between Power Distance and research productivity.	√	
Null-hypothesis A.7.: There is no significant association between Performance orientation and research productivity	√	
Null-hypothesis A.8.: There is no significant association between Humane orientation and research productivity.	√	
Null-hypothesis A.9.: There is no significant association between Gender Egalitarianism and research productivity.	√	

Table 26 indicates that the null hypotheses are rejected for two out of the nine hypotheses tested for the GLOBE dimensions of organisational culture. The alternative hypotheses for associations between research productivity and the organisational cultural dimensions of Uncertainty Avoidance and Institutional Collectivism are therefore accepted.

Table 27. The Results of the testing of Null-hypothesis B.1. There is no significant association between Schwartz values and research productivity

Null-hypothesis/Sub Null-hypothesis	Accepted	Rejected
Null-hypothesis B. There is no significant association between Schwartz values orientations and research productivity.		√
Null-hypothesis B.1.: There is no significant association between Openness to Change values and research productivity.	√	
Null-hypothesis B.1.a.: There is no significant association between Self Direction values and research productivity.	√	
Null-hypothesis B1.b.: There is no significant association between Stimulation values and research productivity.	√	
Null hypothesis B.2.: There is no significant association between Self-Enhancement values and research productivity.		√
Null hypothesis B.2.a.: There is no significant association between Hedonism values and research productivity.		√
Null hypothesis B.2.b.: There is no significant association between Power values and research productivity.	√	
Null-hypothesis B.2.c.: There is no significant association between Achievement values and research productivity	√	
Null-hypothesis B.3.: There is no significant association between Conservation values and research productivity.	√	
Null-hypothesis B.3.a.: There is no significant association between Security values and research productivity.	√	
Null-hypothesis B.3.b.: There is no significant association between Conformity values and research productivity.	√	
Null-hypothesis B.3.c.: There is no significant association between Tradition values and research productivity.	√	
Null-hypothesis B.4.: There is no significant association between Self-Transcendence values and research productivity.	√	
Null-hypothesis B.4.a.: There is no significant association between Benevolence values and research productivity.	√	
Null-hypothesis B.4.b.: There is no significant association between Universalism values and research productivity.	√	

Table 27 indicates that the null hypothesis is rejected for one out of the ten hypotheses tested for the Schwartz dimensions of individual values, and therefore for one of the higher-order values types. The alternative hypotheses for the associations between research productivity and the individual values dimension of Hedonism, and therefore the higher-order values type Self-Enhancement, are therefore accepted.

Table 28. The Results of the testing of Null-hypothesis C.A. Biographical Factors are not significantly associated with Research Productivity.

Hypotheses: Component 1 Biographical Factors and Research Productivity	Accepted	Rejected
Null-hypothesis C. A. There is no significant association between Biographical Factors and research productivity.		√
Null-hypothesis C1: there is no significant association between experience and research productivity.		√
Null-hypothesis C2: there is no significant association between exposure to the international context and research productivity.		√
Null-hypothesis C3: Levels of formal education are not significantly associated with differences in research productivity.	√	
Null-hypothesis C4: There is no significant association between collaboration and research productivity.		√
Null-hypothesis C5: Preference for either quantitative or qualitative methods is not significantly associated with higher levels of research productivity.	√	
Null-hypothesis C6: There is no significant association between marriage and research productivity.		√
Null-hypothesis C7: There is no significant association between research productivity and number of dependent children.		√
Null-hypothesis C8: There is no significant difference in research productivity by gender.		√

Table 28 indicates that the null hypotheses are rejected for six out of the eight hypotheses tested for the associations between biographical factors and research productivity. The alternative hypotheses for the associations between research productivity and experience, exposure to the international context, collaboration, marriage, dependent children and gender are therefore accepted.

Table 29. The Results of the testing of Null-hypotheses C.B. Personal Orientation Factors are not significantly associated with Research Productivity.

Hypotheses: Component 2 Personal Orientation Factors and Research Productivity	Accepted	Rejected
Null-hypothesis C.B. There is no significant association between Personal Orientation Factors and research productivity.		√
Null-hypothesis C9: There is no significant association between job satisfaction and research productivity.	√	
Null-hypothesis C10: There is no significant association between Self-Efficacy and research productivity.		√
Null-hypothesis C11: There is no significant difference between Affectivity and research productivity.	√	
Null-hypothesis C12: Differences in Locus of Control are not significantly associated with differences in research productivity.		√

Table 29 indicates that the null hypotheses are rejected for two out of the four hypotheses tested for the associations between personal orientation factors and research productivity. The alternative hypotheses for the associations between research productivity and (i) Self-Efficacy and (ii) Locus of Control are therefore accepted.

Table 30. The Results of the testing of Null-hypothesis C.C. There is no significant association between Research Work Role Satisfaction and Research Productivity.

Hypotheses: Component 3 Research Work Role Satisfaction and Research Productivity	Accepted	Rejected
Null-hypothesis C.C. There is no significant association between Research Work Role Satisfaction and research productivity.		√
Null-hypothesis C13: Differences in work-role specific satisfaction are not significantly associated with differences in research productivity.		√

Table 30 indicates that the null hypothesis relating to the association between research productivity and work role satisfaction is rejected. The alternative hypothesis for this association is therefore accepted.

Table 31. The Results of the testing of Null-hypothesis C.D. There is no significant association between Supervisory Experience and Research Productivity.

Hypotheses: Component 4 Supervisory Experience and Research Productivity	Accepted	Rejected
Null-hypothesis C.D. There is no significant association between supervisory experience and research productivity.		√
Null-hypothesis C14: There is no significant association between Masters and Doctoral supervision and research productivity.		√
Null-hypothesis C15: There is no significant difference in research productivity by university rank designation.		√
Null-hypothesis C16: There is no significant association between span of control and research productivity.		√

Table 31 indicates that the null hypotheses are rejected for all three of the hypotheses tested for the associations between supervisory experience and research productivity. The alternative hypotheses for these associations are therefore accepted. The findings of the research are now discussed.

CHAPTER 6

DISCUSSION OF THE FINDINGS

6 DISCUSSION OF THE FINDINGS

6.1 INTRODUCTION

In this chapter the results of the quantitative and qualitative analyses are discussed. This chapter extends the investigation from a reporting of the results to a discussion of the results. The qualitative analysis, based on a grounded application which imposed no theoretical structure, was discussed in Chapter four. In Chapter three, the methodology and statistical tests applied to the data were outlined and explained. In Chapter five, the results of the statistical testing were reported. Univariate, bivariate and multivariate results were reported. In this chapter the results are all discussed. The discussion proceeds as follows. Each tested hypothesis is used as a heading, and the discussion is structured according to the three core groupings of hypotheses. First, the values-related hypotheses related to the aggregated, or grouped, level of analysis are discussed. Then, the results of the testing of hypotheses that relate to the testing of individual value hypotheses are discussed. The results of the testing of the hypotheses that relate to individual level performance factors, which are grouped into four component categories, are then discussed. The chapter concludes with a summary. The results of the testing at the organisational, or grouped, level of analysis are discussed as follows.

6.2 UNIVARIATE RESULTS: THE GLOBE ITEMS

According to the univariate statistics, at the School level of analysis, the School of Law was found to have the highest mean level of Uncertainty Avoidance (Table 10). This supports the notion that legal rules and regulations are expected to be associated with Uncertainty Avoidance (Hofstede, 1980a; House *et al.*, 2004). Other Schools with relatively high levels of Uncertainty Avoidance were found to include Geosciences; Chemical and Metallurgical Engineering; and Economic and Business Sciences. The School with the lowest endowment of Uncertainty Avoidance was the School of Geography, Archaeology and Environmental Sciences, followed by the School of Social Sciences. The influence of different practitioner fields might be reflected in the organisational culture endowments of academic fields. These differences in organisational cultural values between academic fields, proxied in this study as academic schools, are taken to contest the predictions of convergence theory (Kerr *et al*., 1960); organisational culture values do not currently exhibit convergence, or similarity,

across academic fields. This is not to say this is not happening; but at this time, convergence is not evident.

If constraints to innovativeness are indeed associated with higher endowments of Uncertainty Avoidance, Future Orientation and Collectivism (House *et al*., 2004), then academic fields higher in these endowments would be expected to have lower levels of research productivity. This expectation is based on an assumption, however; the assumption that research productivity, or outputs as measured in this research, represent innovative knowledge creation. The analysis of the different types of research productivity were expected to provide more insight into which type may be constrained by organisational culture endowments predicted by theory to constrain innovativeness.

The School of Economic and Business Sciences was found to have the highest mean level of Future Orientation, followed by the School of Chemical and Metallurgical Engineering and the School of Geology, Archaeology and Environmental Sciences. The School of Literature and Languages was found to have the lowest mean of Future Orientation. According to GLOBE theory (House *et al.*, 2004), economics and business sciences might be expected to be academic fields that are planning oriented, or that have more of a temporal perspective than other academic fields. The highest mean for In-group Collectivism was for the School of Education, followed by the School of Economic and Business Sciences. The lowest mean was found to be for the School of Geography, Archaeology and Environmental Sciences. If In-group Collectivism reflects cohesion and loyalty to groups (House *et al*., 2004), then a normative culture of group loyalty might possibly be common to education, economics and business studies. Interestingly, the highest mean for Institutional Collectivism was found for Geosciences, followed by the School of Economic and Business sciences. The lowest means were found for Animal, Plant and Environmental Sciences and the School of Education. The relatively high means of the School of Economic and Business Sciences for both of the Collectivism items might suggest that such academics are loyal both to professional groups and also to institutions. The contrast between the School of Education's high level of In-group Collectivism and low level of Institutional Collectivism might reflect a loyalty to a profession, or the group, within a context of lower levels of institutional loyalty. The highest mean for Assertiveness was found for the School of Geosciences, followed by the School of Chemical and Metallurgical Engineering. The lowest level of Assertiveness was found to be for the School of Education. This difference in the 'toughness' or 'harder' values (House *et*

al., 2004) is taken to possibly reflect the differences between the 'hard' sciences and the 'softer' normative approach taken by educational practitioners. The highest mean for Power Distance was found to be for the School of Economic and Business Sciences, followed by the School of Chemical and Metallurgical Engineering (Table 16.). The lowest mean was found to be for the School of Architecture and Planning, followed by the School of Literature and Languages. The nature of economics and business sciences practitioner fields and the engineering practitioner fields might be reflected in the Power Distance endowments of their academic schools. As expected, the highest levels of Performance Orientation were also found to be for the School of Economic and Business Sciences, given that business and economic performance might be a core aspect of enterprise training. Interestingly, and unexpectedly, the next highest mean value of Performance Orientation was for the School of Arts. The lowest levels of Performance Orientation were found for the School of Animal, Plant and Environmental Sciences, followed by the School of Accountancy. The contrast between the School of Economic and Business Sciences and the School of Accountancy was unexpected, as both of these Schools were primarily business oriented. The School of Arts was found to have the highest values of Humane Orientation, followed by the School of Education and the School of Architecture and Planning. The School with the lowest endowment of Humane Orientation was the School of Accountancy, followed by the School of Geosciences. The highest mean level of Gender Egalitarianism was found to be for the School of Economic and Business Sciences, followed by the School of Education. The lowest levels of Gender Egalitarianism were found to be for the School of Geosciences, followed by the School of Arts. Having considered the univariate results of the testing of the GLOBE measures, the univariate results of the testing of the Schwartz values items are now discussed. These univariate results suggest that there are differences in the mean endowments of GLOBE organisational cultural values between the academic schools measured. These results are aligned with the qualitative findings that suggest that substantive differences in organisational culture exist between academic fields. According to the qualitative findings, the influence of practitioner fields might be a dominant influence on the practices and values of an academic field. Despite evidence of differences between academic fields in terms of organisational cultural endowments, journal output was not found to be associated with the values theoretically related to innovativeness; neither in terms of GLOBE organisational cultural values or Schwartz individual values. It is argued that the constraints to forms of research productivity that are less subject to the influence of peer reviewers within a specific academic discipline, such as book chapter publication, are more 'vulnerable' to the influence

of values orientations that are associated with lower levels of innovativeness. Similarly, it is argued, on the basis of the holistic analysis of both qualitative and qualitative findings, that these relationships are similar across levels; at the organisational culture level and at the individual level of values.

6.3 UNIVARIATE RESULTS: THE SCHWARTZ VALUES ITEMS

Universalism values were found to have the highest mean of the Schwartz values items, followed by Self-Direction and Benevolence values (Table 18.). These means were considered to be appropriate to a university context. Power values were found to have the lowest mean, followed by Conformity and Hedonism values. These mean scores also reflected the expected responses of academics in such a context. The univariate results of the testing of biographical and contextual factors are now considered.

6.4 UNIVARIATE RESULTS: INDIVIDUAL PERFORMANCE FACTORS

In terms of the biographical performance factors, the mean of years worked for the institution was 6.39 years, years as a researcher was 10.2 years and full-time work experience was 14.6 years (Table 20). The mean age of an academic in this context was 40.67 years, with a mean of 19.3 years of formal education. Because research productivity was found to primarily be a function of Specific Human Capital, or experience in the research context and not so much experience in other work contexts, this category of factors were considered to represent an important dimension of the predictors of research output. Personal Orientation factors were expected to demonstrate a higher degree of range restriction for academics than the general population, because academics are typically selected on the basis of the attainment of higher degrees and other criteria. The standard deviations of the measures, however, did not give any indication of extremely low or high differences in the levels of intrinsic performance factors across the sample. According to the research work role satisfaction factors, means of satisfaction with research were found to be the highest (4.87), followed by satisfaction with teaching (4.23), which were in turn higher than satisfaction with administration (2.23), which were about half the levels of values of the former two (Table 19). Just less than half of the respondents were not doctoral staff, and just short of a third were at the doctoral level, but not yet at the associate professor or professor level (Table 21). Fourteen percent of respondents reported having the associate professor designation and eight percent reported being professors. In terms of the methodology performance factor, 45.6% of respondents were

found to report a preference for quantitative methods (Table 22). Interestingly, Self-Efficacy measures (Table 19) for statistical analysis had a lower mean (49.88) than for qualitative analysis (71.33). In terms of other biographical factors, just over half (57%) of the respondents reported being married, and the mean number of dependent children was found to be 1.09. Gender as a biographical performance factor was found to reflect a slight dominance of females in the sample (53%). Over half of the sample reported having English as their home language, and ten percent of the respondents reported having Afrikaans (Table 22). Just over half of the sample reported being of South African origin. This context is therefore relatively diverse in terms of international staff. This might reflect relatively strong linkages with the global knowledge system. The results of the testing of the hypotheses are now discussed.

6.5 ORGANISATIONAL LEVEL OF ANALYSIS: GLOBE ORGANISATIONAL CULTURE VALUES AND RESEARCH PRODUCTIVITY

The research question posed at the organisational level of analysis was: *What is the relationship between Organisational Cultural values and research productivity at the level of the academic field?* The null hypotheses derived from this research question were tested in the quantitative portion of this research. The results of the testing of these hypotheses are discussed below, and then the qualitative findings are related to the quantitative findings. In this way a holistic analysis is facilitated.

6.5.1 HYPOTHESIS/PROPOSITION A.: THERE IS A SIGNIFICANT ASSOCIATION BETWEEN THE GLOBE DIMENSIONS OF ORGANISATIONAL CULTURE AND RESEARCH PRODUCTIVITY.

The results of the testing of the null-hypotheses that relate to the associations between each of the GLOBE dimensions and research productivity are discussed as follows. Each heading, however, is in the form of the hypothesis, and not the null-hypothesis.

6.5.1.1 Hypothesis A.1. There is no significant association between Uncertainty Avoidance and research productivity.

Schools with higher levels of Uncertainty Avoidance were found to have published fewer book chapters. The null hypothesis was rejected. For the purposes of a holistic analysis, the relationships between Uncertainty Avoidance and research productivity at the individual level

are also discussed here. Individuals with higher levels of Uncertainty Avoidance values were found to have presented fewer conference papers, to have lower gross research productivity nad to have published fewer book chapters. A tension exists, in the literature, between the predicted performance enhancements associated with Uncertainty Avoidance and its negative influence on organisational outcomes. Uncertainty Avoidance is expected to be associated with the creation of order, structure and work ethic (Hofstede, 1980b:45). However, negative associations have also been found between Uncertainty Avoidance and basic science at the societal level (De Luque & Javidan, 2004). Uncertainty Avoidance has also been found to be associated with constraints to effective communication (Gudykunst & Nishida, 2001), and with constraints to innovation in organisations (Shane, 1995). If knowledge creation is inherently innovative (Chesbrough, 2005; Huang, 2009; Sandow and Rhodes, 1996; Senge, 2006) then it is expected that research productivity reflects this innovativeness. The results, however, seem to either indicate that innovative values (lower levels of Uncertainty Avoidance) (House *et al*., 2004) are not associated with the more extensively subsidised measures of output: ISI/IBSS and DOE accredited journal article publications and conference proceedings publications. It is argued that journal article publication (the primary outputs that are supposed to capture the progress of knowledge creation) might not be associated with innovativeness. If so, then it is suggested that these results support the argument of Kuhn (1970: 2), that "science does not develop through the accumulation of individual discoveries and inventions"; that academic research output is not necessarily innovative. According to Kuhn (1970), incommensurable ways of viewing the world might dominate the progress of academic discovery, because research output is based on the social values of academics rather than on the real creation of knowledge. This lack of an association with innovative values was also found to be the case for Openness to Change values, which, as innovative values (Schwartz, 2007), were also expected to be associated with ISI/IBSS and DOE journal article publication and the other measures of research productivity; yet were found to not be associated with any of them. It is also argued that the qualitative findings also support this core argument; the specific mechanisms that explain aspects of the seemingly 'incommensurate' relationships between different academic fields, and that explain constraints to innovative knowledge creation, are discussed further in the sections that follow.

Interestingly, these negative associations of Uncertainty Avoidance are with the 'lower level' forms of research output and not the 'higher level' research outputs, such as journal articles and conference proceedings, which are more extensively subsidised by the South African

Department of Higher Education incentive system. Certain types of work are either 'initiation-type' work, fundamentally requiring innovativeness, or are 'implementation-type' work, requiring planning, rules and stipulated processes (Nakata & Sivakumar, 1996). On the basis of the findings of the study, it is argued that journal article publication might not necessarily be 'initiation-type' work that is expected to be associated with innovative knowledge creation. Uncertainty Avoidance is expected to constrain 'initiation-type' activities and enable 'implementation-type' activities (Nakata & Sivakumar, 1996). Research outputs of the 'initiation-type' were expected to be negatively associated with Uncertainty Avoidance, according to Nakata and Sivakumar's (1996) predictions.

Interestingly, book chapter publications, which are to some extent less subject to the influence of the journal type review process, were found, at the individual level, to be negatively associated with two GLOBE organisational culture dimensions that represent a theoretical constraint to innovativeness (House *et al*., 2004): Uncertainty Avoidance and In-Group Collectivism. Book chapter publication was also found to be negatively associated with Power Distance values at the individual level; an organisational culture values dimension which was expected to constrain innovative work through its constraints to collaborative work across hierarchical levels (House *et al*., 2004). Conference presentations were also found to be negatively associated with Uncertainty Avoidance as well as Institutional Collectivism at the individual level. It is argued that book chapters and conference presentations might be more innovative, or 'initiation-type' outputs. If so then these types are expected to be a better match to innovative knowledge creation than journal articles and conference proceedings publications. Nakata and Sivakumar (1996) stress, however, that the influence of Uncertainty Avoidance does not necessarily act in isolation, but can work synergistically with other cultural effects, or can work against other cultural effects in a 'cannibalistic' fashion. These results, however, represent the 'net effect' of each of these dimensions of organisational culture; or what is found to dominate, or manifest over and above the influence of other influences. Following the GLOBE precedent (House *et al*., 2004), bivariate associations that represent such a 'net' influence of organisational cultural values were used in this study.

The more 'open source' paradigm of knowledge creation (Chesbrough, 2005) is expected to be reflected in more on-line journal publications and increasing accessibility to this flow of knowledge. If journal article publication is not inherently innovative, then this might suggest

that the influence of the open source paradigm has not yet resulted in a more innovative process of journal article production in the South African context. Indeed, South African journal article publication might not be inherently innovative. South Africa has been found to reflect relatively high levels of Uncertainty Avoidance in previous research; with the 25th highest in the world (De Luque & Javidan, 2004). Southern Africa, as a global region, has also been found to be associated with relatively high levels of Uncertainty Avoidance (De Luque & Javidan, 2004). The negative relationship between Uncertainty Avoidance and innovativeness (Shane, 1995) might suggest that low levels of innovativeness may be a feature of this context. The high levels of associations between societal culture and organisational culture found worldwide by the GLOBE studies (House *et al*., 2004) suggest that the relationships found here between Uncertainty Avoidance and research productivity are, likewise, not entirely independent of societal cultural effects.

Higher levels of Uncertainty Avoidance are associated with more rigid HRM regimes that are less flexible, which might constrain innovativeness in organisations (De Luque & Javidan, 2004). The South African human resources systems are rigid in terms of strict labour regulation (Bendix, 2001). This strict HRM regime includes Affirmative Action provisions in employment, based on quotas, which are targeted at achieving racial transformation in order to address racial inequality associated with the historical context of South Africa (Bendix, 2001). A high level of Uncertainty Avoidance is perhaps also reflected in South Africa's use of a bureaucratic rating system, the NRF for its researchers (National Research Foundation, 2013), where promotions and appointments are also based on the ranking of a researcher. However, the incentivisation of ISI/IBSS and DOE accredited journal articles is based on publication, and does not measure the extent to which such outputs are truly innovative, or truly represent knowledge creation. Such criteria are typically left to reviewers, or the 'gatekeepers' of journal article publication in a specific field. According to the qualitative analysis findings, journal reviewers can be risk-averse, and might be cautious to trust, and therefore to accept, new and innovative work if it significantly challenges convention.

The results suggest that the different types of research productivity are substantively different in their associations with the GLOBE dimensions of organisational culture. These results are considered to support the argument that the performance of organisational units and individuals, measured in this case as research outputs, can be constrained by values systems (Rowley & Benson, 2002; Kerr, 1983). *These differences contest the predictions of*

convergence theory (Kerr *et al*., 1960); at this point in time in this context organisational cultural values do not seem to have attained homogeneity across academic fields.

If the organisational cultures of specific academic fields were *substantively different* from each other, and if these differences made comparisons of output between different academic fields incommensurate, then significant associations between the research outputs and the GLOBE organisational culture values dimensions would not be expected to manifest in testing. Such associations might only be expected to manifest in outputs that were relatively less subject to the stringent review process of a particular academic field; such as book chapter publications. The sections below will relate these results to the qualitative findings and these issues will be discussed further.

6.5.1.2 Hypothesis A.2: There is a significant association between Future Orientation and research productivity.

Academic schools with higher endowments of Future Orientation values were not found to be more or less research productive. The null hypothesis was accepted. The analysis at the individual level is discussed here in order to provide further holistic insight. Individuals with higher endowments of Future Orientation values were found to have published fewer book chapters. However, after controlling for the influence of Affect, this association was found to be weak, at just within the ten percent level of significance. It is possible that this association might reflect the theoretical association between Future Orientation and Uncertainty Avoidance, as both are, to some extent, associated with the creation of organisational structure and planning (Carl *et al*., 2004). According to previous research across over sixty countries, Uncertainty Avoidance and Future Orientation have been found to share about 45% of variance between them (De Luque & Javidan, 2004). However, no association between Future Orientation and research productivity was found at the level of the academic school, and the association found at the individual level was no longer significant after Affect was controlled. Therefore, the expected predictions of GLOBE theory, that Future Orientation might constrain performance (in this case research productivity) through its constraint to innovativeness (House *et al*., 2004), is not found to be supported.

6.5.1.3 Hypothesis A.3.: There is a significant association between In-Group Collectivism and research productivity.

In-group Collectivism values of academic schools were found to be weakly associated with book and book chapter publication. However, these associations were found to be outside the required five percent level of significance, and the null hypothesis was accepted. The testing of the relationships between In-group Collectivism and research productivity at the individual level is discussed here in order to provide a holistic perspective of these relationships. Individuals with higher reported endowments of In-Group Collectivism were found to have published significantly fewer book chapters. This result finds support in theory suggesting that collectivism might reflect the dominance of the group over the individual, which can constrain innovation and facilitate resistance to change (Triandis, 1989). However, there are differences between schools according to measured In-Group Collectivism. The relationship between In-Group Collectivism and research productivity is discussed further in the sections below that relate the qualitative findings to the quantitative findings, for a more holistic analysis.

6.5.1.4 Hypothesis A.4.: There is a significant association between Assertiveness and research productivity.

Academic schools with higher levels of Assertiveness were found to have significantly higher publications of DOE accredited journal articles. However, after controlling for Affect, the association was found to not be significant. The null hypothesis was accepted. Nevertheless, the net association is discussed here because of the theoretical relationship between Assertiveness and Extraversion, which has been found to be strongly associated with Positive Affect (Den Hartog, 2004). It is possible that controlling for Affect might have altered the nature of the testing, if Positive Affect is a component of Assertiveness values, by definition. If the GLOBE item Assertiveness captures Hofstede's (1980a) dimension of Masculinity, then the positive association between Assertiveness and DOE publications supports findings by Kedia *et al*. (1992) of a positive association between Masculinity and research productivity in the R&D context. The positive association between DOE publications and Assertiveness is also consistent with the findings of an association between societal level Assertiveness and success in science and technology (Den Hartog, 2004). It might be possible that the more assertive relationships associated with higher endowments of Assertiveness (Den Hartog, 2004) may reflect lower levels of conformity and 'groupthink', which might

facilitate innovativeness through the contestation of ideas. The strong associations typically found in previous research between Assertiveness and Extraversion, a 'Big Five' personality factor, might also reflect the influence of higher levels of engagement with others (Den Hartog, 2004). Extraversion, and Assertiveness, might therefore be expected to be associated with more extensive network formation, or relationships between people. This might account for some dimension of the relatively greater success of Schools with higher levels of Assertiveness in the publication of DOE accredited journal articles. This result also supports the findings, in other contexts, that lower levels of Assertiveness, which reflect a preference for affiliation, have typically not been found to be associated with higher levels of job performance or work effectiveness (House *et al*, 2004). This echoes the findings of McClelland (1961) which suggest that a need for Affiliation can be negatively associated with higher levels of managerial job performance or effectiveness. The positive association for Assertiveness, which was the only positive association out of all the testing of the GLOBE values with research productivity, might also be considered to support the theoretical argument of the GLOBE theorists that a certain degree of Assertiveness is needed in organisations to ensure external adaptation and survival in a competitive environment (Den Hartog, 2004). Where the environment is competitive, academic Schools with higher levels of Assertiveness might be able to more successfully 'compete' in such an environment. This relationship might outweigh the negative influence of higher levels of Assertiveness which are predicted to be associated with lower levels of cooperation and internal integration (Den Hartog, 2004). The Assertiveness dimension is also considered to be aligned with Deal and Kennedy's (1982) 'tough guy' culture which is typically associated with individual rewards and internal competition (Den Hartog, 2004). Such values that are focused on competition and rewards might possibly not be suited to international journal article publication to the same extent as it might be suited to DOE article publication if the latter provide the same rewards yet are not as difficult to achieve. Hofstede (1980a) argues that Masculinity values are associated with innovativeness. This association, however, is contested by Nakata and Sivakumar (1996), who argue that lower levels of Masculinity are aligned with a climate of support and nurturing which might be better suited to innovation. According to Nakata & Sivakumar (1996), Masculinity is associated with more effective 'implementation' in work contexts, and constrains 'initiation' in work tasks. To the extent that English speaking countries have been found to have higher levels of Assertiveness (Den Hartog, 2004), the dominance of English as a language of publication and research might also be expected to also 'reward' Assertiveness. Further research is suggested into the relationships between

Assertiveness and the different types of journal article publication in order to understand the specific causes underlying this relationship.

6.5.1.5 Hypothesis A.5.: There is a significant association between Institutional Collectivism and research productivity.

The association between Institutional Collectivism and conference paper presentations was found to be significant in the sample of academic schools, but only after Affect was controlled for. Collectivist behaviour is typically used to reduce uncertainty (De Luque & Javidan, 2004), and such behaviour is expected to therefore constrain innovativeness. The null hypothesis was rejected at the level of the academic school. For the purposes of a holistic analysis, the results of the testing at the individual level are also discussed here. Individuals with higher reported endowments of Institutional Collectivism were also found to have presented fewer conference papers. Further research into the influence of Institutional Collectivism on conference presentation in this context is recommended, particularly in the form of more detailed qualitative research which might be able to establish what the causal mechanisms underlying these effects are.

6.5.1.6 Hypothesis A.6. There is a significant association between Power Distance and research productivity.

Power Distance was found to be negatively associated with book chapter publications for academic schools but this association was weak, at just within the ten percent level of significance. Hence the null hypothesis was accepted. For the purposes of a holistic perspective, the analysis at the individual level is also discussed here. Individuals with higher endowments of Power Distance were found to have published fewer book chapters. South Africa has been found to have the highest recorded levels of Power Distance globally (Carl *et al*., 2004). Findings by Kedia *et al*. (1992) suggest that higher levels of Power Distance are typically associated with lower levels of research productivity (although in industrial settings and not necessarily in academic contexts). Higher levels of Power Distance typically constrain performance by constraining communication and collaboration across different hierarchical levels (House *et al*., 2004). Further research is suggested into whether industrial R&D differs significantly from academic research in terms of the way organisational culture influences it. Kedia *et al*.'s (1992) findings suggest that R&D might be more sensitive to the influence of Power Distance values than academic research.

6.5.1.7 Hypothesis A.7: There is a significant association between Performance Orientation and research productivity.

Performance orientation was not found to be significantly associated with any of the dimensions of research productivity. This finding is surprising because the focus on performance improvement and innovation that is typically associated with Performance Orientation is expected to be associated with higher levels of work performance (Javidan, 2004). It might be possible that academic Schools with higher levels of Performance Orientation may direct their efforts towards other goals than research; particularly those Schools with larger practitioner communities. A possible example of this effect might be the School of Economic and Business Sciences, which was found to have the highest mean of Performance Orientation values. Reasons for the lack of significance of many of the GLOBE items when tested against research productivity at the level of the academic school are discussed further in the sections below that relate the qualitative findings to the quantitative findings.

6.5.1.8 Hypothesis A.8: There is a significant association between Humane Orientation and research productivity.

Humane orientation was not found to be significantly associated with any of the dimensions of research productivity. To the extent that the theoretical construct Humane Orientation was derived theoretically from McClelland's (1961) conception of need for Affiliation (House *et al*., 2004), the lack of a positive association between work performance and Humane Orientation was not unexpected.

6.5.1.9 Hypothesis A.9: There is no significant association between Gender Egalitarianism and research productivity.

Gender egalitarianism was not found to be significantly associated with any of the dimensions of research productivity. Despite findings, at the societal level, of a positive association between Gender Egalitarianism and gross national product per capita, economic prosperity, higher life expectancy and general satisfaction (Emrich *et al*., 2004), no positive or negative association was found between the Gender Egalitarianism of an academic school and research productivity. The lack of an association in this context might reflect range restriction; within such a professional cohort, relatively high levels of Gender Egalitarianism with less variance between individuals might be expected to be the norm. The GLOBE

findings tested middle managers in organisations, which despite significant findings that relate to Gender Egalitarianism might reflect a cohort different in nature to this cohort. These results may suggest that there is no association between Gender Egalitarianism and research productivity in this academic context. The qualitative results are now discussed in relation to the quantitative findings, in order to provide a holistic perspective of the influence of organisational culture on research productivity.

6.5.2 GLOBE organisational culture and research productivity: the qualitative findings

According to the results of the qualitative analysis, a differentiation was stressed by respondents; between different academic fields which differed in their approach to research, and, hence, also to research productivity. The qualitative analysis findings that were reported in Chapter 4 were based on an application of a qualitative grounded approach; the results were discussed without reference to the quantitative results, and no theoretical framework was imposed on the analysis. In contrast, in this section the GLOBE theoretical dimensions frame the analysis, as the grounded process is modified to allow theory to be imposed on the analysis. In this section, the qualitative results are also discussed in relation to the quantitative results. This process is also followed in the section that reports the results of the testing of Schwartz values theory.

The primary difference between the quantitative and the qualitative findings reflects the methodologies applied to the analysis. The quantitative analysis was an exploratory exercise aimed at establishing whether generalisable relationships between GLOBE organisational cultural values and research productivity might exist across schools. The qualitative analysis attempted to understand, by way of thematic content analysis, the relationships between organisational culture and research productivity between academic fields. The analysis that follows is therefore framed according to the GLOBE theoretical dimensions, and the qualitative findings are used to corroborate, or alternatively to qualify, the quantitative results discussed above. The sections are separated due to the triangulated approach; as discussed in the methodology chapter, the positivist paradigm is followed in the previous section, and the transcendental realism/interpretivist paradigm (Miles & Huberman, 1994) is applied in the qualitative research analysis. The qualitative findings are considered as follows.

To some extent, certain influences might exist across different academic fields within an academic institution. In contrast with discipline-specific differences, the influence of the institution across different academic fields is reflected in the incentives it provides.

"The system in which a researcher operates can influence a researcher's values by virtue of the reward system that it employs." [OCDIFF-R7]

However, in trying to understand the influence of different types of GLOBE organisational culture dimensions on research productivity, the tension between the specificity of these relationships within academic fields and the commonality of these relationships across academic fields is evident.

"…what makes you qualified and what makes for quality what makes for productivity...what makes for independence....what makes for a seminal contribution...they would differ across the fields.."[OCDIFF-R2].

Such differences between academic fields offer certain insights into what dimensions may be related to higher or lower levels of research productivity within such fields, independently of discipline. In the case of disciplines such as economics, the culture might be one more aligned with relatively strong norms that relate to quality, or 'unwritten rules' that might constrain gross research productivity yet are aimed at increasing the publication of higher quality journal articles.

"I think also that the tendency in economics is to try and publish in high ranking journals and so the organisation of culture there is more on elitism if you like…that's the perception I get from the outside…producing only in the best journals, publishing very infrequently perhaps as a result as a cause or as an effect of that…it is actually more difficult than say the lawyers to produce a larger amount of research output…" [OCUA-R1]

The case of economics is differentiated from the case of law, with the implication that such relatively strong norms, or unwritten rules, are not applied as extensively across the legal research discipline, which has significantly higher levels of research productivity. Higher levels of Uncertainty Avoidance might be reflected in these relatively stronger rules, or norms held by disciplines such as Economics. If the organisational culture of different fields is primarily related to the structure of practices within each academic field, which differ from other fields, then one might need to take note of the dominant influences that shape the structure of practices in such fields. There may be two levels at which relationships between innovativness and research productivity manifest. Innovativeness may differ by academic discipline. Further, innovative work may be considered of low value, or be less likely to gain acceptance in quality journals in certain fields, such as Economics. In this case, creativity

may be constrained by Uncertainty Avoidance through risk of failure- this effect might crowd out the differences in innovativeness that occur within different fields.

One fundamental influence on the structure of practices within academic fields is the extent to which the academic field is dominated by an influential practitioner field that necessitates a prioritisation of 'professional training', or teaching, over research.

"*Because the university is currently structured around undergraduate teaching...it's not actually structured to support research...research is an add-on activity...its structured around undergraduate teaching...so...because there's...you have schools...and faculties which are committed to undergraduate teaching loads there...all your physical structures...and your organisational structures are all structured around that undergraduate teaching...*"*[OCRVT-R3]*. "*In fields strongly oriented towards professions (the health sciences, for example) organisational culture tends to have little understanding of or interest in research. It tends to be directed towards producing practitioners who can 'go out there and do the job'. It does not see the need for academic research; if it supports research is must be 'practical' or 'relevant' research.*"*[OCDIFF-R11]*.

To the extent that teaching differs from research, academic fields with more of a teaching orientation might be expected to be associated with differences in GLOBE values endowments from those with a research orientation. The practitioner orientation of an academic school, or the extent to which the practices and values of an academic school are shaped by those of their professional counterpart community, is therefore expected to be one dimension of difference for organisational culture dimensions. Another dimension is the extent to which the academic school is influenced by the academic field. Certain academic fields are more localised than others, or have a more geographically local 'centre of gravity', and may therefore have more opportunity to influence aspects of the organisational culture rather than to be influenced.

"...law is entirely...it is entirely local...they don't feel the need to benchmark internationally at all, and, by their own criteria, they are exceptionally good...but if you look at South Africa's contribution to the advancement of law…to the advancement of knowledge, it is one of the worst of all internationally...we make hardly any contribution..." [OCIGC-R3]

The negative association found between Uncertainty Avoidance and book chapter publication might reflect the negative influence of Uncertainty Avoidance on book chapter publication. This would support Shane's (1995) findings; that Uncertainty Avoidance constrains innovativeness in organisations. However, the lack of a significant association with gross research productivity, or with the other dimensions of research productivity, suggests that

research productivity, when measured as research output, may not be a match with innovative values. The qualitative data, however, suggest that it might be the match between the Uncertainty Avoidance of the research versus that of the field, or the gate-keepers of the field, that might contribute to higher levels of research productivity within each field, rather than the differences between fields. Consequently, in economics research a higher level of Uncertainty Avoidance might be necessary to be able to publish more, and in legal research a lower level of Uncertainty Avoidance might be necessary to publish more. High levels of Uncertainty Avoidance in Economics might dictate an emphasis on international quality, which may constrain output, according to the qualitative findings. If these international standards are not met, then papers will typically not be published. According to the qualitative findings, in Law there is less Uncertainty Avoidance, because researchers seem more relaxed because they know they are good locally, and this encourages innovativeness in their research. The qualitative findings also stress the importance of the practitioner fields in their influence of research productivity.

Notably, book chapters reflect a measure of research productivity that is not subjected to the peer review process to the same extent as journal articles. Hence, this measure may reflect relationships that are less dependent on the cultural alignment of disciplines and their 'gate-keeper' communities. The significance of the association between the net measure of Assertiveness and DOE journal article publication might suggest that DOE journal article publication may be related to a culture of Assertiveness, or a culture of Assertiveness-acceptance across academic disciplines. Further research might be able to indicate the extent to which South African journals differ from other forms of research productivity in terms of their cultural alignment, and the influence of such an alignment on journal article acceptance.
Institutional and In-Group Collectivism might be expected to facilitate higher levels of research productivity if these values support collaborative research and collaborative learning about research. Higher research productivity might be achieved in the face of challenges when collaborations are used.

"...people coming to us have severe language problems...one of the ways we deal with this is arranging our research into groups....and the groups then help each other...so instead of having individuals working where you have no one to talk to they are in a group of five, six, seven people, and they can...then you get peer group learning which is very important in an environment where people are second language initially...things like that...so though…one of the reasons...one of the organisational reasons for our success we believe is the teamwork we

engender into the people so we work as a team and we expect the students to work as a team.. ...so that working as teams you get huge increases in output, in productivity whichever way you want to define it...but of course you want to have people who are who can work together and not everybody can work in a team...so I have this metaphor of what I call generous researchers and selfish researchers...and I believe that the students and the teamwork with the generous researchers are much more inventive than the selfish researchers. ..." [OCCOLL-R5]

The negative association for Schools with higher levels of Institutional Collectivism with conference presentations contrasts with the predictions derived from the qualitative analysis. If strong collective cultures are associated with pressures toward conformity at the expense of individual creativity then such a negative finding would be expected. The strength of the influence of the practitioner field on its corresponding academic field, however, might be stronger when higher levels of Institutional Collectivism are present. The broader influence of such an effect might be expected to act at the level of the academic conference presentation, because this is typically the first type of research output achieved for beginning researchers. Further research might offer a deeper understanding of the tension between collaborative aspects of collectivism and the constraints potentially posed by endowments of collectivism, which might contribute to tight cultures (Triandis, 1989), or cultures in which individual creativity is stifled by group cohesion. Notwithstanding the contribution of collectivism values to research productivity in certain fields, an overarching, or dominant, generalisable association between any collectivism dimension of organisational cultural values and research productivity would not be expected if different academic fields were sufficiently different in the extent to which collaborative research is undertaken.

"*In my field [medical research], it is extremely rare to publish a piece of original laboratory-based research as a sole author. This differs significantly from the field of Humanities in which sole and/or first authorship is most highly valued."[OCDIFF-R7]*. "*…the research culture in the humanities is more individualistic than group, the latter being the science model…to write a critical study of an author, say, requires an extended, philosophical argument in which expression is a crucial sense-making procedure. There is limited opportunity to involve a team or even student assistants…"[OCDIFF-R9]. "…law is a very competitive discipline…there are loads of us…and it is fairly easy to get output and it's a numbers game and you want those numbers on your own rather than with others and you want to make the impact on your own so its…people tend to research on their own…"[OCDIFF-R14]*

It is also possible that in certain disciplines a supportive yet more autonomous, or individualistic culture, might contribute to higher levels of research productivity.

"…so a culture that allows academics to freely decide what direction they want to go to...in terms of what they want to research...[will lead to higher levels of research productivity] and so maybe you can summarise it as autonomy...an autonomous culture..."[OCDIFF-R14]. "I think there is a lot of…kind of burnout that happens…especially if you are in a culture that is not supportive…and…some people start out by trying to be innovative in the beginning…and if the culture of the organisation doesn't allow for them to undertake that research…or…you know…give them space or whatever…then you know…cynicism creeps in and…you know…people become…disenchanted…and potentially stop doing research…"[OCDIFF-R12]

Different predictions are therefore evident as to the influence of the group and its relationship to research productivity. Research productivity might therefore also be a function of the extent to which the organisational culture of academic schools corresponds to the organisational culture of the specific academic field, which includes those in other universities in the same field, as fellow 'gate-keepers' of the publication process. In environments where collaborations can enable research productivity, constraints to such collaborations that exist between people based on hierarchical relationships and constraints to the informal relationships between people might constrain research productivity. Higher levels of Power Distance are expected to constrain such collaborative work between individuals who are at different levels of seniority. Environments can also be structured to improve communication between people, including across hierarchical levels.

"I think that would be enormously...if there was an environment in which people could regularly...drop in for a coffee or something...and you didn't know who was going to be there...you didn't know the topic for the.....the discussion was going to be....it would do two things...it would create opportunities...that you hadn't thought of...and it would solve problems that you didn't think were solvable...because someone else knows how to do it..." [OCPD-R3]. Provide support not control [in order to increase research productivity]. [OCDIFF-R8].

Ordinarily, as in the case of private enterprise, it would be expected that Performance Orientation would be associated with higher levels of research productivity in the university context. The university research context, however, might be significantly different from the private research context.

"It's interesting that the most enabling research environment in which I have worked and the one in which there was the greatest encouragement to do innovation and the fewest constraints on what you had to do to achieve it was in private industry lab...that was the chamber of Mines research organisation...so you would think that...it is completely the converse to what you would expect...you would expect that the university...would make things easy for research...and that the private industry that was trying to make money out of it would constrain it...but it was entirely...exactly the opposite..." [OCPO-R3]

These responses echo the results of Kedia *et al*. (1992), where private R&D and academic research differed in their tested associations with organisational cultural dimensions. Academic research might be significantly less innovative than private sector research, or R&D. Academic research is also considered to face relatively more constraints to innovative research than private research. From the qualitative data, what emerges is the sense that the academic fields are fundamentally different in their cultures and the way they do research. Whereas the *profit motive might underlie commonality across different R&D contexts* (and perhaps facilitate innovativeness), the qualitative findings suggest that fundamental differences in the type of research conducted in different academic fields and their relationship to research productivity might make a comparison of such different fields problematic.

"…our research is easier and its cheaper [than that of other academic fields]…don't need equipment and our data is processed for us…you can have a prolific publishing career by never leaving your office…because the data gets delivered to your desktop…which makes law a prolific discipline in any university…it's not that a legal article is shorter than an economics article or takes less actual writing than an economics article…it's just that the amount of pre-prep that you need to do before you can start putting words to paper is vastly different…" [OCDIFF-R15]

The fundamental differences in how research is done might have a fundamental influence in how the culture of the field develops. Such fundamental differences also extend to notions of 'paradigms'.

"The physiology...at least the physiology that I do is...is completely empirically driven...there is no paradigm behind it at all...it's always been intriguing...and difficult for me...when you talk to psychologists...and they say well...we come from this school...and it is driven by all the paradigm...that you are talking about from the social sciences...there...this is our base...and this is our framework...and then we latch on to that...because in physiology we work the

opposite way around...we are empirically driven...and out of that come frameworks..." [OCDIFF-R3]

At the heart of differences between academic fields are the different problems, or research questions, that differ by academic field.

"I was in the science faculty for quite a number of years and the rationality of many of the practices [of education research] are very hard for scientists to understand...for example...and in the field of mathematics where I work mathematicians find it...find it very hard to understand…the nature of educational research...because in mathematics there are unsolved problems and what you do is find the theorems that solve it and it is quite clear and at the beginning of the nineteenth century we had 40 unsolved problems...some of them have been solved some of them remain unsolved...how come you still haven't solved the problem of learning I mean you have been at this for how many...ok...so...so...its understanding what's a problem and the nature of a problem and the nature of problems in human life are rather different...than a proper mathematical problem...so what that does is that it impacts on social measures across fields and what counts as research across fields..." [OCDIFF-R2]

These qualitative results suggest certain implications for the investigation of the relationships between endowments of GLOBE organisational culture values and research productivity across different fields. If convergence theory (Kerr *et al*., 1960) predicts the convergence of best practices over time, then these qualitative findings suggest that convergence theory is not supported in this context. It is possible that convergence might be more likely to occur between academic fields and their practitioner communities; both in terms of their function as training providers and also as providers of problem solving in the form of research. The correspondence, or alignment, between the organisational culture of an academic field and its larger academic field (that provides the gatekeepers for publication) and practitioner community (whose problems and needs the academic field addresses) might therefore be more important in facilitating research productivity, irrespective of the organisational cultural endowment of the academic field. This argument is made on the basis of the qualitative analysis. Accordingly, the lack of clear and dominant relationships between the endowments of GLOBE values by different academic schools and research productivity is therefore not surprising, notwithstanding the limited and exploratory nature of the analysis. An implication that derives from these findings is that attempts by university management to standardise or centralise the management of different academic fields might face challenges. The organisational culture linkages of academic fields to their different practitioner communities are expected to overshadow relationships between different academic fields. For example, the

methodological differences between academic fields and their different perceptions of rigor and quality in research might be 'surfaced' as contentious issues if different academic fields are managed as single units, because the 'real' organisational cultural alignment is between the academic discipline and its practitioner field, with its specific needs in terms of (i) its training needs and (ii) the type of problems or research questions that are specific to that field. It is perhaps possible that organisational cultural tensions and conflict might arise when different academic fields are subsumed into managerial units without an organisational structure that allows for the decentralisation of practices to match broader academic and practitioner fields.

"I have never worked professionally within a single discipline and I think the disciplines are weaker...in social science at Wits...they tend to be weaker than they are, for example, in the United States...in part because of the school model...it hasn't really worked...but if we compare what we do with a British or United States scholar the other disciplines really give you strict benchmarks of success I think in the sense that you know where you need to publish...you know what conferences you need to present your papers at...you know who are the big...the leaders in the field...that you want to impress..." [OCDIFF-R6]

A tension seems to be stressed here; the tension between the university's school model, which might represent the administration division imposed on a disciplinary area, and the discipline model which derives its research direction (and organisational culture) from the discipline itself, which is outside of the university. Research productivity might be enabled through a more effective alignment between the individual academic discipline and its connections with the research activities of the field on an international basis. To the extent that research output typically requires acceptance by peer reviewers, or gate-keepers at a discipline level, research productivity is expected to be a function of the extent to which such research conforms to the precedent, practices and culture of the discipline. Research productivity, then, might be related to the cultural 'fit' between the academic unit, or academic school, and its research counterparts in the same academic field in other universities rather than to relationships between other academic units, or schools.

The organisational culture of academic schools, and the relationships between organisational culture and research productivity might therefore be shaped by the tension between three fundamental influences; (i) the influence of organisational cultural convergence toward the values of the specific academic field; (ii) the influence of cultural convergence toward the values of the practitioner community specific to the academic field; and (iii) the influence of

the organisation itself, in terms of its organisational cultural influence, toward its systems and values. It is at the nexus of these three dominant tensions that the relationship between organisational cultural values and research productivity might need to be understood.

On the basis of these findings, it is concluded that, at this point of time and in this context, the predictions of Convergence theory are not supported; these findings suggest that organisational cultural dimensions are not similar between academic fields, and research productivity practices vary substantively between different academic fields. These findings therefore support the argument of Culture theory; that cultural differences will constrain trends towards homogeneity in cultural values and practices of different groups of people in different organisations (Hofstede, 1980a). The results also suggest that individuals and academic schools that have more innovative GLOBE organisational cultural values do not produce more 'high level' research outputs, such as ISI/IBSS or DOE accredited journal article publications. Instead, individuals and schools that have more innovative GLOBE organisational cultural values are found to have produced greater numbers of 'lower level' research outputs such as book chapters. Kuhn's (1970) argument, that academic research is not necessarily innovative, but is typically a function of social forces amongst academics, is also considered to be supported.

Organisational cultural values are found to potentially constrain certain measures of research output, other than journal article publications. *It is therefore concluded that these findings support the argument that endowments of GLOBE organisational cultural values of academics do constrain certain types of research productivity in this context*. It is argued that collective mental frameworks, in the form of cultural values systems, may pose a constraint to performance (House *et al*., 2004; Kerr, 1983; Rowley & Benson, 2002). Recommendations for theory and for practice that derive from these findings are offered in the following chapter.

It is suggested that further research investigate the relationships between GLOBE organisational cultural values and research productivity specifically in terms of the relationships between academic schools and their corresponding academic and practitioner fields. Whereas the influences of aggregated values might be 'crowded out' by fundamental differences in the way research is conducted in different fields, the influence of individual motivational values on individual research productivity is expected to pick up differences in

motivational goals that are more proximal to the individual. The results of the testing of associations between differences in Schwartz (2007) values and differences in research productivity are discussed as follows.

6.6 INDIVIDUAL VALUES: INDIVIDUAL LEVEL OF ANALYSIS

The research question posed at the individual level of analysis was: *What is the relationship between individual motivational values and research productivity?* The null hypotheses derived from this research question were tested in this research. The results of the testing of these hypotheses are first discussed and then the qualitative findings are related to the quantitative findings in order to provide a holistic analysis of both sets of findings. In the following discussion, if an effect is found to be significantly associated, according to tests of zero-order correlations, then such an effect is discussed as a finding. The rationale for this approach is that even if Negative or Positive Affect do influence a respondent's responses, it is unclear whether this influence is caused by method bias (Podsakoff *et al*., 2003), or if the internal psychological mechanisms that underpin an individual's motivational values share some commonality that is reflected in an individual's Affective endowment. Therefore, in order to meet the prescriptions of Podsakoff *et al*. (2003), each association was also reported with the influence of both Negative and Positive Affect controlled for. Response bias (Schwartz, 2007) was also controlled for. The discussion also follows the structure offered by Schwartz's (1996) theory, in that the circumplex structure of values represents patterns of conflict versus compatibility between values in relation to specific tested associations. The results of the testing of the hypotheses relating to Schwartz's (1996) values dimensions are discussed as follows.

6.6.1 HYPOTHESIS B. THERE IS A SIGNIFICANT ASSOCIATION BETWEEN SCHWARTZ VALUES AND RESEARCH PRODUCTIVITY.

6.6.1.1 Openness to Change Higher Order values types

6.6.1.1.1 Hypothesis B.1. There is a significant association between Openness to Change values and research productivity.

Hypothesis B.1.a. There is a significant association between Self-Direction values and research productivity. Individuals with higher endowments of Self-Direction values were not found to be more research productive. Self-Direction values are associated with independent and innovative thought and actions (Schwartz, 2007). These results were taken to support

Kuhn's (1970) argument; that academic research outputs are not necessarily associated with innovative knowledge creation. This result is also taken to also support the conclusions of the analysis of Hypothesis A in this regard.

As indicated above, it is argued that the lack of associations between the innovative and autonomous Self-Direction values (Schwartz, 2007) and research output supports the notion that this type of output does not represent innovative knowledge creation, but rather a less innovative form of work product. This result echoes the results of the testing of Uncertainty Avoidance discussed previously, where lower levels of Uncertainty Avoidance were expected to be associated with innovativeness as an important aspect of knowledge creation yet no significant associations were found for journal article publication. Further research is recommended in order to ascertain the extent to which university research outputs are indeed innovative in nature. If these outputs are not inherently innovative, then such research might not truly reflect knowledge creation. Recommendations for theory and for practice, based on these results, are provided in the following chapter.

Null-hypothesis B1.b. There is no significant association between Stimulation values and research productivity. No significant association was found between Stimulation values and any of the dimensions of research productivity. The lack of an association between this dimension of Openness to Change values and research productivity is taken to perhaps contest the notion that research outputs are fundamentally a form of innovative knowledge creation that is associated with higher levels of innovative motivational values.

6.6.1.2 Self-Enhancement Higher Order values types

6.6.1.2.1 Hypothesis B.2. There is a significant association between Self-Enhancement values and research productivity.

Hypothesis B.2.a. There is a significant association between Hedonism values and research productivity. According to net associations, Hedonism values were found to be negatively associated with ISI/IBSS journal article publications, conference presentations, book chapter publications and gross research productivity. The weak and negative associations for DOE journal article publication and conference proceedings publication with Hedonism values were found to become significant at within the five percent level of significance after correcting for Affect and response bias. Hedonism values are derived from biological needs

of individuals as biological organisms, rather than from the need for coordinated social interaction or from the need for the functioning and survival of groups (Schwartz, 1994). As such, these needs are associated with a desire for affective arousal (Schwartz, 1994). It is argued that higher levels of Hedonism values will typically conflict with work that requires a tolerance for more monotonous tasks or work that does not provide reasonably high levels of stimulation, as predicted by Activation theory (Scott, 1996). These findings support the predictions of Activation theory which suggest that individuals have a threshold of stimulation that they require from work tasks; where performance over time can be related to congruence between the stimulation level of the task and the required stimulation level of the individual (Scott, 1966). It is argued that research work is associated with high investments in time and in activities which, when compared with teaching for example, are relatively monotonous and require painstakingly detailed applications. The immediate gratification required by individuals with high levels of Hedonism values (Schwartz, 1994) might also prioritise individual and immediate satisfactions above delayed gratification required of research work. Similarly, Hedonism values conflict with Self-Transcendence values (Schwartz, 1994); a contribution to others, or self-transcendence is also a characteristic, perhaps, of research work. It is argued, on the basis of the qualitative results, that research work also has a component that is oriented towards others; the contribution of research to the needs of others. The findings that relate to Power values are discussed below.

Hypothesis B.2.b. There is a significant association between Power values and research productivity. Individuals with higher levels of Power values were found to have published fewer ISI/IBSS accredited journal articles. Individual motivational values were expected to constrain international journal article publication more than other forms of research output because this measure was expected to be more sensitive to values effects. After controlling for Affect and for response bias, this association was, however, no longer found to be significant. This association is nonetheless discussed. Power values were also found to be weakly and negatively associated with the publication of conference proceedings, at just within the ten percent level of significance. To the extent that individuals with a need for Power are expected to prioritise control over productivity, and are more focused on immediate outcomes (Winter, 1973), it is argued that high levels of Power values are not expected to be a match with the nature of research work. Similarly, to the extent that individuals with a higher need for Power tend to "seek to stand out publicly" (McClelland & Watson, 1973:139), such individuals, within a context of both teaching and research, are

expected to be less inclined to be research-oriented if research work is less socially oriented than other aspects of academic work. Individuals who are motivated by "social status and prestige, control or dominance over people and resources" or that have goals primarily associated with power, authority and wealth (Schwartz, 1996:122) might be less inclined to commit to the relatively autonomous nature of research work which offers little in the way of such immediate pay-offs. The lack of a significant association between Power values and any of the dimensions of research productivity after bias was controlled for is therefore taken to be surprising. It is acknowledged that research productivity might be a form of activitiy that is not fundamentally susceptible to the influence of Power values as a dominant constraint.

Hypothesis B.2.c. There is a significant association between Achievement values and research productivity. Achievement values were not found to be significantly associated with any of the measures of research productivity. This might indicate that a "focus on self-centred satisfaction" (Schwartz, 1994:24) of individuals high in Achievement values does not constrain research productivity for these individuals in the same way that it does for individuals with high Hedonism values. However, the lack of a significant positive association between Achievement values and research productivity was taken to be surprising, because individuals with high levels of Achievement values are expected to aspire to be "successful, capable, ambitious and influential" (Schwartz, 1996:122). The lack of such a significant association might speak to a substantive difference between research productivity as a form of work and the type of work that is positively influenced by Achievement values. Achievement values are not associated with an external source of need satisfaction (such as social reaction for high Power individuals) but with an internal satisfaction that is related to attainment of competence (Winter, 1973; McClelland & Watson, 1973). These conceptions, however, do not account for the lack of a positive association with research productivity. This is unexpected, as a high need for Achievement is expected to be associated with striving for accomplishment on the basis of private goals (McClelland, 1961; McClelland & Watson, 1973). Further research is suggested into the relationships between research productivity and Achievement values in order to understand the relationships of this value orientation with research productivity, which might possibly be an atypical form of work performance. It might be possible that individuals perceive additional effort invested in research outputs to be marginal after a point. If the requirements for tenure have been met, and a minimum level of output is maintained, then there might be less of an incentive for individuals to publish extensively (which, according to the qualitative findings, is the case

with career-driven achievement yet not with passion-driven motives where research productivity does not fall off after the attainment of tenure or rank). As such, individuals with higher levels of Achievement values might possibly not be motivated to engage with high levels of research productivity as they might with other work. This explanation, however, is not based on evidence, and further research is suggested into whether this is a plausible explanation for why individuals high in Achievement values do not perform better in research productivity.

6.6.1.3 Conservation Values Higher Order values types

6.6.1.3.1 Hypothesis B.3. There is a significant association between Conservation values and research productivity.

Hypothesis B.3.a. There is a significant association between Security values and research productivity. No significant associations were found between Security values and any of the dimensions of research productivity. These results might suggest that the prioritisation of motivational goals associated with social stability or the security of self through the reduction of uncertainty (Schwartz, 1994) is not a dominant constraint to research productivity in this context. Similarly, this values orientation is also found to not be a positive factor in the facilitation of research productivity either. To the extent that such values are, according to theory, expected to constrain innovativeness (Schwartz, 1994), the lack of a relationship between Security values and research productivity as a dominant effect is surprising. The absence of a negative association between Conservation values and the dimensions of research output might suggest that innovativeness is not a fundamental, or dominant, aspect of research output.

Hypothesis B.3.b. There is a significant association between Conformity values and research productivity. According to the zero-order correlations, individuals with higher levels of Conformity values are found to have published fewer book chapters. However, when Affect and response bias were controlled for, the association failed to attain significance. Conformity values are typically associated with the prioritisation of the norms and expectations of others (Schwartz, 1994:25): (i) on the one hand it might be expected that such conformity might be antithetical to innovation and the innovative processes required for knowledge creation and research productivity, yet (ii) on the other hand research productivity might be closely tied to research precedent, and some element of conformity to precedent and

the norms and expectations of others might be important. Due to the tension between these two extremes of conformity, it is perhaps understandable if Conformity values do not attain significance in this context because if they did then this would indicate that one of these effects dominates the other. Further research is recommended into the causal mechanisms that underlie such an influence of values on research productivity in this context. It is, however, concluded that innovativeness might not be a dominant aspect of research output, because Conformity values were expected to constrain innovativeness (Schwartz, 1994); this was the effect that was expected to be dominant in an academic context.

Hypothesis B.3.c. There is a significant association between Tradition values and research productivity. Tradition values are not found to be significantly associated with any of the measures of research productivity. Tradition values, which are only derived from group needs (Schwartz, 1994), and not biological needs, might not influence research productivity as a form of work performance. To the extent that tradition values are typically associated with the maintenance of the status quo (Schwartz, 1994), it is surprising that a negative association was not found between these values and research productivity. These results suggest that research productivity might not be as sensitive to constraints of innovativeness as expected, if a high degree of innovativeness is a prerequisite for knowledge creation (Nonaka, 1994).

6.6.1.4 Self-Transcendence Higher Order values types

6.6.1.4.1 Hypothesis B.4. There is a significant association between Self-Transcendence values and research productivity.

The results of the testing of the two subordinate null hypotheses derived from this core hypothesis are discussed as follows.

Hypothesis B.4.a. There is a significant association between Benevolence values and research productivity. Individuals with higher levels of Benevolence values were found to have published significantly fewer international journal articles. This was taken to represent the net association between these measures. As for all the other tests of Schwartz values associations, for the purposes of scientific rigour, further analyses were performed; after a response bias correction was performed, the negative association between Benevolence values and international journal article publication was no longer found to be significant. However, the weak and negative association found between Benevolence values and DOE journal article publication was found to increase in significance to within the five percent

level of significance when the response bias correction was applied, although when this was, in turn, controlled for Affect, the level of significance fell outside of the five percent limit. If Benevolence values share a motivational goal of the prioritisation of the in-group that is of a social nature (Schwartz, 1996), this would clash with the individualistic nature of the research process, which might require much time to be allocated to writing, a solitary endeavour, notwithstanding the collaborative nature of much research. Further testing prompted by this tentative explanation was found to indicate that Benevolence values were positively associated with satisfaction with teaching and also a preference for qualitative methods rather than quantitative methods. A preference for teaching was found to be negatively associated with many of the measures of research productivity. Benevolence values were also found to be negatively associated with satisfaction with research and statistical research Self-Efficacy. Satisfaction with research was found to be positively associated with most of the measures of research productivity. These quantitative results are discussed in relation to the qualitative data in the sections that follow. Notwithstanding the lack of significance of the associations between Benevolence values and research productivity, further qualitative and quantitative research is also recommended in order to draw out the tension between the individualistic versus the collaborative nature of research, and to clearly indicate the differences in the antecedents to each type of research, and the role Benevolence values might contribute to research productivity for each.

Hypothesis B.4.b. There is a significant association between Universalism values and research productivity. Universalism values were found to not be associated with any of the dimensions of research productivity. Universalism values, with motivational goals relating to social justice, unity with nature, and protection of the environment and similar aspects (Schwartz, 1996: 221), might be expected to motivate normative research, or research aimed at making a social contribution through the creation of knowledge. Given the results of the qualitative analysis, this was therefore a relatively surprising result. However, given that the measured effects needed to generalise across all the academic fields included in the research, it is acknowledged that the influence of practitioner fields with needs other than social contribution-related values might have dominated the results. The quantitative results were taken to represent net, or 'tip of the iceberg' associations that were strong enough to manifest over and above other influences. As such, the significant findings are taken to represent dominant values effects in this context.

In the reporting of the qualitative results that relate to individual values, grounded analysis was applied, and no theoretical framework was imposed on the analysis. In contrast, in the following section, the Schwartz (2007) theoretical framework is discussed in relation to the qualitative findings in order to corroborate, or to qualify, the results of the empirical findings. The results of the quantitative testing, therefore, are now discussed in relation to the qualitative findings.

6.6.2 Schwartz individual values and research productivity: the qualitative findings

In order to relate the quantitative results to the qualitative analysis, it is important to understand, from the qualitative analysis, the extent to which these results captured the predicted influence of Schwartz's (2007) values dimensions on research productivity. According to Schwartz's (2007) values theory, motivational values influence behaviour. It is acknowledged, however, that the influence of these motivational values might not transmit perfectly into research output.

"I know tons of people who would like to be primarily researchers or would like to be doing much more research than they do...so their value system is oriented toward it in that way but it often does not translate into behaviour...it often does not translate into putting the right sort of time or effort...or learning the right things you need to learn in order to be able to actually do what comports with your values..."[VVRP-R10]

In order for a net association to attain significance in the quantitative testing process, it would need to be strong enough to translate into behaviour related to research productivity. A fundamental mediating or moderating influence of the extent to which Schwartz (2007) values might transmit to research productivity is perhaps the role of self-perceived work identity. Certain values orientations might be relatively less or more aligned toward a specific role of academic work. Schwartz (2007) values orientations that are more aligned with research would therefore be expected to be associated with higher levels of research productivity. According to the qualitative data, there seem to be three fundamental roles that an academic might primarily identify with; (i) the role of academic researcher; (ii) the role of a professional related to the practitioner field; and (iii) the role of a teacher.

"…the extent to which you perceive yourself to be an academic and wanted to be an academic and wanting to produce research…we do have a large professional subset of people who perceive themselves as being professionals first and teachers second and not as researchers…that we have in common with other disciplines in the faculty such as

accountants who perceive themselves as CAs first and as researchers second…um…its more difficult to get someone who conceives of themselves first and foremost as a legal practitioner to pursue research with the same…rigor and dedication as someone who wants to be an academic and an academic only…you find that split coincides with the commercial law versus public law splits…and the commercial lawyers tend to see themselves more as lawyers and practitioners whereas the public lawyers don't…to the extent that I don't view myself as a lawyer at all…but more as a social scientist that happens to be writing as an academic…so I write more and am more productive than someone who views themselves as a lawyer first and foremost…for who different outputs matter…"[VVRP-R15]

For different individuals, certain motivational values might have motivational goals that motivate behaviour that is aligned with research productivity. Motivational values might transmit to research behaviour in a complex way if research cannot be planned and performed in the same way as many other work activities.

"Research is a little like falling in love; you can't force it; it happens when it happens. All you can do is expose yourself to suitable situations and environments and be receptive. Part of making oneself receptive is reading in and around the field and developing appropriate skills so that one can run with an idea when it suggests itself…" [VVRP-R11]

The transmission, or influence of motivational values on research output, might however be dependent on the incentives provided for research, and how individuals with different types of motivational values perceive these incentives. For individuals with different dominant configurations of Schwartz (2007) values orientations, the transmission effect from motivational values toward research productivity will therefore be expected to differ substantially.

"…so some people might not value research to be very important while others might find it as very important...so if someone places a high value on that research, it is possible that that could drive research productivity...on the other hand, some people might value research as valuable but not engage in the research...you know that is another problem...yes, we value the research, yes but where are the incentives for doing so? So it does not necessarily mean that if we place a higher value on research it does not necessarily automatically mean that that can lead to higher research productivity. I think there must be some interaction between value and motivation and incentives...what is it I am going to get out of this...that is very important...that's my definition of value..."[VVRP-R14]

It is perhaps reasonable to expect that an individual motivated by Self-Direction motivational values associated with creativity and autonomous intrinsic satisfaction (Schwartz, 1992)

might be less motivated by financial incentives than an individual motivated by Achievement or Power values. However, Schwartz (2007) values theory does predict that behaviour, such as, in this case, behaviour associated with the research productivity process, can be driven by individual values. An example, perhaps, is the motivational drive associated with Self-Direction values that is expected to be associated with higher levels of research productivity.

"[A successful research culture is produced by] people with passion and drive and self-belief."[RPPASS-R8][RPDRV-R8][RPSEF-R8][VSD-R8] "...self-direction...very important you know you cannot be a good researcher if you do not have any direction...you know...what do you want to be? If you want to establish yourself as an authority in a particular field you need to have a self-drive...you need to chart your path yourself...nobody else is going to do that for you...they can create a conducive environment but you have to chart your own direction...independent thought is very important…"[VSD-R14]

Characteristics such as passion, drive and self-belief are inherently associated with the individual. According to the qualitative data, a researcher can be motivated by a need for achievement and recognition. There might therefore be an ego-related aspect of research productivity.

"…if you get involved with generating an article you have your name in a learned journal and that gives a sense of achievement which is…if you like…a vanity of a certain kind but you've got to be driven by that…I would say that criterion is probably what would open or close for me my definition of who's a researcher and who is not…if you asked that question and said "is it of interest to you to have your name in a learned journal of something that you produced?" and the answer is indifference then that person, in my view would probably not be a researcher. Because they don't have the necessary passion for achievement in that very narrow area of which they get excitement for getting it…"[VACH-R1]

In terms of the tension between Self-Enhancement values and Self-Transcendence values, research productivity is mooted as being a primarily individualistic activity, associated with individual-level motivations, as opposed to a social function.

"I don't know it is not so much the satisfaction of becoming known but the satisfaction of knowing that you created something that has been…is worthy publication so it is not a kind of social function it is a very individualistic one…" [VSEEN-R1]

A fundamental tension exists in human beings between Self-Enhancement and Self-Transcendence higher order values (Schwartz, 2007). To some extent this tension might be

reflected in attitudes around the two contrasting roles of an academic; teaching versus research.

"There is a tendency among my colleagues to think of research as somehow selfish...and then to think of teaching and administration as doing things for others and so...they want to be good people...they don't want to be selfish...and so there is some tendency to think I need to be a very good teacher and a very good administrator...which is fine actually that's right...but the problem there is that they'll often devote much more time to those endeavours than they themselves really feel they ought to..."[VSEEN-R10]

The values discourse of the 'selfishness' of individuals that prefer research to teaching cannot be taken to exist outside of the South African context of massification; the increase in student numbers without a corresponding increase in capacity. Such a tension between teaching and research seems to dominate in institutions.

"Wits is already saying...it wants to raise itself to be one of the top 100...and that is great...but I don't see that they have examined sufficiently what it needs to do to make the staff more productive...because we have this overlay of increasing number of students...less prepared students...no increase in staff to cater for it...I couldn't...believe it when the university decided to do away with the tutor positions...because that is central to being able to do the marking and to get things done...let the academic staff then have more time to do research...so I think there has been a bit of a mismatch between the intention...which I think has been very positive...and the way of making productivity improve..."[RPRVT-R4]

Tutor positions might need to exist as an alternative 'stream' of career choice (the other being research), because massification might disable highly productive research if no increase in capacity can off-set increasing demands associated with increasing numbers of students. Values of Self-Transcendence might contribute to more hours invested in teaching, at the expense of research. The negative association found between Benevolence values and DOE journal article publication seems implausible until this potential explanation for this result is considered. Similarly, the negative net bivariate association between Benevolence values and international journal article publication is also seen as less implausible in light of this potential effect. Benevolence values are associated with the preservation "and enhancement of the welfare of people with whom one is in frequent personal contact" (Schwartz, 1996:122). These values are taken to be matched to teaching. Benevolence values are theoretically similar to the dimensions of Tradition and Conformity due to their focus on an individual's in-group, and these values are, therefore, adjacent to each other on the circumplex structure of values (Schwartz, 1996:124). According to further quantitative tests,

Benevolence values were found to be positively associated with satisfaction with teaching and a preference for qualitative methods rather than quantitative methods. Benevolence values were also found to be negatively associated with satisfaction with research and the statistical research Self-Efficacy item. As already indicated, satisfaction with teaching was found to be negatively associated with research productivity.

However, the influence of Benevolence values might extend further than just to a differentiation between teaching and research in this context. Indeed, to some extent the peer review process itself, through which research products need to gain acceptance, is work that is typically performed voluntarily, or without financial remuneration.

"Benevolence...that's what research is all about...it is about Benevolence...you know, you have to be willing at your own benevolence, to review someone else's submission...if someone else is going through...doing his studies, PhD, we should be able to assist him...one way or another...it has nothing to do with monetary value...so to me benevolence is very important...that is why we can send papers to journals...people at their own benevolence can review...and even publish those works without you paying a cent...so that's very important if we have people that stick to themselves so they want to extend their wealth of knowledge to someone else then there's no way we can do research...so that is very important..."[VBEN-R14]

There is perhaps an irony associated with these responses. On the one hand, Benevolence values might be associated with teaching where teaching is regarded as less selfish than research, and individuals that research might be regarded as more selfish for prioritising research over teaching. On the other hand, it might be those researchers that are more benevolent that provide of their time to act as peer reviewers that support research productivity itself through assisting in the research delivery process. Notwithstanding this, research productivity, in contrast to teaching, might be primarily driven by Self-Enhancement motivational values, particularly Achievement values, and not altruistic or Self-Transcendence values.

"...it is very much…it's a selfish thing ...research…it is selfish in the sense that you are excluding you're putting a lot of energy into something which has very little beyond your own satisfaction…and obviously the creation of knowledge but that's to a very small select few rarefied area of individuals it's an activity which is in a sense selfish driven by a drive for one's own personal feelings of achievement and satisfaction…I wouldn't regard it as an altruistic thing…research…something you would have to do for your own satisfaction and

contentment which makes it very hedonistic...the kick I get from getting my name in a journal is a kick no one else gets…"[VSEEN-R1]

The satisfaction that might drive highly productive researchers might not be primarily altruistic, but at the same time, this satisfaction does not seem to be related to immediate gratification such as that expected of individuals with high endowments of Hedonism.

"…and some of the really successful researchers...as I am saying...are absolutely selfish…"[VSEEN-R3]"…achievement...research is about achievement...if you are an academic the first thing they ask you is 'What have you achieved?' and by what have you achieved its basically saying 'How many publications do you have?' [Laughs] 'What have you published?' so that's a sense of achievement…"[VACH-R14]

The satisfaction and enjoyment derived from achievement motivations is considered distinct from the satisfaction and enjoyment associated with Hedonism. Hedonism values were found to be negatively associated with gross research productivity; DOE journal article publication; international journal article publication; conference presentations; conference proceedings publication; and book chapter publication. Whereas the motivational goal structure of Achievement values shares a Self-Enhancement commonality with Hedonism values, the former is associated with an intrinsic motivation and not the physiologically-oriented motivational goals associated with Hedonism (Schwartz, 2007). The type of satisfaction or enjoyment stressed by the these respondents does not seem to reflect the lack of an ability to delay gratification that is expected to be associated with the Schwartz (2007) dimension of Hedonism, but rather a relatively selfish gratification, or enjoyment which moderates the difficulty of research; without such an enjoyment research work can be experienced as a chore. This is, instead, an enjoyment which contributes to perseverance in the face of the difficulty of research.

"...hedonism...is gratification for one's self...but...the fun element is hugely important in research...people have got to enjoy it...because it is very difficult to do...if it is a chore...you won't do it....but for me that's...I agree totally with the concept that there are behaviours...or attitudes...which are not immediately...or obviously attached to research but are...in fact...indeed...driving it..."[VSEEN-R3]

There is thus a conception of pleasure associated with what is acknowledged to be a difficult and unenjoyable experience for others that do not find pleasure in the research activity. There is a sense that these two states are binary opposites- highly productive researchers enjoy, or have fun doing, research, yet the research process can be experienced by others as something

'difficult', or 'a chore'. Research seems to be considered as enjoyable after a transcendence has occurred, or desire for pleasure itself has been 'overcome'.

"...ultimately I think of school as a way of learning to overcome one's desire for pleasure...or certain kinds of pleasure...and we sort of are...I have this image of a tree and a gardener...who twists the tree...or bends the tree to grow in a certain way...I think higher education is a lot like that...I think...initially...it's not pleasant to do research...it just isn't…You're scared of failing...you don't know what you are doing...and as you point out it takes a lot of time and you really have to focus...on some fairly specific things...but over time...you do learn to enjoy it...and if you get in the right habit it becomes something you want to do…"[VHED-R10]

The implication of this is that intrinsic motivation might be a significant driver of research productivity; an internal psychological process. However, this effect is different from the Hedonism dimension offered by Schwartz (2007) which is underpinned by motivations associated with immediate gratification. Hedonism values are associated with pleasure "and sensuous gratification for oneself", and associated with motivational goals aligned to pleasure and the enjoyment of life (Schwartz, 1996:122). These values are at odds with the need for perseverance associated with research.

"...you know it depends on the personality...to be a good researcher you got to have a lot of perseverance...if you want to do things quickly you are not going to do..."[VHED-R5]

The motivational values associated with perseverance might more appropriately be associated with Achievement values, or values more aligned with making a contribution to knowledge such as Universalism values.

"Achievement...would drive research productivity much more so than pleasure...it's a lot of frustration...it's rare that you get...it is a law of nature...that referees are already cranky...you know...it is almost never pleasant reading criticism...it's not framed very generously in most cases...and the time between actually doing something and getting a result...getting an acceptance...until it is seeing it published...is enormous...so I mean I get a lot of pleasure when I am actually writing...but it took an awful amount of practice to get that way...I think what drove me initially and what drives a lot of my colleagues who are productive...isn't so much the sense of pleasure but rather the sense of achievement that they want or they want to be able to say at the end of the day they made a difference to their

fields...or discovered something new...that's right...contribution to knowledge..."[VACH-R10][VUNI-R10]

Achievement values and Universalism values might both drive certain research productivity. In a sense this may be considered an unexpected outcome, according to Schwartz's (2007) theory; that Self-Enhancement and Self-Transcendence values, which are typically opposed to each other, can both be found to motivate certain behaviour. A further differentiation seems to be present in certain of the responses; between the enjoyments of research akin to passion, versus a drive for research as a vehicle for career progression. It is possible that Self-Direction motivational values are, in certain cases, associated with the first of these and that, in certain cases, Achievement values are associated with the second type.

"It's motivation...passion...[ ]...it is simply the passion for research the motivation the ambition...the so passion is research for the sake of research...because you are enjoying it...that's research for the sake or love of research...ambition I would say is research for the sake of progression..."[VSD-R13][RPSAT-R13][RPAMBIT-R13]

This differentiation, however, might also extend to the sustainability of high research outputs.

"Oh it differs...you know...not all the values do...passion remains passion...unless you find another love...that's a different story...but generally on the whole I think research driven by passion is more likely to be constant...whereas research driven by ambition...motivation for progression...is likely to...you know...be...once you have achieved...because there is a certain level of progression you can achieve...at the university as a researcher...you can do professorship and that's that..."[VSD-R13] "... um...but if you're looking for public acclaim that is more likely to be more constant...like passion..."[VSEEN-R13]

Another differentiation is also evident; passion is differentiated from a motivation for public acclaim. Where passion might be considered to be related to Self-Direction values, a motivation toward public recognition might be more common to Achievement or Power values.

"...but that in law we have less of a problem of people slowing down when they have reached senior levels because the kind of impact that we strive for is much easier to access at a senior level...and so peoples' egos and their dedications to causes keep them productive, even after they have reached a senior level...which in some of the other disciplines where you need to egg people along where they don't primarily consider themselves writers I think you lose...or

that certainly was my sense…an accountant you can make him write but he is going to stop when he gets his chair because it is not where the value is…I think there is less of that in law…um…I suppose one's sense of…if your research was very cause-bound…of having achieved what you wanted to achieve would make you less productive…in a way…if you can't get into anything else…"[VSEEN-R15]

The notion that ego-related motivational values such as those associated with Achievement and Power values might contribute to sustained research productivity is interesting, because this implies that Self-Enhancement values might play a role not only in facilitating research output but also by contributing to the sustainability and perseverance of research productivity.

"[Research productivity is related to the values of] Power: Being promotable; achieving your position of being first/the best."[VPOW-R16] "People may want to maintain their image/standing (achievement). Self-direction: motivation to function on one's own and trust your own judgments."[VACH-R16][VSD-R16]

If power values are associated with motivational goals such as career progression, then such values might be associated with higher levels of research output. However, these levels might be limited to those that are expected to be necessary to obtain promotion. It is argued that the negative net association found between Power values and international journal article publication might possibly reflect the fact that the institution does not typically differentiate between locally accredited (DOE) journal article publications and ISI/IBSS journal article publications for promotional purposes; these types are all considered accredited journal articles. Individuals with higher levels of Power values might therefore be incentivised to target DOE journal articles in order to achieve promotion if they perceived these journals as easier to 'get into' than international journals.

As suggested in the respondent responses above, the satisfaction, or pleasure obtained by individuals that experience research in a positive way might be fundamentally different from the physiological pleasure-seeking associated with Hedonism values. Hedonism values are associated with a "desire for affectively pleasant arousal" (Schwartz, 1994:24). As such, research productivity might be a function of the extent to which an individual can achieve transcendence, or can overcome such desires for pleasure. Hedonism values are associated with goals that derive from the individual needs of individuals as biological organisms, rather than the requirements of coordinated social interaction or the smooth functioning and survival

of groups (Schwartz, 1994). If higher levels of Hedonism values are associated with a biological need for affective arousal that is fundamentally at odds with the delayed gratification necessary for persevering in research then higher levels of Hedonism values are expected to constrain research productivity. This might be a factor that fundamentally differentiates individuals in their ability to be highly productive researchers.

"I think that the want is a very large proportion...there are people that can't be researchers even if they want to be...if I want to be the world champion high-jumper I can't be....the world champion...I might want to be very badly but I can't...I don't have the body...I don't have the physique...it is the same...there are people that can...there are people that can't and it depends on other factors as well..."[VHED-R5]

It is argued that the enjoyment of the research process reported by these highly research-productive respondents relates to intrinsic motivations that are independent of biological pleasure seeking. The intrinsic connection to their research work of such highly productive researchers might be likened to an extreme form of engagement with their craft, or passion; to the extent that work-to-leisure time spillovers might be common. This contrasts strongly, however, with the case of those that are motivated to do research for reasons of career progression.

"From my own experience if I look at my colleagues there are those that have a genuine interest in doing research...they like their science...and they work on it...they'll find time...they will work in the evenings...they will work on the weekends...there are others...and it is probably an equal size group...which do it because they are told to...they want to get their masters, they want to get their PhDs and they want to get their promotion...so the driver is a little bit different...there's not because of the fascination with the field or the interest in the field..."[VACH-R4]

A fundamental differentiation in the motivational structure of research productivity is therefore also evident in the responses of this respondent. On the one hand, a genuine interest in doing research might be expected to be related to Self-Direction values which are associated with "independent thought and action- choosing, creating, exploring", and with motivational goals associated with "creativity, freedom, [being] independent, choosing [one's] own goals" and curiosity (Schwartz & Boehnke, 2004:239). Self-Direction values derive from goals which arise from the needs of an individual both as a biological organism and also from the requirements of coordinated social interaction (Schwartz, 1994). It is

argued that the interest in the field or fascination with the process of research is reflected in Self-Direction values, which fall into the 'Openness to Change' higher-order values type. On the other hand, people that do research in order to achieve promotion might be motivated in a different way, and might be motivated by Achievement values. Hedonism and Achievement values are adjacent to each other in the circumplex structure of values, and are both associated with a "focus on self-centred satisfaction" (Schwartz, 1994:24). Achievement values are defined as being associated with personal "success through demonstrating competence according to social standards" (Schwartz, 1994:24). Achievement values are associated with motivational goals related to being "successful, capable, ambitious and influential" (Schwartz, 1996:122). Whereas Self-Direction values might relate to the curiosity or enjoyment of research as an autonomous activity, Self-Direction values might also be aligned with the critical thinking required of research.

"I've said...once you get started...once you start looking at the literature you will then very soon find something that you don't agree with...[laughs] and that's the one that you should follow up...and work on..."[VOPEN-R4] "I think curiosity is a very important factor...if you don't want to know...why would you bother? You know so curiosity is an extremely important thing...and again...that can be nurtured..."[VSD-R5]

The notion of curiosity as an aspect of research productivity that can be developed in others seems to imply that this dimension has potential for the development of academic staff. It is argued that this dimension of Openness to Change values (Self-Direction) stands in contrast with Self-Enhancement Hedonism values, which have an entirely biological motivational structure (Schwartz, 2007), in that the latter values might constrain research productivity in a way that is more difficult to address. However, although the research process might be considered an individualistic one, a desire to make a difference may also be also present, which suggest a relationship to Universalism values. The theme of motivation that is driven by a need for recognition is, however, a recurring theme.

"Well again the values come from…being able to contribute, being seen able to contribute by your peers in a learned journal or article, to the extension of knowledge in a particular field…so the values would be those if I was going to express them would be contribution, recognition of creativity, recognition of extending knowledge areas so it would be…I mean to frame it as a value it would be a…recognition of one's…of one's products…intellectual products and the…the satisfaction of having produced something which

is…publishable…which also is like a kind of craftsmanship you publish something that you make, you make something which is there to be admired…" [VSTRANS-R1]

Certain research productivity might be ego-related, in which case an interesting juxtaposition is found; ego related research that is also Self-Transcendent because of its Universalism. It might be possible that there is an ego-related, or social, pay-off associated with Universalism-oriented research work. A specific focus of universalism values is the improvement of social life.

"I think for a lot of people it [research productivity] is about power it is about achievement...I think for a lot of people it is about those...my work has been driven by improvement...improvement of social life...so that's the motivation so the decisions I make have that in mind.."[VUNI-R2]

Universalism values are also framed as a motivation, or a desire, to make a difference, which can act to place the research process in perspective, or to provide a rationale for a research agenda, as well as an overarching perspective.

"…the best researchers also need self-belief and desire to make a difference – a clear view of what is required and why."[VSD-R8]

The qualitative data also provide insights into the potential mechanisms through which Self-Enhancement or Self-Transcendence might contribute to research productivity.

"…universalism is very important because the world is getting connected and we do research that is interconnected across disciplines and not only across disciplines but publishing in international journals so that you can try and inform and advance knowledge...not only in one particular segment of a continent…"[VUNI-R14]

Universalism values are associated with understanding, "appreciation, tolerance and protection for the welfare of all people and for nature" and the prioritisation of the needs of others rather than selfish interests (Schwartz, 1996:221).

"...if I have a vacant studentship...people want to come and work...so I don't have any difficulty...attracting people but the ones that are coming in will...firstly work their buts off... and then secondly, they pick up the ethos...and will spend time mentoring...and helping this next generation down there...and all of this...and then adds...it adds papers...peer reviewed paper ever day...the fact that...they will help each other...if somebody has a paper in the formative stages...they can give it to one of their colleagues...and this person will read it and advise them...and not expect anything in return...not expect...other than a reversal of that

process...but they won't expect their name to go on it...on the paper just because they have read it..."[VSTRANS-R3]

There seem to be advantages that might accrue to motivational values that are aligned with collaborative work, by way of harnessing the networks or the group learning that might contribute to higher levels of research productivity. Benevolence values are also expected to be associated with such developmental activity; in a similar way to how individuals might feel about teaching. Benevolence values are found to be negatively associated with a preference for research rather than teaching (-.247;p<.0001; and -.255;p<.0001 with Affect controlled). Individuals with higher levels of Benevolence values seem to primarily derive their primary job satisfaction from teaching, and not from research. According to the qualitative findings, the developmental aspects of research productivity seem to be a positive match for Benevolence values.

"*…it is so the sum of the total is much bigger than the sum of the individual parts...so that working as teams you get huge increases in output, in productivity whichever way you want to define it...but of course you want to have people who are who can work together and not everybody can work in a team...so I have this metaphor of what I call generous researchers and selfish researchers...and I believe that the students and the teamwork with the generous researchers are much more inventive than the selfish researchers...they leave a legacy where the selfish researchers don't leave a legacy...the selfish researchers may be just as smart as the generous researchers but the effect on the system and what they achieve and leave behind is very different..."[VSTRANS-R5]*

The subordination of the self to the needs of others or of the group might allow an individual to access group resources such as input that can provide the basis for learning, which in turn can result in higher individual research output. However, these conceptions seem to relate most strongly to the research productivity of individuals that are building their skills, or that are developing as researchers. The notions of mentorship and the development of typically younger researchers also emerge.

"Benevolence and universalism may become more prominent, the more a person becomes older and established, which may lead the person to also be interested in developing other researchers."[VSTRANS-R16]

Implicit in these responses is the notion that selfish researchers do exist, at the highest levels of research productivity; yet that typically the more established an individual becomes, the

more they might subordinate their goals to those of others, and become more developmentally oriented. Self-Transcendence values might have an additional upside. Universalism and Benevolence values might also be associated with some degree of 'reputational capital', whereas professional reputations might be devalued by a self-oriented focus. However, it is not clear whether professional reputations associated with selfishness might have any influence on research productivity. Indeed, if time is a critically important input into the research productivity process then individuals perceived to 'ring-fence' their time at the expense of helping or developing others might have a perceived 'unfair' advantage with respect to research productivity. Benevolence values might constrain the research productivity of academics if they were associated with a prioritisation of teaching at the expense of research yet such values might also increase research productivity through the publication of collaborative work of students. Self-Transcendence values might increase the value derived from networks, including value in the form of higher research outputs.

"...but you can create an impression...which sometimes perhaps is not earned...but I do not go out to do that...as some people...integrity is part of it and the other part of it is...to me the people that I know that have done very well that are the top of their field...they are also modest...and those people who keep on shouting to the rooftops how good they are...who sometimes...if you dig deep enough...they're not...so I think that integrity and the modesty in some way go together..."[VUNI-R4]

Universalism values might also contribute to research productivity in a way that interacts with the urgency of social problems. Universalism values might therefore motivate academics to publish in specific fields. An example of such a field is public law.

"...individual values…it would depend on the type of lawyer and the type of research that you perceive yourself as being and the kind of audience that you would want to pitch yourself towards… so you find many public lawyers are NGO workers or frustrated NGO workers who want to make a difference to the world…who what to save the world and…um…so…who's driving force is that…who see themselves driven by a particular cause…and who's productivity will increase or decrease depending on the urgency of the cause and on what's out there…in HIV for example, a lot of HIV activists….who were…who are still HIV activists were based at Wits for a long time and in the…in CALS which is a subset of law… and were much more productive in the Mbeki era…than they are now…because the issues were more urgent…so depending on what they are driven by…their productivity will go up or down…"[VUNI-R15]

Values, as well as the contexts of certain research, do not seem to be static, but might also be subject to change according to the life-stage of the individual academic. In terms of the changes over time that relate to the tension between Self-Enhancement and Self-Transcendence and also between Openness to Change and Conservation, one dimension of values changes might be in the priorities of a researcher. Family related changes are an example of such changes in priorities. Family-to-work spillovers reduce the opportunity for research that is motivated by self-oriented motivations.

"I would say the factors that influence a researcher's values over time would be…the well…the research you could have a life cycle in a sense that at certain times the research output and…this personal vanity becomes less important than the realities of the situation which we are faced with for example your productivity may become lesser when you are going through the stage of…growing family you have to provide so you do more consulting work and you have less time for… it is very much…it's a selfish thing …research…it is selfish in the sense that you are excluding you're putting a lot of energy into something which has very little beyond your own satisfaction…" [VSEEN-R1] "…so that the young person that comes in and is determined to make a splash has got different values from the one that has just had two young kids and you know really just wants to keep a job to support that..." [VACH-R6]

Family commitments are perhaps an important influence on an individual's motivational goals, and the extent to which these goals prioritise research productivity at the expense of other personal goals.

If book chapters represent a dimension of research productivity that is not primarily subjected to the peer review system of a field to the same extent as other measures, then associations between individual values and this dimension of research productivity might reflect relationships that are more independent of the influence of the specific field. The negative net association between book chapter publication and Conformity values might reflect a constraint associated with Conformity values. Conformity values are associated with a restraint "of actions, inclinations, and impulses likely to upset or harm others and violate social expectations or norms" and also being associated with motivational values related to politeness and obedience (Schwartz, 1994:22). To the extent that Achievement, Self-Direction and Power values seem to be the values primarily related to research productivity according to the qualitative data, Conformity values might stand in contrast to these values. In much the same way as Uncertainty Avoidance values might constrain book chapter

publication, it is suggested that Conformity values might also. The low levels of innovativeness associated with Uncertainty Avoidance and Conformity values might constrain a form of research productivity (book chapters) that is relatively less dependent on the 'gatekeepers' associated with specific academic fields. To the extent that a rigorous peer review system might be risk-averse, the process might constrain innovativeness as a dimension of Openness to Change values.

"The peer review system works ok…not wonderfully…there is a tendency to look at the names of the people who wrote the paper and to accept the credentials of those know…and that is particularly true when you come with a new idea…[VOPEN-R5]

Kuhn's (1970) notion that academic research is not necessarily innovative, but is primarily a function of social linkages between academics seems to find certain support here. The notion of 'in-groups' also seems to suggest that innovative knowledge creation is constrained if one needs to be able to 'get in' in order to get new ideas published. Collectivism, in this form, may constrain innovative knowledge creation.

"…so if you come with a new idea it is easier to sell it if you are well known… so what I am trying to tell you is…there is that aspect…that belongs to the system…that those that are in find it easier to get things done that those that want to start…"[VOPEN-R5]

This researcher, who is rated as top in the world in a scientific field, recounts the difficulty he had with publishing a 'revolutionary' paper in the field.

"…so a starting young researcher…particularly with a really good idea can find it very hard…I mean…one of my earlier papers which had something which was quite novel and revolutionary…we kept sending it to the journal but every time we sent it to the journal the reviewer had a new comment…it wasn't you know…the same comment…so we had done this about three or four times and the final comment from the reviewer was I am sure that I could prove this wrong on the back of an envelope if I had the time…so I wrote to the editor [laughs] and I said that's not a review…either he can prove it wrong or he can't…you know…you can't keep on…this guy who doesn't believe us but can't show we are wrong…you have either got to say we are wrong…or we are not…and eventually it got published…and it was certainly the paper with which I have had the most citations on…by a long way…"[VOPEN-R5]

The constraints posed to innovativeness by the 'gatekeeper' system might also have negative implications for the development of new knowledge in academic fields.

"…but I was not a well-known person in the field…and this reviewer…who I presume…I don't know his name…presumably was a well-known reviewer…if his scepticism was

sufficient to do that…so this makes it very hard for young new people to come into the field…[VOPEN-R5]

Convergence theory predicts that performance, such as research output that reflects innovative knowledge creation, will continually increase because of the continuous innovative benchmarking of, and the continual incorporation of, innovative best practices from other contexts. It is a core argument of this thesis that the predictions of Convergence theory are not supported in this context. It is argued that innovativeness is a fundamental requirement for such convergence to occur. It is also argued that the constraints that values systems pose to convergence are dominated by their constraints to innovativeness. Such values constraints to innovativeness are therefore considered to pose constraints to knowledge creation, which is inherently innovative. The result of these constraints may be research outputs that are less innovative; that are less likely to reflect knowledge creation.

On the basis of the findings, it is concluded that values systems constraints to research productivity (which is defined as innovative knowledge creation; the creation of *new* knowledge) may be associated with a cost; to individual researchers, to academic fields, to universities and to societal stakeholders that rely on new knowledge. The implications of these findings and the recommendations that derive from these findings are considered in the following chapter.

At this juncture, having related the quantitative results of the testing of the Schwartz values dimensions to the qualitative data in a holistic analysis, the results of the testing of the relationships between the individual 'performance' factors and research productivity are now discussed. *It is now taken to be understood that the model of performance factors and their relationships with research productivity are not expected to be the result of an effective process of innovative benchmarking, and are not necessarily expected to be a reflection of universal best practice from other contexts*. As discussed, on the basis of the preceding analyses, Convergence theory was not found to be supported. Instead, relationships between the performance factors and research productivity are taken to represent relationships that are perhaps specific to the South African context that will generalise to other contexts only to the extent that such contexts are similar to the South African context. As such, the use of a qualitative process in order to derive propositions for testing individual performance factors was considered appropriate. Given the abundance of antecedents to research productivity

present in the literature it was considered necessary to delimit the scope of the research to factors derived from the grounded research process.

6.7 INDIVIDUAL PERFORMANCE FACTORS: INDIVIDUAL LEVEL OF ANALYSIS

In the following sections, the results of the testing of the hypotheses that relate to the potential influence of a range of individual level factors on research productivity are discussed in relation to the reviewed literature. In order to facilitate clarity in structure the discussion is structured by the hypotheses tested, each of which is used as a heading in the following sections.

6.7.1 HYPOTHESIS C.A. THERE IS A SIGNIFICANT ASSOCIATION BETWEEN BIOGRAPHICAL FACTORS AND RESERCH PRODUCTIVITY.

The results of the testing of the factors found to group together on component category one of the factor analysis process are now discussed. In each case the results are discussed. The implications and recommendations based on these results, however, are considered in the chapter that follows.

6.7.1.1 **Hypothesis C1: There is a significant association between experience and research productivity.**

In order to avoid singularity, the work experience and age measures which were taken to represent compound variables, or variables that were a function of the other time-related variables, were not included in the multivariate analysis of the predictors of the gross research productivity and the six subordinate dimensions of research productivity. The relationships between the different dimensions of time-related effects and research productivity were, instead, tested using partial correlation analysis. These results are reported as follows.

6.7.1.1.1 Hypothesis C1.a: There is a significant association between age and research productivity.

Age was found to be significantly associated with gross research productivity; DOE journal article publication; international journal article publication; conference proceeding publication; conference presentation; book publication; and with book chapter publication,

according to the zero-order tests of association. These results are found to support Becker's (1964) Human Capital theory prediction that, over time, investments in learning that are proxied by age are expected to result in increased productivity. According to the results of tests of partial correlations, however, the significant and positive zero order correlations for all of the research productivity variables with age were no longer significant when years as a researcher were controlled for except for book publication and book chapter publication. This supports the notion that Specific Human Capital (Becker, 1964) is related to research knowledge investments that account for productivity in research. This result also suggests that little additional skills and knowledge relevant to journal article publication and conference outputs are contributed by learning proxied by age, over and above specific experience as a researcher. Research productivity might primarily, therefore, be a function of Specific Human Capital, which is context specific (Becker, 1964). According to further analysis, when total work experience is used as the control variable, DOE article publication (.166;p<.083) and international journal article publication (.129;p<.053) are found to be weakly associated with age. This further analysis supports the notion that it is not the influence of total work experience but the influence of experience as a researcher that primarily accounts for higher levels of research productivity in terms of journal and conference outputs. When years of working for the institution are used, instead, as the control variable, age is found to be significantly associated with all the measures of research productivity except book chapter publication. This indicates the importance of years of experience as a researcher over and above years of experience with a specific institution in accounting for research productivity. The implications of these results and recommendations are considered in the following chapter.

6.7.1.1.2 Hypothesis C1.b: There is a significant association between years spent in South Africa and research productivity.

Years spent in South Africa were found to be positively associated with the publication of DOE journal articles, both in terms of zero-order correlation and also with South African origin controlled for. Years spent in South Africa were not found to be significantly associated with any of the other research productivity items according to the zero-order correlation analysis. However, when age and South African origin, together, were controlled for, years in South Africa were found to be negatively associated with international journal article publication and also weakly and negatively associated with conference presentations and gross research productivity. This result might indicate that an alignment with the local

journal ‘system’ may occur according to time spent in the South African context. However, these results also indicate that with more time spent in this context fewer international journal articles may be produced. This result makes sense if promotion criteria in this context recognise both DOE and international articles equally, and if the former are less difficult to achieve. When age was the control variable, years in South Africa were found to be negatively associated with international journal publication; conference proceedings publication; and weakly and negatively associated with conference presentations and book chapter publications. Exposure to the South African context might be associated with lower levels of certain types of research productivity. Alternatively, these findings might indicate that exposure to the international milieu, as opposed to the South African context, might positively influence publication of internationally accredited journal articles and conference proceedings. In summary; to the extent that the human resources regime might incentivise both DOE accredited and internationally accredited journal article publication, exposure to this context might incentivise individuals to target DOE publication if this were a ‘path of least resistance’. The relationship between full-time work experience and research productivity is considered as follows.

6.7.1.1.3 Hypothesis C1.c: There is a significant association between years of full-time work experience and research productivity.

Years of full-time experience, or years of total work experience, were found to be significantly associated with all the measures of research productivity. However, when the influence of age was controlled for, total work experience was only found to be positively associated with conference proceedings; conference presentations, book chapter publication and weakly associated with gross research productivity. When years as a researcher were controlled for, total work experience was found to be significantly associated with book publication, yet with no other research productivity measure. This result suggests that total work experience contributes some dimension of General Human Capital (Becker, 1964) only to book publication. This finding supports the conception that research productivity in the other categories of research output is largely a function of Specific Human Capital (Becker, 1964), which is primarily associated with learning that is only obtained as a researcher. This result supports the notion that tacit knowledge (Nonaka, 1994) might be an important aspect of research productivity, because tacit knowledge is associated with Specific Human Capital, in that knowledge from other work contexts might not generalise to the academic research productivity context in the same way as explicit knowledge would. The significance of the

total work experience measure in the multiple linear regression analysis is not taken to contest this because this was the only time-related variable included in these models. It was therefore expected to 'take up' the influence of its years as a researcher component measure. The broader measure of years of total working experience was taken as the appropriate measure of total experience tested in the multivariate process. This measure was found to have the largest standardised coefficient in the equations with dependent variables of gross research productivity, ISI/IBSS journal article publication, conference proceedings publication and conference presentations. It was a significant predictor of DOE journal article publication in the model that included significant variables only. This result suggests that of all the variables tested, experience contributes the most to journal and conference research outputs.

6.7.1.1.4 Hypothesis C1.d: There is a significant association between years of experience as a researcher and research productivity.

Years of experience as a researcher is found to be significantly associated with all the measures of research productivity except book publication. After the influence of age and, in turn, experience with the institution, were controlled for, these associations were still found to be significant. The results of this analysis confirm the notion that research productivity is primarily associated with Specific Human Capital, according to Becker's (1964) conception; where learning investments associated with the research context, and not experience beyond this research context, contribute to these dimensions of research productivity. Research productivity might therefore be a function of tacit knowledge endowments, which are context specific (Nonaka, 1994).

6.7.1.1.5 Hypothesis C1.e: There is a significant association between years of experience within the institution and research productivity.

Years of experience of working for the institution were found to be significantly associated with all the measures of research productivity except book publication. When years as a researcher were controlled for, years of working for the institution were found to be significantly associated with DOE article publication yet not significantly associated with any of the other measures of research productivity. Person-job fit becomes better aligned over time with experience in the institution (Erdogan & Bauer, 2005); this might be reflected in the association between years of experience in the institution and DOE journal article publication. This result might also suggest that the human resources regime of the institution

may be incentivising DOE article publication in a manner that is different from that experienced in other research contexts. If DOE accredited journals are given the same weighting in promotional assessments, for example, then the institution itself might be creating an incentive for staff to focus on DOE journal publication instead of ISI/IBSS journal article publication.

The results of the testing of the associations between the different forms of experience and research productivity suggest that higher levels of output require tacit experience (Nonaka, 1994), or Specific Human Capital (Becker, 1964). The influence of tacit experience is therefore taken to dominate as the most significant factor that contributes to research productivity in this context. The implications and recommendations that derive from the discussion of these results are considered in the following chapter.

6.7.1.2 Hypothesis C2: There is a significant association between exposure to the international context and research productivity.

6.7.1.2.1 Hypothesis C2.a: There is no significant difference in research productivity by country of origin.

Individuals of non-South African origin were found to have published significantly more conference proceedings and book chapters. Being of Zimbabwean origin was found to be weakly and positively associated with DOE article publication and United Kingdom origin was found to be positively associated with gross research productivity, international journal article publication, conference proceedings publication and conference presentations. Being of United States of America (USA) origin, however, was not found to be significantly associated with any of the dimensions of research productivity. In terms of the multivariate analysis, which was undertaken in order to establish if the influence of South African origin was significant after other multivariate effects were controlled for within the model, South African origin was found to be negatively associated with conference proceeding publication and book chapter publication. To the extent that exposure to different contexts might be considered to represent an investment in some kind of learning (Becker, 1964), that might result, in some way, in improved productivity, being of non-South African origin might offer an advantage of some sort in conference proceedings publication and book chapter publication. This result supports the notion that globalised connectivity might serve to enable research productivity (Swan, 2007), and might support other theory and research findings that

suggest that network-related advantages may accrue to people on the basis of shared national origin (Light, 1984; Shapero & Sokol, 1982; Wilson & Martin, 1982). Further research is suggested into these factors such as South African origin that might constrain or enable research productivity; such research might offer more insight into differences between the local and international contexts, and the implications of such differences for research productivity. The relationship between the number of countries lived in and research productivity is considered as follows.

6.7.1.2.2 Hypothesis C2.b: There is a significant association between the number of countries an individual has lived in for more than a year and research productivity.

The number of other countries an individual reported having lived in for over a year was found to be significantly associated with conference proceedings publication and the publication of book chapters. Partial correlation analysis was applied in order to ascertain if countries lived in were associated with conference proceedings publication and book chapter publication when South African origin was controlled for. When South African origin was controlled for, conference proceedings publications, but not book chapter publication, were found to be significantly associated with countries lived in for over a year. This result suggests that years spent in other countries might potentially have an influence on conference proceedings publication that acts over and above the influence of South African national origin. This result also suggests that the influence of South African national origin might have a stronger influence on book chapter publication than the influence of countries lived in. Relationships that span national borders might offer some form of social capital advantage (Coleman, 1988), which might accrue in the form of conference proceedings publications. When tested using multiple linear regression analysis, the direct associations between countries lived in and all the measures of research productivity were, however, all found to not be significant. This might indicate that the net effect captured in the bivariate relationship might possibly be better explained by the influence of one or more of the other covariate variables included in the analysis. The associations between home languages and research productivity are discussed as follows.

6.7.1.2.3 Hypothesis C2.c: There is a significant difference in research productivity associated with differences in home languages.

English as a home language was found to be significantly associated with gross research productivity, conference presentations and book chapter publications, yet not with any of the other measures of research productivity. Other home languages such as Afrikaans and Zulu were not found to be significantly associated with any of the measures of research productivity. No significant association was found between English as a home language and any of the other measures of research productivity according to the multivariate tests. The significant bivariate associations between English as a home language and gross research productivity, conference presentations and book chapter publications might reflect the hegemony of English as a dominant language of research, although at the 'lower levels' of research productivity (rather than journal articles, which represent 'higher levels' of research productivity). This result might offer tentative recommendations. If conference presentations are the first opportunity for staff to become engaged in the research process, as a 'first rung' on the latter of academic research progression, then not having English as a home language might constrain progression to other forms of research output. It might be possible that individuals with other home languages avoid conference presentations because of the verbal nature of the process. Such staff should be supported and encouraged to break through this potential barrier. The standards of academic writing might require people to master what may be their second or third language and if conference presentations are a first step to further development of research outputs then this issue might need to be the focus of management support and interventions. Such individuals might be unfairly disadvantaged in this respect in a research milieu dominated by English usage. Implications and recommendations that derive from these results are considered in the following chapter.

6.7.1.2.4 Hypotheses C2.d: There is a significant difference in research productivity by experience in a multinational company.

Individuals with experience in a multinational company were not found to be more, or less, research productive. This dimension of learning, which is considered to represent a dimension of Human Capital (Becker, 1964), was therefore not found to be associated with research productivity. This result might be taken to support the previously discussed results which suggest that research productivity is a form of Specific Human Capital, and that only experience in the research context primarily contributes to research productivity.

6.7.1.2.5 Hypothesis C2.e: There is a significant difference in research productivity associated with membership of professional associations or networks.

Membership of professional associations was found to be associated with gross research productivity; international article publication; local journal article publication; conference proceedings publication; conference presentations and book chapter publication. Membership of these associations might confer advantages associated with membership of networks (Burt, 2001; Coleman, 1988; Granovetter, 1973; Lin, 2001). According to the multiple linear regression analysis results, membership of professional associations was found to be associated only with book chapter publication, and weakly. These results suggest that the other factors in the multiple linear regression analyses might better explain the relationship between professional association membership and these dimensions of research productivity. However, due to the complexity of the multivariate nature of such testing, the bivariate positive associations between professional associations and these dimensions of research productivity were not discounted. It is suggested that academic researchers might benefit from joining such academic and professional networks with a view to using these linkages to build collaborative publishing linkages or other linkages that might support research productivity. The relationship between levels of formal education and research productivity is considered below.

6.7.1.3 Hypothesis C3: Levels of formal education are significantly associated with differences in research productivity.

According to the Pearson tests of association, years of formal education were found to be weakly associated with higher numbers of conference presentations, yet were not found to be associated with any of the other measures of research productivity. When years as a researcher are controlled for, the association between years of education and each of the research productivity measures is found to not be significant. This result might indicate that the formal education process may offer General Human Capital investments in learning (Becker, 1964) which might not translate into the learning investments necessary for research productivity. Individuals with higher levels of cognitive ability are expected to 'learn faster' or have a curvilinear or multiplicative relationship between cognitive ability and the influence of experience (Schmidt & Hunter, 1998). If this were the case, then individuals with higher endowments of cognitive ability would be expected to finish their higher degrees in a shorter period of time, which might militate slightly against the positive association between years of education and research productivity. The results of the testing of the relationships between collaboration and research productivity are considered as follows.

6.7.1.4 Hypothesis C4: Differences in levels of collaboration are significantly associated with differences in levels of research productivity.

The ratio of co-authorship, or the amount of co-authored journal articles divided by the amount of total journal articles, is found to be significantly and positively associated with international journal article publication and weakly associated with total journal article publication, yet is not found to be significantly associated with DOE journal article publication. Co-authorship, or number of co-authored journal articles of an individual, was found to be significantly associated with journal article publication. This broadly supports literature which posits a positive association between collaboration and research output (Hara *et al*., 2003; Rachal *et al*., 2008; Rynes *et al*., 2001). However, when controlling for the total number of co-authored journal articles published, the ratio of co-authorship was found to be negatively and significantly associated with total journal article publication; for both DOE article publication and international journal article publication. On the basis of these results, it was decided that further investigation of this relationship was necessary, as it was not clear what the net linear relationship between co-authorship and journal article publication was from these results. From the linear scatterplot of these items it was determined that there were possibly two patterns in the data: (i) a linear pattern, and (ii) an exponential pattern. In order to test this relationship, a regression model was used with total journal article publication as the dependent variable and total co-authorship as one independent variable and with total co-authorship squared as the other dependent variable. Co-authorship was, however, found to be associated with total journal articles in a positive and linear and not in an exponential manner. When co-authorship and co-authorship ratio are included in the equation the former was found to be significantly and positively associated with total journal article publication and the latter was found to be significantly and negatively associated with total journal article publication. The variance inflation factors, tolerance values and values of the condition indices values suggested that this difference in the signs between these two items was not due to multicollinearity. This result suggests that as individuals increase their output of total journal publications they typically reduce their proportion of collaborations. At very high levels of research output, individuals may, therefore, be expected to publish relatively more sole-authored research in this context.

6.7.1.5 Hypothesis C5: Preferences for either quantitative or qualitative methods is significantly associated with higher levels of research productivity.

According to the Pearson tests of association, a preference for quantitative rather than qualitative methods is not found to be significantly associated with any of the research productivity measures at within the five percent level of significance. A preference for quantitative methods is found to be weakly associated with conference proceedings publications, yet according to the multiple linear regression results this item was not found to be significantly associated with conference proceedings publication. Across the entire sample, these results therefore indicate that research output is generally independent of a differentiation of methods by quantitative versus qualitative methods. This result is considered to support the argument derived from the qualitative analysis; that generalisable relationships that relate to the relationship between practices of different academic fields and research productivity should not typically be expected, because of fundamental differences between academic fields.

6.7.1.6 Hypothesis C6: There is a significant association between marriage and research productivity.

Individuals that reported being married were found to have published more DOE journal articles and conference proceedings, yet were not to found to be more research productive on any of the other measures. The associations between marriage and research productivity might, however, have picked up the influence of time, which is expected to include the effects of age and of time spent as a researcher. A process of partial correlation analysis was therefore used which controlled for age and also dependent children. When dependent children, as a tested variable, was included as a control variable, gross research productivity was then found to become significantly associated with marriage; DOE journal article publication was still found to be positively significantly associated with marriage yet the conference proceedings publication item was no longer found to be significant. However, when age was controlled for, marriage was found to not be associated with any of the measures of research productivity except book publication, with a negative and weak association. These results suggest that family-to-work spill-over, which has been found to potentially have a negative influence on work productivity (Dilworth, 2004; Dilworth & Kingsbury, 2005), might not exert a significant influence in this context along the dimension of marriage. Marriage, however, might just reflect one dimension of potential family-to-work

spill-over, and dependent children might be expected to require a significant time investment which might influence family-to-work spill-over effects. The associations between dependent children and research productivity are considered as follows.

6.7.1.7 Hypothesis C7: There is a significant association between number of dependent children and research productivity.

Dependent children, as a tested variable, are found to be positively associated with conference proceedings publication but not with any other of the research productivity items. To the extent that this association might have captured the effects of time, or age, partial correlation analysis was used in order to control for age as a covariate variable. After controlling for age, dependent children are found to be negatively associated with international journal article publication, and positively and weakly associated with conference proceedings publication. According to the results of the multiple linear regression analysis, dependent children are also found to be negatively associated with international journal publication. This was the only significant association of dependent children found according to the multiple linear regression analysis process. This result might suggest that family-to-work spill-over (Dilworth, 2004; Dilworth & Kingsbury) may be present in terms of international journal article publications.

The positive influence of the conference publication item is surprising, unless academics with families are more prone to attending more conferences of a 'higher standing' which publish conference proceedings rather than conferences with a 'lower standing' that do not publish conference proceedings. Although family-to-work spill-over effects might have less of an influence than work-to-family effects (Eagle *et al*., 1997), the presence of a negative association between international journal article publication and the number of dependent children of an academic might suggest that further research is needed into what potential 'family' costs are associated with highly productive researchers. Further research is suggested into the family/work interactions around international journal article publication. If time, as a resource, is a necessary condition for research productivity, then at extremely high levels of research productivity, such as those that are expected to be associated with international journal publication, spill-over effects might exist. It is concluded from these results that family-to-work spill-over effects might be present. The associations between gender and research productivity are now discussed.

6.7.1.8 Hypothesis C8: There is a significant difference in research productivity by gender.

Male academics were found to have higher gross research productivity, to have published more internationally accredited journal articles and conference proceedings, and to have made more conference presentations. These associations were analysed further using partial correlation analysis. The zero order Pearson point biserial correlations were found to support the initial t-test findings. When dependent children and, in turn, marriage, were controlled for, these significant associations were not found to change. These results suggest that the influence of marriage or dependent children do not necessarily account for the gender differences found in this context. In terms of the multivariate analysis, these results were confirmed by the multiple linear regression analysis. These results suggest that gender effects are robust to the influence of any of the covariate factors. These results support findings in other academic contexts that have found males to dominate journal article publication (Barbezat, 2006; Rachal *et al*, 2008; Rothausen-Vange *et al*., 2005), notwithstanding other findings that females have published more in certain more research-intensive contexts over certain periods of their careers (Rothausen-Vange *et al*., 2005). Being male was found to be significantly and positively associated with a preference for research over teaching and weakly associated with satisfaction for research, or a research locus of satisfaction. Being female was found to be significantly and positively associated with satisfaction with teaching, or a teaching locus of satisfaction, and weakly and negatively associated with satisfaction with research. These results echo other findings from other academic contexts that males have been found to spend less time on teaching versus research (Barbezat, 2006). If male academics are expected to publish more than female academics in less research-oriented contexts (Rothausen-Vange *et al*. 2005) then it is suggested that the culture of the institution be managed to become more research intensive, in order to possibly contribute to greater research gender equity. If relatively high teaching loads and an 'excessive emphasis' on teaching is a significant constraint that is common to both genders in other contexts (Barbezat, 2006), then the significant relationships between satisfaction with teaching might indicate an important dimension of such differences in research productivity by gender. Further research might provide more insight into how and why female academics might be relatively more dissatisfied with research in this context than male academics and why they draw their primary work satisfaction from teaching instead, and *vice-versa*. Further research might provide insight into how gender inequality in this context can be addressed.

These results suggest that biographical differences between individuals, such as experience, contribute the most variance to research productivity. This corresponds to the factor analysis results that indicate that these factors contribute the most variance as a group in the factor loadings. Having considered the contribution of biographical factors to research productivity, the results of the tests of associations between personal orientation factors and research productivity are now discussed.

6.7.2 HYPOTHESIS C.B. PERSONAL ORIENTATION FACTORS ARE SIGNIFICANTLY ASSOCIATED WITH RESEARCH PRODUCTIVITY

6.7.2.1 Hypothesis C9: There is a significant association between Job Satisfaction and research productivity.

According to the bivariate analysis of the associations between Job Performance with research productivity, measured as seven dimensions of research output, no significant bivariate association was found between job satisfaction and these dimensions of job performance. When parametric partial correlation analysis was applied to the data, with NA and PA controlled for, job satisfaction was also not found to be significantly associated with either of the dimensions of research productivity. According to the results of the multiple linear regression models run with all the dimensions of research productivity as dependent variables, job satisfaction was also found to not be a significant predictor of any of these. With regard to the net relationships, this finding does not support theory offered by Hackman and Oldham (1976), Herzberg (1966), Organ (1988; 1997) or Scott (1966), that predict, on a theoretical basis, a positive association between job satisfaction and research productivity as a form of work performance. This finding, of no significant net association between job satisfaction and job performance, also runs contrary to meta-analysis findings of a true mean correlation of .30 between overall job satisfaction and job performance found over 312 samples and 54417 respondents by Judge *et al*. (2001). According to self-determination theory (Gagne & Deci, 2005), relatively more autonomous work, such as research work, is expected to be associated with higher levels of job satisfaction. There are, however, according to these theoretical predictions, many different contributing effects that underpin the net association between job satisfaction and job performance. Another explanation of this relationship might, however, arise from the nature of academic work itself.

A plausible explanation for this effect (a lack of a significant association between job satisfaction and research productivity) is the presence of range restriction (Sackett & Yang,

2000). If academic staff are typically a relatively homogenous group of individuals that have been 'selected' into such work on the basis of the completion of higher degrees and other criteria, which include satisfaction with academic work, such a selection might reduce the variability in job satisfaction relationships, or associations. Such research, it is argued, is important in such contexts, in order to ascertain the extent to which such theory does extend to different cohorts of professional workers, and particularly academics as a specific cohort of workers.

However (according to further analysis), when the effect of specific work-role loci of satisfaction were statistically removed using partial correlation analysis, the associations between job satisfaction and international journal article publications ($p<.069$) and also total journal article publications ($p<.078$) were found to be negative, yet were just outside the five percent level of significance. The Mr./Ms. designation variable was found to be significantly associated with higher levels of job satisfaction both in terms of zero-order correlation ($r=.176;p<.008$) as well as when affect was controlled ($r=.198;p<.003$). More research productive, or more senior staff, might be more job dissatisfied in this context. According to the mechanism of OCB offered by Organ (1988; 1997), dissatisfaction can disable the extra, or not directly compensated, commitment and effort that an individual applies to work. If dissatisfaction is associated with higher levels of research productivity then Organ's (1988; 1997) predicted mechanism might suggest that more junior staff, who are expected to be less research productive, would be more likely to be more committed in their work. Similarly, Activation theory (Scott, 1966) is also not supported as a dominant effect in terms of its prediction that individuals, in meaningful work, over time may experience a better alignment between required activation levels, or stimulation levels, associated with certain types of work, and satisfaction. The control, through partial correlation analysis, of the specific work-role related loci of satisfaction was expected to reveal relationships that were not confounded by such differences. According to the predictions of referent cognitions theory (Folger, 1987), individuals who successfully publish more in international journals might be more sensitive to dissatisfaction in a particular university because they are more able to find employment somewhere else. If more senior staff are relatively less Job Satisfied, this might have implications for such institutions, such as the loss of skilled staff (Aydogdu & Asikgil, 2011, Delobelle, Rawlinson, Ntuli, Malatsi, Decock & Depoorter, 2011; Mobley, 1977). The associations between Self-Efficacy and research productivity are now discussed.

6.7.2.2 Null-hypothesis C10: There is no significant association between Self-Efficacy and research productivity.

The significant positive associations found between (i) total research Self-Efficacy and gross research productivity; (ii) DOE article publication Self-Efficacy and DOE publications; between (iii) international journal article publication Self-Efficacy and international journal article publications; between (iv) conference proceedings publication Self-Efficacy and conference proceedings publications; between (v) conference presentation Self-Efficacy and conference presentations; between (vi) total research Self-Efficacy and book and book chapter publications; and between (vii) total research Self-Efficacy and gross research productivity are all congruent with theory and previous findings that predict a positive relationship between Self-Efficacy and work-related performance (Bandura, 1997; Stajkovic & Luthans, 1998). These associations are significant, notwithstanding the evidence provided by previous research that suggests that the association between Self-Efficacy and work performance is typically expected to be weaker for tasks that are higher in complexity (Stajkovic & Luthans, 1998). The significance of Self-Efficacy in the multiple linear regression analyses suggests that the effect of Self-Efficacy is typically salient also when other covariate factors are also controlled for in the model. The relationship between Self-Efficacy and research productivity is also expected to be recursive, where not only are higher levels of Self-Efficacy expected to contribute to higher levels of research productivity but higher levels of success with research are also expected to contribute to higher levels of Self-Efficacy (Rosenthal & Jacobson, 1968). In other words, a virtuous circle might exist. Any increase in the Self-Efficacy of research staff might be expected to be associated with increases in research productivity for staff in this context. Further research is recommended; into the mechanisms through which Self-Efficacy may contribute to research productivity. The results of the testing of the associations between affectivity and research productivity are now discussed.

6.7.2.3 Null-hypothesis C11: There is no significant difference between Affectivity and research productivity.

According to the zero-order Pearson correlation tests, none of the research productivity measures was found to be significantly associated with NA. Conference presentations were found to be positively and weakly associated with PA. To the extent that PA is related to the 'Big Five' personality dimension of Extraversion (Watson *et al*., 1988), the more extroverted

individual might be more inclined to present more conference papers than others with lower endowments of PA. In none of the multiple linear regression models for the seven measures of research productivity were any of the associations with either NA or PA found to be significant. Affect is therefore not taken to be significantly associated with research productivity in this context, notwithstanding the possibility that Affect might contribute to method bias (Podsakoff *et al*., 2003). To the extent that NA is related to the 'Big Five' dimension of Neuroticism and PA is related to Extraversion (Watson *et al*., 1988), the lack of associations of affectivity also contest findings of associations of Neuroticism and Extraversion with work-related outcomes in other contexts that were expected to generalise across contexts (Lynn & Martin, 1995). Similarly, NA was found to not "act as a general nuisance factor", that "taps psychologically important but organically spurious variance" (Watson & Pennebaker, 1989:250) in this specific research context, although certain minor effects were found when Affect was controlled for in certain instances (discussed in previous sections above). Research productivity might, to some extent, be robust to the influence of Affect.

6.7.2.4 Hypothesis C12: Differences in Locus of Control are not significantly associated with differences in research productivity.

According to the results of the Pearson tests of association, an internal locus of control was not found to be significantly associated with any of the measures of research productivity. According to the results of the multiple linear regression analyses, however, locus of control was found to be a significant predictor of book chapter publications. Except for the case of book chapter publications, these results contest the empirical findings and theory that predict a positive relationship between an internal Locus of Control and job performance (Judge & Bono, 2001; Littunen & Stormhammar, 2000; Miller *et al*., 1982; Rotter, 1966; Spektor & O'Connel, 1994; Wallston & Wallston, 1978). The measures of research productivity (except for book chapter publication) as dimensions of job performance were therefore not found to be significantly predicted by levels of internal locus of control in this context. This sample, however, might reflect a cohort of professional staff in which range restriction might be present (Hunter, Schmidt & Le, 2006). Because of the relatively rigorous selection of such individuals, a process which includes requirements such as higher degree attainment, the population of this study was expected to be relatively homogenous in contrast to many other working contexts.

6.7.3 HYPOTHESIS C.C. RESEARCH WORK ROLE SATISFACTION IS SIGNIFICANTLY ASSOCIATED WITH RESEARCH PRODUCTIVITY.

6.7.3.1 Hypothesis C13: Differences in work-role specific satisfaction are significantly associated with differences in research productivity.

In order to test this hypothesis, tests were run between the items representing (i) satisfaction with research, or a research locus of satisfaction, and (ii) satisfaction with teaching, or a teaching locus of satisfaction, and the seven measures of research productivity. These results are discussed as follows.

6.7.3.1.1 Hypothesis C13.a: Satisfaction with research is not significantly associated with research productivity.

Individuals with higher levels of research locus of satisfaction were found to have higher levels of gross research productivity and to have published more international journal articles, DOE journal articles; and to have presented more conference papers. A research locus of satisfaction, however, was not found to be significantly associated with the publication of conference proceedings, books or book chapters. Satisfaction with research was found to be negatively associated with satisfaction with teaching, and positively associated with the satisfaction with research versus satisfaction with teaching item. These results indicate that there might be a substantive difference between these types of research production that is reflected in these satisfaction profiles. The publication of conference proceedings, book publications and book chapter publications might be less of a focus for such researchers than journal article publications and conference presentations. These results might suggest that if ways could be found to increase the intrinsic satisfaction of individuals with research work then research productivity would be increased. It is argued that satisfaction levels specific to research might possibly act as a primary mechanism that may offer a way to increase research productivity amongst academic staff. It is therefore recommended that HRM systems focus more extensively on the intrinsic rewards or intrinsic aspects of incentivising research productivity, particularly because evidence has been found in other academic contexts to support the notion that such incentives are effective in increasing research output (Hales *et al*., 2005). Implications and recommendations based on these findings are considered in the following chapter.

6.7.3.1.2 Hypothesis C13.b: Satisfaction with teaching is not significantly associated with research productivity.

Individuals with higher reported levels of teaching locus of satisfaction were found to have lower levels of gross research productivity and to have published fewer international and DOE journal articles, conference proceedings and book chapters, and to have presented fewer conference papers. However, no association was found between a teaching locus of satisfaction and the publication of books. Further tests indicated that satisfaction with teaching was negatively associated with satisfaction with research and negatively associated with the satisfaction with research versus satisfaction with teaching item. To the extent that individuals with a teaching locus of control might be significantly less research productive and more dissatisfied with research, these findings are found to support seminal theory (Hackman & Oldham, 1976; Herzberg, 1966; Organ, 1988; Scott, 1966), and meta-analysis evidence (Judge *et al*., 2001), from different contexts that predict a negative relationship between work related dissatisfaction and aspects of work performance. The dichotomy between these two fundamental tasks of the university; teaching and research, is found to be reflected in the satisfaction profiles of academic staff. A teaching locus of satisfaction is found to be negatively associated with almost all of the tested measures of research productivity; these findings support the notion of role conflict offered by the scarcity model (Moore, 1963), where satisfaction with one role might be less compatible with the performance of another role. Scarcities of time, or resources, are at the heart of such role conflict, according to Moore (1963). Despite previous meta-analysis findings that have contested the notion of the scarcity model (Hattie & March, 1996), in this context this conception cannot be excluded. Investments in time, or other individual intangible resources in research and teaching might, indeed, not be mutually supportive, as argued by Fox (1992).

The divergent reward system model predicts that relationships around teaching and research will reflect the human resources systems that prioritise research over teaching in terms of promotions, and, therefore, remuneration (Hattie & Marsh, 1996). On the basis of these results, however, it is argued that certain intrinsic satisfaction loci might enable individuals to possibly be robust to such systems. It is, therefore, further argued that such role conflict might be reduced in this manner only if the intrinsic satisfaction of such individuals is taken into account in the process.

For the purposes of further analysis, binary variables were created for (i) hybrid loci of satisfaction types, which comprised individuals that scored over the midpoint of the scale for both teaching satisfaction and research satisfaction; (ii) individuals with a teaching-only locus of satisfaction, where those with a satisfaction with research were removed from this sub-sample; and (iii) individuals with a research-only locus of satisfaction, where those with a satisfaction with teaching were removed from this sub-sample. Surprisingly, hybrid satisfaction types were found to be negatively associated with all the research productivity types including ISI/IBSS journal article publications, other than the publication of book chapters, albeit weakly (between the five and ten percent levels of significance) for DOE journal publications, conference presentations and book publications. Teacher-only types were found to be negatively associated with conference presentations and book chapter publications, and were also found to be negatively yet weakly associated with international journal article publication.

This further analysis suggests that, although individuals with a teaching locus of satisfaction are typically negatively research productive, individuals that derive their satisfaction from both teaching and research are perhaps the least productive in terms of journal article publications. This finding might suggest that role conflict is most intense in individuals that derive their satisfaction from both teaching and research. It is argued that this finding further supports the scarcity model of Moore (1963), as role conflict, particularly in terms of time or other resource allocation, is expected to be more intense for individuals that derive their satisfaction from both roles.

Interestingly, individuals with a 'research only' locus of satisfaction are found to not be significantly dissatisfied with the incentives available for research. It is individuals with a 'teaching only' locus of satisfaction that are found to be the only of these three groups to be significantly (negatively) associated with this item (satisfaction with financial incentives available for research). This might indicate that financial incentives may play a role in the extrinsic motivational perceptions of individuals that derive their satisfaction from teaching and not research. If this were so, then a recommendation that derives from this is that the impact of extrinsic rewards on research productivity of such individuals should be further researched. Human resources remuneration systems might provide a better incentive for such individuals.

The negative associations of hybrid academics with research productivity contest certain of the predictions of the conventional wisdom model that predicts a positive and synergistic relationship between teaching and research, and also the 'g' model, which also predicts such a relationship (Hattie & Marsh, 1996). Both of these models are predicated on the inherent ability of an individual, or competence that spans both of these work roles (Hattie & Marsh, 1996). It is argued that the inherent ability of an individual will, instead, be primarily directed by intrinsic forces such as a research locus of satisfaction, rather than by ability alone. The different enterprises model, which predicts that teaching and research are fundamentally different activities (Hattie & Marsh, 1996), is considered to be supported in this context, although the prediction of this model; that no relationship exists between them, is not supported, as individuals that derive their satisfaction from teaching are found to be significantly less research productive.

According to the further analysis of 'research-only satisfied' and 'teaching-only satisfied' individuals, a difference was found in research-related self-efficacy between teaching-only satisfied and research-only satisfied individuals. Negative associations of research-related self-efficacy were found to dominate the associations of teacher-only satisfied individuals. Interestingly, the hybrid category was found to have fewer negative self-efficacy scores yet was found to have more negative research productivity scores for journal publications than the teaching-only category. The significance of self-efficacy as a predictor of research productivity supports empirical evidence from other contexts, including meta-analyses (Stajkovic & Luthans, 1998) that have found positive associations between self-efficacy and different dimensions of work performance. This result might, however, indicate that some effect dominates the low research productivity of hybrid academics which exists over and above the effect of self-efficacy. It is tentatively suggested that this lower level of research productivity is perhaps associated with role conflict. Whereas the negative associations of teaching-only satisfied individuals relate to lower levels of self-efficacy, it is argued that it is possible that hybrid academics are less research productive because of a fundamental role conflict between the twin roles of teaching and research. On the basis of these findings, it is, therefore, argued that there is a typology of research productivity by locus of satisfaction which dominates work roles in this context. These results suggest that if human resources systems take these differences into account then research productivity might be increased.

The differentiation of academics by teaching versus research work roles was a theme that emerged extensively in the qualitative analysis. The significance of the differences between these two roles and their relationships with research productivity were taken to be one of the core findings of this study. Implications and recommendations of these findings are discussed in the following chapter.

6.7.4 HYPOTHESIS C.D. THERE IS A SIGNIFICANT ASSOCIATION BETWEEN SUPERVISORY EXPERIENCE AND RESEARCH PRODUCTIVITY.

Three variables were included in this component classification: masters and doctoral supervision, university rank designation, and span of control. The hypotheses that relate to the tests of associations between each of these and research productivity are now discussed.

6.7.4.1 Hypothesis C14. There is a significant association between Masters and PhD supervision and research productivity.

Individuals that were found to have supervised more masters degree students were found to have higher levels of gross research productivity, and to have published more DOE journal articles; international journal articles; conference proceedings; and book chapters, and also to have presented more conference papers. These results broadly support the positive associations predicted by Hara *et al*., (2003), which are premised on the harnessing of the efforts of postgraduate students toward joint publication. The predictions of Human Capital theory (Becker, 1964) are also supported; which predicts that the learning investments in such supervision may contribute to the research productivity of supervisors. However, when years as a researcher were controlled for, masters degree supervision was found to be significantly and negatively associated with international journal article publication yet positively associated with book chapter publication. This might indicate that over and above the influence of years of experience as a researcher, individuals that supervise more masters students might publish fewer international journal article publications. When years as a researcher were controlled for, masters degree supervision was also no longer found to be significantly associated with DOE article publications; conference proceedings publications; and gross research productivity; yet was found to be weakly associated with conference presentations. According to the multiple linear regression analyses, masters degree supervision was found to be positively associated with conference presentations and with book chapter publication. According to these results, it might be possible that the supervision

of master degree students may typically result in significantly higher levels of conference presentations and book chapter publications for the supervisors of these students. Further research is suggested into the relationship between masters degree supervision and international journal outputs in order to more clearly understand this relationship, because this result is surprising. It might be expected that, after years of experience as a researcher, a supervisor might be more able to convert students' research work into international journal article publications. It might be possible, however, that over time these potential publications are diverted toward DOE article publication due to the incentive structures of the institution, which give DOE and international journal publications equal weight. However, DOE journal article publications are not found to be higher for supervisors of more masters students; no influence over and above their experience as researchers seems to be evident.

According to the zero-order tests of association, doctoral supervision was found to be significantly associated with gross research productivity; DOE journal article publication; international journal article publication; conference proceedings publication; conference presentations and book chapter publication. However, when years as a researcher are controlled for, the doctoral students supervised item was found to be significantly associated with conference proceedings publication; conference presentations; the publication of book chapters; and gross research productivity; the 'lower' levels of research output. With years as a researcher controlled for, doctoral supervision was found to be weakly and positively associated with the publication of international journal articles but not associated with the publication of DOE journal articles. When the doctoral supervision item was run in the multiple linear regression models instead of master degree supervision the item was found to be significantly associated with book chapter publication. This was the only measure of research productivity found to be associated with doctoral supervision according to the multivariate analysis.

These results suggest that journal article publication is not significantly predicted by masters or doctoral degree supervision over and above the influence of years of experience as a researcher. However, both forms of supervision may facilitate conference presentations and the publication of book chapters.

6.7.4.2 Hypothesis C15: Research productivity differs significantly by University rank designation.

The full professor and associate professor designation items were found to be significantly associated with all of the research productivity items except for the publication of books. The doctoral designation item was not found to be significantly associated with any of the research productivity items. These results might reflect the use of research publications as criteria for promotion to professorial ranks whilst the doctoral designation is typically dependent on the examination of a thesis. The Mr./Ms. designation item was found to be negatively associated with all the measures of research productivity except book publication. This result was expected. When controlling for years of experience as a researcher, using partial correlation analysis, the professor designation item was no longer found to be significantly associated with conference proceedings, and was still not significantly associated with book publication. This result might suggest that the attainment of professorial rank does not explain rates of publication of conference proceedings over and above the influence of years of experience as a researcher. However, to the extent that this item is still significantly associated with the other measures of research productivity over and above the influence of years of experience as a researcher, this designation might differentiate the sample. Individuals with professorial designations are more research productive according to the other measures over and above the influence of years of experience. After controlling for years of experience as a researcher, the associate professor designation was no longer found to be significantly associated with DOE journal article publication, international journal article publication, conference proceedings, book chapter publication, and gross research productivity, and was also found to be less significantly associated with conference presentations (to outside of the five percent level of significance). These results suggest that the differentiation between full professor and associate professor (when each is contrasted with the rest of the sample) might reflect a difference between individuals that produce research at a rate commensurate with the influence of experience over time in a research context (associate professors) and those that produce research at a rate over and above this rate (full professors). After controlling for years of experience as a researcher, book publication was found to still not be significantly associated with the Associate Professor designation. This might indicate the role of book publication as a form of research output that differs substantively from the other measures. This result might have picked up the fact that book chapters may not receive the same subsidy provisions as accredited journal articles do.

After controlling for years as a researcher there was no change in the significance of the zero-order associations between the doctoral designation item and the measures of research productivity; these were all found to remain not significantly associated. After controlling for years as a researcher, the Mr./Ms. designation was no longer found to be negatively and significantly associated with DOE journal article publication, conference proceedings publication, and less significantly associated with book chapter publication. This designation was also found to remain not significantly associated with book publication after years as a researcher were controlled for. After controlling for years as a researcher, this designation was, however, found to remain negatively and significantly associated with international journal article publication and with gross research productivity. According to these results, research output by designation might be differentiated into two categories. The first category may be associated with research productivity that is more or less constant with experience within the research context, which is broadly expected in academics up to the associate professor designation level. The second category may be associated with research productivity that is over and above what can be explained by years of research experience, which is associated with the full professor designation. It is concluded that the professor designation is an appropriate indicator of relatively high levels of research output. This result conforms to findings of higher levels of journal publication that are associated with forms of professorial designation (Rachal *et al*., 2008). The associations between span of control and research productivity are now considered.

6.7.4.3 Hypothesis C16: There is a significant association between span of control and levels of research productivity.

According to the bivariate tests, span of control, or the number of people that report to an individual in the organisation, was found to be significantly associated with gross research productivity, conference presentations, book publication and book chapters, yet was found to not be significantly associated with DOE journal publication and conference proceedings publication. It was also found to be weakly associated with international journal article publication. If the management of more members of staff is associated with constraints to research productivity in terms of 'absolute' or 'net' levels, then this would be expected to be reflected in tests of bivariate associations. Having tested the relative research productivity (between different forms of output), further tests were conducted in order to ascertain the potential influence of having a larger administrative load on research productivity over and

above the influence of years of experience as a researcher. Interestingly, only the publication of books and book chapters were found to be significantly associated with span of control after years as a researcher were controlled for. Further research might offer more insight into whether and why individuals that choose or attain more senior administrative roles tend to also publish more books and book chapters, over and above the influence of years of experience as a researcher. As expected, span of control was also found to be significantly associated with the Professor designation and weakly associated with the Associate Professor designation whilst being negatively associated with the Mr./Ms. designation item. These findings were considered to be consistent with Campbell and Fiske's (1959) criteria of discriminant and convergent validity; expected relationships were found. When tested in the multiple linear regression analysis, span of control was not found to be significantly associated with any of the measures of research productivity in any of the models. Interestingly, these results might suggest that individuals that undertake management roles, in this context, might be robust to the influence of time and other constraints associated with such roles on research productivity.

6.8 CONCLUSION

This chapter provided a discussion of the results of the quantitative portion of the research. The results of testing of associations between the GLOBE organisational values dimensions and research productivity were first discussed. The results of the qualitative analysis were then related to the quantitative findings. Next, the results of the testing of the associations between the Schwartz individual values items and research productivity were discussed. The quantitative results were related to the qualitative findings. The chapter then concluded with a discussion of the results of the testing of associations between the four component categories of performance factors and gross research productivity together with the six subordinate measures of research productivity. The bivariate and multivariate results were then discussed in relation to each of the tested hypotheses in turn. The core findings of the study at the organisational cultural level were found to suggest that the predictions of Convergence theory are not supported in this context; research productivity in the form of journal articles is not found to be associated with innovativeness. Schools that are found to be more innovative, however, seem to have produced higher numbers of 'lower level' research outputs such as book chapters. Convergence theory predicts that performance, such as research output that reflects innovative knowledge creation, will continually increase because of the continuous

innovative benchmarking of, and the continual incorporation of, innovative best practices from other contexts. The analysis of the relationships between individual values and research productivity was also taken to context the notion that research output is primarily associated with innovativeness. A core argument of this thesis was that the predictions of Convergence theory are not supported in this context. The analyses of the relationships between both cultural values and individual values are taken to support this argument. The discussion provided further insights into certain dominant relationships beween individual level factors and research productivity. Research productivity is found to be a function of tacit learning, and experience as a researcher more than from other forms of working experience. Individuals that are more satisfied with teaching are found to be significantly less research productive. A differentiation is found between a 'teacher' cohort and a 'researcher' cohort in this context that is associated with differences in gender and loci of satisfaction. A more detailed summary of the research, its conclusions, and recommendations for practice and further research is now offered in the final chapter, which follows.

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

7 CONCLUSIONS AND RECOMMENDATIONS

7.1 INTRODUCTION

In this chapter, the research is concluded with a summary of the research, of its objectives, and of the qualitative and quantitative findings. Recommendations are made for practice and further research. The objectives of this chapter are therefore:

- To summarise the research reported and discussed.
- To offer a discussion of the implications of this research for theory and practice.
- To make recommendations.

The core research question addressed in this research was the following: "*What is the relationship between organisational cultural values, individual motivational values, individual performance factors and research productivity?"*
From this core research question, the following three specific sub-ordinate research questions were derived, and hypotheses were, in turn, derived from these sub-ordinate research questions:

1. *What is the relationship between organisational cultural values and research productivity at the level of the academic field?*
2. *What is the relationship between individual motivational values and research productivity?*
3. *What is the relationship between individual performance factors and research productivity?*

Although the statistical procedures used in the research could not ascribe causality to relationships, the use of a qualitative grounded analysis application together with the quantitative analysis was used in order to provide a holistic analysis. An overview of the process followed in this research to answer these research questions is provided in the form of a summary as follows.

7.2 SUMMARY OF THE RESEARCH FINDINGS

Convergence theory (Kerr *et al*., 1960) predicts that, due to competitive pressures, organisations and individuals in work contexts will continuously apply innovative new

practices to their work. This process of innovatively applying best practices contributes significantly to performance (Kerr *et al*., 1960). At the heart of the predictions of Convergence theory, however, is the notion that *innovativeness* will result in the spread of best practices, and that homogeneity in best practices will eventually occur. According to the predictions of convergence theory, *new knowledge creation*, or research productivity, is expected to be enabled by 'best' practices that are increasingly becoming similar across different contexts. However, despite the "best practices viewpoint" (Huselid, 1995:643), a gap typically exists between such universal best practices and the actual practices applied in pursuit of performance (Rowley & Benson, 2002). This gap is typically the result of the influence of values systems, which act to constrain the innovative benchmarking and implementation of new practices from other contexts (Rowley & Benson, 2002). This effect has been found to be a dominant constraint to research productivity in R&D contexts, reflected in the 'not-invented-here' phenomenon (Foster, 1985). This research sought to investigate *what contributes to research productivity* in the context of a large South African university. The study also sought to investigate *the extent to which value systems constrain research productivity*; both at the level of the academic field and at the level of individual research output. Theory was developed from a qualitative analysis, and this theory, together with GLOBE and Schwartz values theory, was tested in this context; a triangulation of sorts was applied methodologically and a holistic perspective of the relationships around research productivity was enabled. It is concluded that Convergence theory was not found to be supported; not at this point in time in this context. Convergence theory was not supported: (i) in terms of its predictions of homogeneity in organisational culture between different academic fields, and (ii) in terms of its predictions of homogeneity in the practices of different academic fields. The qualitative findings indicate that cultural differences between academic fields dominate in this context. The quantitative findings were found to support the qualitative findings; differences between academic fields were reflected in measured differences in organisational culture between academic schools. The qualitative analysis found that the practices related to research also differ substantively between academic fields. It is argued that the implications of these findings are important because they suggest that the factors found to be associated with research productivity (the performance factors) represent a context-specific set of factors, which cannot be assumed to be a reflection of best practice in other contexts. This research, therefore, has attempted to offer a model of the factors associated with research productivity that is grounded in this context, and also to provide a perspective of certain boundary conditions in the form of values systems within which this set

of factors exist. On the basis of the predictions of theory, that were subsequently supported by the results of the study, it is argued that the primary mechanism through which values systems constrain the spread and implementation of best practices is through constraints to innovativeness. However, it is also suggested, on the basis of these results, that journal articles, which represent the primary form in which knowledge is disseminated, are not associated with innovativeness, both in terms of organisational cultural values and also in terms of individual motivational values. If ISI/IBSS and DOE journal article publications are not associated with innovativeness, then certain implications derive from these findings. These implications and recommendations based on these findings are discussed in sections that follow.

On the basis of these findings, it is argued that the model of the factors that were found to be associated with research productivity in this research represent a set of factors that are therefore 'sub-opimal' in their contribution to research productivity, and might represent outcomes in a context in which innovativeness is constrained. Recommendations based on these conclusions are offered in the sections that follow.

It is argued that these results contribute to, and extend, the GLOBE and Schwartz values literature into an important context; the South African higher education milieu. If knowledge creation is needed in order to solve societal problems, and if research productivity is constrained by values systems, then such constraints impose a cost on societal stakeholders. These findings also fit into previous research on research productivity by providing insight into factors that are related to research productivity in this context at this point in time; that are grounded in the context. The identification of this set of factors provides insight for those interested in improving research output, and global competitiveness in the value that universities can add to society through research. A summary of the objectives of the study, and of the more specific recommendations that derive from the conclusions, is now provided.

7.3 SUMMARY OF THE RESEARCH OBJECTIVES

The aim of this research was to investigate the interrelationships around cultural values, individual values, individual performance factors and research productivity in order to provide insight into potential improvements in the management of research productivity that might contribute to human development and human progress. The overarching aim of the

research was to provide insight that might help reduce the costs imposed on stakeholders, including individual researchers and academic fields, which are associated with inefficient or ineffective research productivity. The objective of this research was therefore to develop and test theory that relates organisational cultural values, individual values and individual-level performance factors to research productivity. A summary of the process of hypothesis testing is offered as follows.

7.4 SUMMARY OF THE QUANTITATIVE AND QUALITATIVE FINDINGS AND RECOMMENDATIONS

This research has provided empirical evidence in the form of certain statistical associations that either supported or contested theory, and the research questions were answered through an analysis of these results, both qualitative and quantitative. While causality cannot be ascribed to statistical results, it is argued that the testing of theory undertaken, through a holistic analysis that used both qualitative and quantitative methods, is sufficient to support certain arguments made in the research. The research questions are answered as follows in relation to the qualitative and quantitative findings.

7.4.1 Research Question 1: What is the relationship between organisational culture values and research productivity at the level of the academic field?

On the basis of the theory that was found to be supported by the quantitative results, and also on the basis of the qualitative findings, it was concluded that cultural values might primarily constrain certain forms of research productivity through their influence on innovativeness (De Luque & Javidan, 2004; Gudykunst & Nishida, 2001; Hofstede, 1980a; Nakata & Sivakumar, 1996; Sandow & Rhodes, 1996; Shane, 1995). It is argued that these results support the argument that cultural values may act as a constraint to individual and organisational performance (House *et al*., 2004; Rowley & Benson, 2002), through their action as a constraint to innovativeness. Although the casual mechanisms that underlie this constraint cannot be tested empirically, the findings were found to contest the predictions of Convergence theory (Kerr *et al*., 1960). Convergence theory was contested, as values were found to differ substantively between academic fields and research practices were also found to differ significantly, to the point that comparisons between fields on the basis of research output related to these different values or practices was found to be problematic. At this time,

and in this context, the homogeneity in organisational cultural values and practices between academic fields predicted by Convergence theory was not found to be present.

The failure of the predictions of Convergence theory that are reflected in the relatively high levels of heterogeneity; in the form of organisational cultural values endowments, and also in research practices, between academic fields, suggests that the innovative application of best practices that are an important influence on individual and organisational performance (Camp, 1989; Huselid, 1995; Vos *et al*., 1997) might not be occurring sufficiently in this context. It was concluded, therefore, that the evidence and analysis provided by this research supports the argument that values systems may constrain research productivity in this context.

The lack of an association between *journal articles* and innovativeness values was taken to contest the notion that these forms of research outputs, as knowledge creation, are fundamentally related to innovative, or new, knowledge creation (Nonaka, 1994). Instead, the qualitative and quantitative results were considered to support the argument of Kuhn (1970); that academic research output does not, inherently, represent innovative knowledge creation, but is more likely to be a function of the social features of groups of academics.

Further research is recommended into unearthing the exact causal mechanisms that underlie the constraints that values systems like organisational culture may pose to research productivity. In the absence of such knowledge, it is recommended that researchers proactively increase the extent to which they benchmark innovative processes, both from other global contexts and also those that are used in different academic fields. This might contribute to research that is more related to new and innovative knowledge creation. The more that innovative knowledge is generated, the more likely it will be that university research outputs will be able to contribute to solving societal problems. It is recommended that innovative values be prioritised in the discourse around research productivity, by all stakeholders. If research productivity in the form of journal articles is indeed not the most innovative form of research output, then perhaps journal reviewers may help to encourage innovativeness in the papers that they review. However, this might be difficult, given that journal reviewers are responsible for quality control, and risk is associated with new and innovative findings; such work might not yet be substantiated by other research.

The qualitative findings suggest certain explanations for some of the almost incommensurate differences between academic fields. The types of research problems that an academic field typically addresses are primarily oriented to their practitioner field, or practitioner community. Similarly, the requirements of the practitioner fields in terms of professional training were found to be a dominant aspect of academic activity, according to the qualitative results. This is perhaps understandable in the South African context, where universities are under pressure to cater to increasing numbers of students. A fundamental tension between teaching and research was found to be a recurring theme in this context. Deriving perhaps from the influence of the practitioner community, according to the qualitative findings, two dominant and perhaps incompatible, even incommensurate, cultures were found to dominate the institutional context: a culture of teaching versus a culture of research. The findings also suggested that individuals that derive their primary job satisfaction from teaching are fundamentally less research productive than individuals that derive their primary job satisfaction from research. This qualitative proposition was found to be supported in the quantitative analysis. The strength of the practitioner field that corresponds to an academic field was found to potentially dictate the extent to which an academic field would be associated with a culture of teaching rather than a culture of research. The issue of the 'tail wagging the dog' or the 'dog wagging the tail' aside, inextricable connections between academic fields and their practitioner fields might dictate the extent to which teaching, or training practitioners, is prioritised in an academic school.

In terms of other cultural influences on research productivity, according to the qualitative findings, an organisational culture of massification, or implementing a strategic focus on training much higher numbers of students (without a corresponding increase in resources), was found to perhaps dominate as a constraint to research productivity. This culture of massification was found to potentially contribute to a vicious circle in which administrative actions taken to address problems associated with higher teaching loads were constraining research productivity through an increase in bureaucratisation. A theme that was found to emerge from the analysis introduced a discourse around the notion of a need to 'protect' research-productive academics from the influence of bureaucracy and massification.

On the basis of these findings that suggest that academic fields are substantively different from each other, both in terms of organisational culture and in terms of research practices, it is recommended that decision making around research is devolved to the level of the

academic field, and differences between academic fields are respected. If accountability in terms of research output is applied to individual academics, a system of benchmarking against the norms of the specific academic field to which such an academic belongs should be used, so as to not prejudice individuals in fields that perform and produce their research in ways that differ from other fields. It is recommended that performance management systems, if applied, are managed at the level of the individual discipline, so as to take into account the fundamental differences that might exist between fields. Further research is recommended into the specific causal mechanisms that may transmit values effects to research productivity. Conclusions that relate to the potential influence of Schwartz (2007) motivational values on research productivity are offered as follows.

7.4.2 Research Question 2: What is the relationship between individual motivational values and research productivity?

At the individual level of analysis, the testing of the associations between the Schwartz values orientations and research productivity revealed only one association for the higher order values tension that corresponds with the dialectical opposition between innovativeness (Openness to Change values) and conservation (Conservation values). This was for the negative association between Conformity values and book chapter publication. If research productivity is inherently expected to be associated with innovativeness and creativity, then, according to Schwartz's (2007) values theory, Openness to Change values are expected to be associated with higher levels of research output and Conservation values with lower levels of research output.

According to Convergence theory (Kerr *et al*., 1960), innovativeness, in the form of implementations of new best practices, which is typically associated with Openness to Change values (Schwartz, 1992), was expected to be associated with higher levels of research productivity. According to these findings, Convergence theory was not found to be supported in the testing of Schwartz values in this context. In light of these findings, it is recommended that academic staff be given access to support to attend international conferences and to take sabbaticals with the goal of helping them to be more innovative in their research work. More benchmarking of top universities and individuals known for the innovativeness of their research might enable more research that can contribute to knowledge and to the needs of societal stakeholders in the South African context.

The results of the analysis of individual values were found to support the argument of the analysis at the level of the academic field; that differences in the requirements for research output associated with different fields might dominate, or 'crowd out' the influence of innovativeness on research output, except in the case of book chapter publications which might to some extent be more independent of these requirements. These results also seem to question the extent to which research outputs, measured as they are in this research, really do represent innovative knowledge creation. It is therefore argued that these results also support Kuhn's (1970) paradigm theory predictions; that academic pursuits are not inherently innovative because they are constrained by the shared values of groups of academics, which form paradigms. On the basis of these results, it is suggested that South African universities should prioritise innovativeness in their strategic orientations. New technologies and ways of doing research might be enabled through a sustained focus on more experimentation and creativity in research within in the university system. If journal article publications are not inherently innovative then the costs of lower research outputs may be borne by societal stakeholders that are most in need of these outputs.

Individual motivational values convergence, or homogeneity, was not expected to manifest between individuals, because individual motivational values derive from biological as well as social origins (Schwartz, 2007). The potential constraints to research productivity posed by individual motivational values systems seemed to manifest strongly in the tension between Self-Enhancement and Self-Transcendence values orientations, rather than the tension between innovativeness (Openness to Change values) and conservation (Conservation values).

In terms of the overarching tension between Self-Enhancement and Self-Transcendence values predicted by Schwartz's (2007) values theory, individuals with higher levels of either of two Self-Enhancement values dimensions, Hedonism values or Power values, were both found to have published significantly fewer international journal articles. Individuals with higher levels of Hedonism values were, furthermore, also found to have made fewer conference presentations, to have published fewer book chapters and to have lower levels of gross research output. With regard to Hedonism values, it was concluded that these results supported the predictions of Activation theory; that there might be a difference in the activation level, or stimulus level, between individuals (Scott, 1966), because some

individuals possess a greater tolerance for painstaking and less stimulating work, which is a characteristic associated with many forms of research work. The implication of this is that individuals that require higher levels of stimulus from their work tasks might be motivated to, and have motivational values aligned to, seeking more socially-oriented work tasks or other work tasks that offer more stimulation than research work. According to Scott (1966), an individual's activation level can change if he or she finds meaning in such tasks. It is argued that the predictions of Activation theory might offer a primary mechanism that underlies the negative associations between Hedonism values and research productivity, because this values dimension is primarily underpinned by a biological basis for motivational values (Schwartz, 2007); not social motivational values. Given that there is a biological rationale for the lower research productivity of individuals with higher levels of Hedonism values, and that it is not easy for an individual to change their biological characteristics, *it is suggested that the principles of comparative advantage be applied*. Individuals that are motivated to teach might be given more teaching to do, with fewer requirements for research. According to these results, it is argued that individuals with high endowments of Hedonism values are not suited to research work in itself. On the basis of the qualitative and quantitative results, the strengthening of the 'tutor' track is recommended; the career track for individuals that choose to do more teaching and to face fewer research requirements for tenure and performance evaluations. This will allow those that prefer research to do more research as they will be able to teach less.

In contrast with Hedonism values which are derived from a biological basis, Power values are driven by social goals (Schwartz, 2007). Power values may also not be an optimal fit with international journal article publication, which is reasonably expected to be associated with high investments of time and effort; for performance evaluations these are not necessarily recognised as being different from DOE articles, which are perhaps not as difficult to publish. Interestingly, Hedonism, Power and Benevolence values were all found to be negatively associated with international journal article publication. It is perhaps at the extreme, or at the higher levels of research productivity, that values constraints manifest significantly. This might be because there is little incentive to choose ISI/IBSS journals when DOE journals will provide similar pay-offs. It is recommended that the research incentives provided for the publications of journal articles be changed to favour ISI/IBSS journal articles. This might expose academics to the international context, and to innovative changes in research productivity. These results also suggest that if ISI/IBSS and DOE journal articles are given

equal weight in the incentive system, then academics may tend to perhaps 'work the system' instead of seeking to produce more innovative knowledge products.

Individuals with higher levels of Benevolence values were found to have significantly lower levels of international journal article publications. A possible explanation for this result was suggested by the finding that individuals with higher levels of Benevolence values may derive their primary job satisfaction from teaching rather than from research. Individuals that derive their primary job satisfaction from teaching were, in turn, found to have significantly lower levels of research productivity across almost all the measures of research output. Other results were found to lend support to this explanation. Benevolence values were also found to be negatively associated with statistical research self-efficacy and also associated with a preference for qualitative methods (rather than quantitative methods). On the basis of these further tests it was argued that the negative association between Benevolence values and international journal article publications might reflect some dimension of a preference for teaching rather than for research. It was tentatively concluded that this values dimension might reflect the fundamental differentiation of the institutional context into teacher versus researcher cultures. This fundamental differentiation; between teaching and research, was found to dominate as an aspect of the qualitative analysis. It is suggested that institutions pay attention to the differences between people according to values. A strengthening of the tutor track would accommodate individuals that derive their primary satisfaction from teaching; this would provide more time for individuals that derive their primary satisfaction from research to do more research.

From the qualitative findings it is concluded that individual values might be the primary drivers of research productivity, especially values reflecting a motivation associated with a need for recognition. Research productivity seems to be driven by a deep and individualistic, perhaps even single-minded drive, which is 'fed' to some extent by peer-level recognition. Curiosity and the autonomous nature of research productivity were also salient aspects of respondent responses. The findings suggest that research is perceived by some to be a selfish activity and teaching to be a benevolent, or unselfish, activity; the consequences of this are that people that teach might tend to devote 'excessive' time to teaching and administration. These perceptions reflect the tension between Schwartz's (2007) higher order dimensions of Self-Transcendence values versus Self-Enhancement values. It is suggested that academic staff should be channelled toward what they choose to do, because these results suggest that

normative values can also be prescriptive; if highly productive researchers are indeed considered to be selfish due to a preference for research over teaching, then this might become a point of contention. It is suggested that the differentiation of roles; between a teaching stream (tutors) and a research stream (lecturers) be developed further. This might be particularly important as institutions of higher education in South Africa face political pressures to take on more of the teaching role that training colleges used to. This might reduce role conflict between teaching and research roles, as the ratio of work between teaching and research can be different for members of different streams.

The qualitative analysis was found to suggest that a fun element to research was necessary, because of the difficulty of research; considered a 'chore' if this element was not present. The findings suggest that 'transcendence' is required of a highly productive researcher; a 'transcendence' where an individual's personal desire for 'pleasure' is 'overcome'. The Schwartz (1996:122) dimension of Hedonism seems to represent the opposite of this conception; motivational goals associated with hedonistic "sensuous gratification for oneself". The qualitative findings are taken to support the negative quantitative associations found between Hedonism values and the measures of research productivity. On the basis of the analysis, another theme was also found to emerge; the differentiation of passion-motivated research from research that is motivated by ego needs. Research motivated by ego needs might be driven by Achievement values if it is recognition of competence that is the goal; or by Power needs if socially motivated status-oriented recognition is the goal (Schwartz, 2007). This differentiation was also taken to be aligned with the negative quantitative result found for the association between Power values and international journal article publication; it is plausible that Achievement-motivated individuals might not be as likely to avoid attempting international journal article publication in favour of DOE journal article publication. It is suggested that research incentive schemes take into account these potential differences between individuals; an innovative array of incentives can be offered. For individuals that are motivated by social goals, more recognition of research achievements may be offered. As suggested previously, by incentivising ISI/IBSS journal article publications over and above DOE publications, individuals with different values motivations might be better accommodated. It is therefore suggested that *diversity in incentives* be applied to motivate research productivity, because individuals are found to have different endowments of Schwartz individual values orientations.

Another conclusion that was reached on the basis of the analysis is that the influence of values on research productivity might change over the life-cycle of an academic. The most important influence in this regard might be the influence of family life, particularly when children are being raised. This notion is supported by the quantitative analysis, as individuals with more dependent children were found to have published fewer internationally accredited journal articles.

On the whole, it is concluded that research productivity might be motivated in different ways by different motivational values. Whereas individuals might prioritise DOE journal article publication at the expense of international journal article publication for promotional reasons, certain individuals that are relatively less motivated by Power, Hedonism or Benevolence values may be more research productive because of a passion for research that is relatively more independent of a primary need for career progression. Such individuals might be more likely to choose to publish in ISI/IBSS journals than in DOE journals, when both are recognised equally for promotional purposes. Nonetheless, according to the qualitative findings, highly research productive academics might be motivated by intrinsic factors that are related to ego (Self-Enhancement) needs, yet their need for recognition may be achieved through the attainment of Self-Transcendence outcomes in their research, such as the development of knowledge, or the upliftment of others through knowledge, which are outcomes associated with Universalism values. The absence of empirical support for certain predictions of the qualitative analysis were considered to be explained by the notion that for a values item to attain significance, it would need to dominate as a net, or 'tip of the iceberg' effect, over and above a host of different effects. A summary of the analysis of the potential influence of individual performance factors on research productivity is offered as follows.

7.4.3 Research Question 3: What is the relationship between Individual Performance Factors and research productivity?

This research question was answered through a process where the individual-level variables were derived from a grounded qualitative research process. Further quantitative factor analysis results indicated that these factors, termed performance factors, loaded onto four component categories, or groups, of factors. On the basis of findings from the values research component of this study, the model of the individual performance factors that are related to

research productivity is considered to include factors that are context specific. However, these factors are found to exist within boundary conditions. One of these boundary conditions established by this study is that these factors exist within a context that might not primarily be innovative; a context that is dominated by the differences between academic fields. Similarly, these individual performance factors are also taken to exist within a context of diversity in individual motivational values. The discussion of the results is now summarised, according to each of these four groupings of factors, as follows.

7.4.3.1 Component Category 1: Biographical Factors and Research Productivity

It was concluded that research productivity improvements over time, overall, are dominated by Specific Human Capital (Becker, 1964); *research experience* was found to be the dominant form of experience in associations of different types of experience with research productivity. This result supports the conception of Nonaka (1994), which stresses the importance of tacit knowledge in knowledge creation. The full time work experience variable was found to have the highest standardised coefficient in the regression equations, out of all the variables included in the analysis. If the most important factor in the model of the variables found to be associated with research productivity is the tacit, or actual, experience of doing research, then certain implications flow from this. It is suggested that staff be encouraged to do research, irrespective of what they might achieve from the process initially. If learning-by-doing is the best way to develop research skills, then training courses offered to individuals should include more practical components. Likewise, it is recommended that interventions to develop staff should be practically oriented. Mentorship in the form of co-authorship is recommended, because this might enable learning-by-doing.

Members of professional associations were found to have higher levels of research output. It was concluded that globalised social networks and connectivity might serve to enable research productivity (Coleman, 1988; Light, 1984; Shapero & Sokol, 1982; Swan, 2007; Wilson & Martin, 1982). It was concluded that membership of such professional associations might confer network-related advantages (Burt, 2001; Coleman, 1988; Granovetter, 1973; Lin, 2001). On the basis of these results it is suggested that individuals wishing to be more research productive ensure that they proactively develop their networks, especially in their fields of research.

Surprisingly, years of formal education were not found to be associated with significant differences in research productivity. This finding might suggest that higher education is not a sufficient condition for the facilitation of research productivity. It is suggested that commonality between what is entailed in higher degrees and journal article publication is increased. Proactive steps can be taken to ensure that these commonalities are encouraged.

On the basis of the results that indicate that foreign origin and years spent in other countries are associated with higher levels of research productivity it is recommended that international diversity be encouraged in selection, in order for such local institutions to 'harness' the knowledge and skills of these individuals and to learn from such individuals. The holding of colloquia and internal research seminars might enable significant learning transfers to occur, as this diversity might be viewed as an organisational asset. International linkages should be proactively encouraged in order to facilitate the innovative benchmarking of best practices in research internationally. Although co-authorship was found to increase in a linear manner with research productivity, it was found that at the highest levels of research productivity individuals tended to publish more sole-authored research. On the basis of these results it is suggested that co-authorships on the part of highly productive researchers be encouraged. This might require a diversity of research incentives rather than a one-size-fits-all approach. Incentives might be provided, over and above existing incentives, for highly productive researchers in order to have them develop others through collaboration, because of the low 'added value' that less experienced co-author may contribute. This problem might be particularly acute if research incentives are halved for an experienced author if he or she is to take on someone as a co-author on a paper.

No significant associations were found for a preference for quantitative or qualitative methods. It was therefore concluded that research productivity in this context might be independent of a choice between qualitative or quantitative methods. Individuals that use the methods most appropriate to a particular field might be more research productive; irrespective of what those methods are.

Marriage was not found to be significantly associated with any of the measures of research productivity when age was controlled. After controlling for the influence of age, dependent children were found to be negatively associated with international journal article publication both in terms of bivariate tests and in terms of multivariate tests. It was concluded that it

might be possible that time constraints associated with family-to-work spillovers (Dilworth, 2004; Dilworth & Kingsbury, 2005) may constrain research output in the form of international journal article publications. Support for academics with family commitments is recommended; flexibility in working hours might lessen the impact of family commitments on research productivity. Male academics were found to have higher levels of gross research productivity, internationally accredited journal article publications, conference presentations and publications of conference proceedings. It was concluded that gender differences found in other academic contexts (Barbezat, 2006; Rachal *et al*, 2008; Rothausen-Vange *et al*., 2005) might extend to gender relationships in this context. It is acknowledged that it is possible that family-to-work spillover (Dilworth, 2004; Dilworth & Kingsbury, 2005) might be present in this context, which might constrain research productivity in a way that is not equal between the genders. Support might be offered to staff with children in the form of on-site child-minding services, or nursery schools. Family commitments might have a disproportionate influence on women in terms of research productivity.

The fundamental differentiation of university work was also found to have a gender dimension. It was found that female academics were significantly more likely to derive their primary work satisfaction from teaching. In light of other findings that male academics: (i) tend to publish more than female academics in contexts that are less-research oriented yet not in contexts that are more research intensive, and (ii) tend to spend less time on teaching than research (Rothausen-Vange *et al*., 2005), it is suggested that an increased focus on research rather than teaching might, to some extent, reduce gender inequality in research productivity. It is argued, on the basis of the qualitative and quantitative findings, that teaching and research are not necessarily compatible in terms of research productivity. Further research is suggested into why female academics are less satisfied with research than teaching.

The biographical component category was found to contribute the most to research productivity of all the component categories. Having derived recommendations from the conclusions of the analysis of the relationships between the biographical factors and research productivity, recommendations that are derived from the analysis of the results relating to personal orientation factors is now provided.

7.4.3.2 Component Category 2: Personal Orientation Factors and Research Productivity

Self-efficacy was found to dominate this category's associations with research productivity in this context. After the influence of experience, self-efficacy was the factor with the highest standardised coefficient in the multivariate analysis. Job satisfaction, locus of control and, to some extent, affect, were found to not be significantly associated with research productivity. Measures of self-efficacy were found to be related to all the measured dimensions of research productivity and with the gross research productivity measure. It was concluded that these results supported theory and research findings from other contexts (Bandura, 1997, Stajkovic & Luthans, 1998) of a positive relationship between self-efficacy and work productivity. On account of the many significant associations found between research productivity and Self-Efficacy measures it is recommended that academic staff, particularly more junior academic staff, be provided with support that is specifically aimed at increasing levels of self-efficacy. More specifically, mentorship might be provided where such individuals 'learn by doing' in order to build confidence at each 'level' of academic output. Conference presentations might be the first 'level' that can be used to build confidence. Such interventions follow the recommendations of Bandura (1997), who stresses the pivotal role of self-efficacy in the achievement of work outcomes. On the basis of these results it is argued that development programmes that specifically incorporate self-efficacy goals may have a significant influence on individual and organisational research productivity. On the basis of the conclusions, the support of individuals through 'learning by doing', or tacit learning (Nonaka, 1994), is taken to be an important aspect of training and development for academics in this context. Practice of actual research, and of each different type of research type (for example: journal article, conference presentation, book chapter, book) is therefore taken to be important in this regard.

The lack of significant associations between research productivity and the other Personal Orientation factors were considered to contest previous empirical findings and theory that supported positive associations between these factors and work performance. It was acknowledged that the associations of job satisfaction, locus of control and affect with research productivity might have been influenced by range restriction; this cohort of professional academic staff might reflect a population in which range restriction is present (Hunter, Schmidt & Le, 2006). If academic recruitment does 'select' for individuals that are relatively homogenous in terms of having higher degrees and other requirements then it is

considered possible that variance between individuals on these items may be constrained. Recommendations based on the analysis of the associations between the research work role satisfaction factors and research productivity are now considered.

7.4.3.3 Component Category 3: Research Work Role Satisfaction and Research Productivity

Individuals with a research locus of satisfaction, or individuals that derive their primary work satisfaction from research, were found to be significantly more research productive in terms of international journal article publication, local journal article publication, conference presentations and gross research productivity. Conversely, individuals with a teaching locus of satisfaction were found to be negatively associated with international journal article publication, local article publication, the publication of book chapters and gross research productivity. Satisfaction with teaching was negatively associated with satisfaction with research. It was concluded that these results supported theory and evidence from other contexts that posit a positive relationship between specific satisfaction loci and work productivity (Hackman & Oldham, 1976; Herzberg, 1966; Judge *et al*., 2001; Organ, 1988; Scott, 1966). In a further analysis of three categories of loci of satisfaction: (i) teacher-only satisfied individuals; (ii) research-only satisfied individuals; (iii) and teacher- and research-satisfied individuals, termed 'hybrids', it was found that such 'hybrids' were associated with significantly fewer publications of international journal articles and conference proceedings, and with weakly significant (at just within the ten percent level of significance) negative associations with all of the other measures of research productivity except book chapter publications. Teaching-only satisfied individuals were found to have fewer conference presentations and book chapter publications, and were weakly and negatively associated with international journal article publications. It was concluded that the predictions of the scarcity model (Moore, 1963) may be supported in this context; that role conflict between teaching and research roles reflects a competition for individual time and resources between these two activities that might result in lower levels of productivity. These findings contest historical evidence from meta-analytic findings (Hattie & Marsh, 1996) that predicts a positive relationship between teaching and research. It is therefore acknowledged, as predicted by Fox (1992), that in this context teaching and research are not mutually supportive. These quantitative results are also in line with the qualitative findings which stress the fundamental differentiation in this institution between teaching versus research cultures. This

differentiation, which was found to be a recurring theme in the qualitative analysis, was found to be echoed in the quantitative findings. This component category accounted for the third largest amount of variance in the factor analysis model.

On the basis of these findings, it is suggested, again, that the principle of comparative advantage should be applied. On the basis of these results, which indicate that if the primary satisfaction that an individual derives from their academic work is from teaching then they have significantly lower research productivity, it is recommended that: (i) training and development is provided that focuses on the commonalities present between teaching and research, one of which might exist at the lower levels of postgraduate supervision; and (ii) interventions are undertaken that are aimed at increasing satisfaction with research activities. On the basis of these results it is recommended that potential role conflict between teaching and research is addressed through applying the principle of comparative advantage (Smith, 2003[1776]). Following Smith (2003[1776]), specialised division of labour is significantly more efficient in producing outputs. On the basis of these results, and following Smith's (2003[1776]) logic, it is suggested that teacher-satisfied individuals be given more hours of work that they prefer (teaching), and research-satisfied individuals be given more hours work that they prefer (research). It is argued that workload models that differ significantly in time allocations for teachers versus researchers might be necessary in a context where societal demands for training might conflict with demands for research output. In this way the teaching loads of more productive researchers may be reduced and the net research outputs of academic units might increase significantly. It is recommended that the 'tutor' track be strengthened, in order to better accommodate individuals with a preference for teaching. This is not to say that teachers should perform no research, but that they should be supported to produce research that is specifically focused, and tailored, to what interests them; teaching. Research into teaching might be a focus of such programmes, because such research might be more satisfying for these individuals. Membership of professional networks that support these two streams might be encouraged. According to the qualitative and quantitative findings, it is suggested that institutions become proactive in their support of these two different streams; so that researchers are not exposed to a culture wherein research is seen as selfish, and teaching is also not seen as underincentivised in terms of promotions in a societal context where higher education institutions are massifying. A tutor track might reduce the exposure of highly productive researchers to the bureaucratic costs associated with rising intakes of students. On the basis of these results it is argued that the South African university faces a

fundamentally different set of societal imperatives, and that the institutional focus on massification is perhaps at odds with goals to increase research productivity. As such, research productivity relationships in the 'developed world' might be different from those in this context. Consequently, it is argued that these results are important because they offer an insight into research productivity in the South African context; a context where knowledge of how to produce research while also catering for increasing massification is important. This point bears repeating: it is argued that in this specific context, in order to accommodate increasing numbers of students where infrastructure development does not keep pace with these increasing enrolments, a significant investment in the development of a 'teacher' track might be imperative, in order to strengthen teaching capacity without constraining research output. Recommendations are now considered that relate to supervisory experience.

7.4.3.4 Component Category 4: Supervisory Experience and Research Productivity

Although individuals with more masters and doctoral supervision experience were found to be significantly more research productive, after controlling for years as a researcher, (i) masters degree supervisions were found to be negatively associated with international journal article publications, and positively associated with book chapter publications, and (ii) doctoral degrees supervised were found to be associated with conference proceedings publication; conference presentations; the publication of book chapters; and gross research productivity; the 'lower' levels of research output, but not with journal article output. According to the multivariate analysis, however, masters degree supervision was found to be associated with conference presentations and book chapter publications only, and the doctoral supervision was found to only be associated with book chapter publications. On the basis of these findings, it is recommended that academic administration take proactive steps to strengthen the linkage between masters and PhD supervision and journal outputs. Perhaps incentivisation systems can be used in order to make it more worthwhile for these dissertations and theses to be converted to journal outputs. Again, it is argued that research productivity incentives be 'diversified' to be able to incentivise different forms of research outputs. A focus of these incentives might be the incentivisation of journal articles that result from from supervision. Of the four designations tested (Mr./Ms., Dr., Associate Professor and Professor), only the Professor designation cohort was found to produce research output over and above the influence of years of experience as a researcher. The Mr./Ms and Dr. designation items were, as expected, found to be significantly less research productive. It is

concluded that this might reflect the prevailing view of the doctorate as a qualification for academics at the beginning of their research careers (Remenyi & Bannister, 2012), as well as the fact that promotions to the professorial levels are typically made on the basis of research output.

Individuals with more people reporting to them were found to have presented more conference papers, and to have published more books and book chapters. These individuals were also found to have higher levels of gross research output, the measure for quantity of research output. However, when their years of research experience were controlled for, then individuals that managed more staff were found to only publish more books and book chapters. An implication of this result is that individuals that take on administrative roles that require the supervision, or management of others, do not seem to be less research productive. In fact, they might be more research productive in certain forms of research output. Having offered recommendations based on the conclusions of the study, the thesis is concluded with a summary of the core conclusions and recommendsations of the study.

7.5 CONCLUSION

The objective of this chapter was (i) to summarise the results of the process of hypothesis testing and the results of the qualitative analysis; (ii) to provide a discussion of the implications of the research for theory and practice; and (iii) to make recommendations. The research questions that provided the rationale and structure for the research were outlined. A summary of the research objectives was provided. A summary of the findings was provided, together with recommendations. The following are the primary conclusions of this research.

- The predictions of Convergence theory are *not found to be supported* in this context. It is argued, on the basis of these findings, that values systems can constrain research productivity. Theory that predicts that values systems such as organisational culture can constrain productivity through their constraint to innovativeness was found to be supported. At this point in time, organisational cultural differences between academic fields, together with substantively different research practices were taken to not support the predictions of Convergence theory (that values systems and practices within organisations will converge, or become homogenous over time).

- Innovative and creative values expected to be associated with innovative knowledge creation are not found to be associated with research productivity in the form of journal research outputs, conference research outputs or book research outputs. Research outputs *might not be inherently innovative* or might not reflect knowledge creation as an innovative activity (as suggested by Kuhn, 1970). Convergence of practices toward best practice norms (Kerr *et a*l., 1960) might not be occurring against innovative standards but against precedent that is not necessarily innovative. The 'gatekeepers', or journal article reviewers, of a specific field might be averse to risk associated with new and innovative research.

- Research productivity may primarily be related to deep-seated differences between academic fields rather than with similarities across such fields, which might be *shaped by the dominant influence of the needs of practitioner fields*, both in terms of the type of research problems of such fields (research) and in terms of the training needs of such fields (teaching). Convergence of practices and values (Kerr *et al*., 1960) might be more likely to occur between an academic field and its practitioner field than with other academic fields.

- Research outputs may primarily be a function of the *alignment of values and practices with an external academic field* (and not across fields) because the 'gatekeepers' of research production control what is publishable. In other words, it might be more important to have the same values and to prioritise the same practices as reviewers do in order to get published. These reviewers are typically sensitive to differences between academic fields, according to the qualitative findings. Convergence (Kerr *et al*., 1960) of practices and values might be more likely to occur between an academic unit and its broader academic field than across fields.

- Individual research productivity may primarily be driven by *intrinsic personal factors*, such as Schwartz (2007) values that prioritise research behaviours over other behaviours, and by intrinsic performance factors such as self-efficacy and also individual biographical differences, particularly the influence of tacit experience. The notion that the incentivisation of research can work off the assumption that academics are homogenous might be erroneous. The results of this study suggest that researchers

are, instead, heterogeneous, and diversity in the types and foci of research incentives might be necessary to accommodate these differences.

- In this context, a conflict between teaching and research may dominate, specifically in the form of role-conflict. Individuals that derive their primary satisfaction from teaching are found to produce significantly fewer research outputs. The findings suggest that South Africa is a context in which massification is occurring in its universities; higher numbers of students are being enrolled without this being matched by infrastructure increases. Researchers are found to complain about the encroachment of teaching on research productivity. It is argued that the 'tutor' or teaching track of academics requires urgent investment and development in order to meet the societal imperatives of higher numbers of students without compromising the ability of universities to deliver research outputs. If the principles of comparative advantage are applied in workload models, then 'teachers' that teach more hours of teaching will free up 'researchers' to do more hours of research.

The empirical findings of this research are taken to be generalisable to the South African context to the extent that other South African universities share similarities with the one under study. The findings also suggest generalisability to university contexts and not to private innovating activities, or private R&D. The findings indicate, however, that certain characteristics shared by South African universities might differ from those of other universities globally. This might indicate that generalisability to the global context is not assured. These findings are taken to contribute to theory development in that theory was developed that predicts relationships around research productivity in this context. These findings also offer insights that imply the revision of theory developed in other global contexts. Further, the findings suggest the falsification of certain theory, notably the predictions of convergence theory in this context.

In summary, it is argued that the lack of support for the predictions of Convergence theory (Rowley & Benson, 2002; Kerr *et al*., 1960; Kerr, 1983) might indicate that researchers and the administrators of research *need to, themselves, ensure that innovative research best practices are benchmarked, tested, and integrated into research practice, because innovative best practices might not be converging in this context*. Convergence theory predicts that organisational cultural differences and differences in practices between academic fields will

reduce due to innovativeness; as practices that are found to deliver superior performance in other contexts are tested and applied across contexts. The source of these best practices might be global, or might simply be within the academic field 'next door'. However, this research has uncovered a myriad of factors that are specific to given disciplines that make singular best practice highly unlikely to contribute to research productivity in this context at present. In the wake of exploratory research such as this study, it is also recommended that further research actively investigate the specific causal mechanisms that underlie the influence of values dimensions associated with research productivity. If all stakeholders involved in academic research in this context can take responsibility to ensure that innovative knowledge creation occurs, then there is a greater chance that value will be added to the lives of societal stakeholders that rely on our research outputs; a virtuous circle of real knowledge creation might be created.

APPENDIX

AND

REFERENCES

8 APPENDIX

8.1 REPORTING OF FUTHER STATISTICAL RESULTS

Further statistical tests were conducted, in order to provide insight into the methodological processes applied in this study. The exact factor structure that the universe of cultural dimensions loads onto has been contested. Hofstede (2006) argues that all of the cultural values load onto five core dimensions. In contrast, Javidan *et al*. (2006) argue that these cultural values fall into nine categories, following the theory developed by the GLOBE studies (House *et al*., 2004). These two bodies of theory are, however, related, with the GLOBE theoretical framework being an extention of the Hofstede (2006) dimensions. Section 8.1.1 reports the results of testing of the factor structure of the GLOBE dimensions in the context of this study, which represents a cohort of academic professionals which differs from the context of middle managers that were used in the GLOBE research. In Section 8.1.2 the results of the factor analysis of the Schwartz values dimensions are reported. In Section 8.1.3 the results of tests of the assumptions of the multiple linear regression analysis are reported.

8.1.1 GLOBE SCALES: FACTOR ANALYSIS

The results of the factor analysis performed for the data aggregated at the level of the academic school for the GLOBE items are reported in Table A (the first model). The results of the factor analysis performed at the individual level for the GLOBE dimensions are reported in Table B (the second model). The factor analysis was applied to the nine GLOBE organisational culture dimensions using principle components analysis. The assumptions underlying exploratory factor analysis were checked for violations. Scatterplots were run in order to check compliance with the assumption of linearity. Pearson correlations were not found to reveal inter-item correlations of above .50 between the variables included in the first model (with data aggregated at the level of the School), although certain of these variables were found to be over the value of .50 for the second model (the model with the data not aggregated). Only variables with values of over .4 were taken to have loaded upon a factor in both models.

According to the results of the testing of the first model, three of the anti-image correlation matrix diagonal values were found to be over .50. The Kaiser-Meyer-Olkin (KMO) measure

of sampling adequacy value was found to be .429, which was considered to be less than the required score of .5. According to Bartlett's test of Sphericity the model returned a non-significant ($p<.101$) approximate Chi-Square value of 47.4 with 36 degrees of freedom. With less than 10 observations per variable, the model was also deemed be a weak test of the factors. A Varimax rotation was used with Kaiser Normalisation. The results of these tests were treated with caution because of the relatively weak sampling adequacy associated with the mode.

For the model run on the data that was not aggregated (the second model), all of the anti-image correlation values were found to be over .5, and in terms of the measures of sampling adequacy (MSA) tests, the Kaiser-Meyer-Olkin (KMO) value was found to be .576, and the Bartlett's test of Sphericity approximate Chi-Square value was 119.7, with 36 degrees of freedom ($p<.0001$). The ration of cases to items was 25:1. On the basis of these tests the sampling adequacy of this model was taken to be acceptable, unlike in the case of the first model. Nevertheless, certain of the variables loaded on the same factors in both models. Uncertainty Avoidance, Assertiveness, Power Distance, Performance Orientation loaded on Factor one in the second model. Whereas in the first model all of these variables also loaded on Factor 1, Institutional Collectivism was found to load instead of Power Distance. Due to the adequacy of the second model and the shortfall in adequacy associated with the first model, only the results of the second model are interpreted. Factor 1 was taken to represent an underlying commonality of a preference for bureaucracy, rules and vertical hierarchical distance associated with the prioritising of assertive, or dominant aspects of relationships together with a concern with performance. Factor 1 was therefore deemed to represent a 'hard' dimension of organisational cultural values. This factor was termed 'Hard Organisational Values'. Factor two comprised loadings of Future Orientation, Institutional Collectivism, and Humane Orientation. This factor was taken to represent an underlying commonality of a prioritisation of planning and organisation associated with loyalty to the organisation and a caring orientation. This factor was taken to represent a 'soft' dimension of organisational cultural values, and was termed 'Soft Organisational Values'. Factor 3 comprised loadings of In-Group Collectivism and Gender Egalitarianism which contrasted with Assertiveness. This factor was taken to represent an underlying commonality associated with high group cohesiveness and equitability with regard to gender equality and a rejection of assertiveness, or 'toughness'. This factor was termed 'Equality Organisational Values'. It

was acknowledged that three 'sub-cultures' might dominate in this context of academic professionals.

Table A: Factor Analysis Results GLOBE dimensions Schools

	Component			
	1	2	3	4
Uncertainty Avoidance	**.569**	**.557**	.000	-.362
Future Orientation	.179	-.108	**.881**	.213
In-Group Collectivism	.154	**.908**	-.109	.180
Assertiveness	**.682**	-.023	.366	**-.562**
Institutional Collectivism	**.882**	-.057	-.092	.008
Power Distance	-.117	**.542**	**.705**	-.287
Performance Orientation	**.867**	.180	.184	.134
Humane Orientation	.038	.108	.113	**.841**
Gender Egalitarianism	-.031	**.881**	.143	.051

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Rotation converged in 6 iterations.

Table B: Factor Analysis Results: GLOBE dimensions Individuals

	Component		
	1	2	3
Uncertainty Avoidance	**.629**	-.120	.316
Future Orientation	.216	**.521**	.156
In-Group Collectivism	.066	.125	**.686**
Assertiveness	**.634**	.159	**-.448**
Institutional Collectivism	.037	**.668**	-.121
Power Distance	**.581**	-.182	.323
Performance Orientation	**.568**	.347	-.002
Humane Orientation	-.357	**.674**	.064
Gender Egalitarianism	.104	-.023	**.634**

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 8 iterations.

According to Hofstede (2006), all cultural values load onto five factors. In contrast, Javidan *et al*. (2006) argue that the universe of cultural values load onto nine dimensions; the dimensions of the GLOBE studies. In this context, however, the underlying factor structure is found to comprise three factors. It is argued that these results support the notion that the academic cohort sampled in this study might differ from the middle manager cohorts used in the GLOBE research programmes (House *et al*., 2004). To some extent, academic staff might represent a more homogenous group than mid-level managers if selection of staff on

the basis of higher degrees and other criteria result in a similar type of person becoming an academic. If this were so then range restriction (Sackett & Yang, 2000) might be present in such a population. It is acknowledged that if academic cohorts are more homogenous than cohorts of mid-level managers, then the nine GLOBE dimensions of organisational culture might be expected to load on fewer underlying factors. The factor loadings discussed above are taken to suggest that organisational cultural values configurations may differ between professional groupings and individuals in different work contexts. The factor analysis results of the testing of the Schwartz values items are reported as follows.

8.1.2 SCHWARTZ VALUES SCALES: FACTOR ANALYSIS

According to Schwartz's (1992) theory of individual values, four categories of values are predicted to dominate the circumplex structure of individual values. The structure of these values in relation to each other was tested, using factor analysis. The factor analysis results are reported in Table C (below). According to the factor analysis results:

(i) Conservation values, which comprise Security, Conformity and Tradition values, are found to load on factor one (Schwartz, 1992). These three factors dominate factor one. These loadings support Schwartz's (1992) circumplex structure, as these three factors are found to load on the same factor, as predicted.

(ii) Self-enhancement values are associated with Hedonism, Achievement and Power values (Schwartz, 1992). Self-enhancement values dominate factor two, as Power and Achievement values load with the highest values on factor two. One of the Openness to Change values dimensions, namely Self-Direction, was found to also load on Factor two.

(iii) Factor Three: As predicted, this Factor is dominated by the two Self-Transcendence values, although two Openness to Change items, namely Self-direction and Stimulation values are also found to load, although with lower values than the Self-Transcendence items. These loadings might indicate that in this University context this professional cohort of respondents may be characterised by a convergence of Self-transcendence and Openness to Change values. According to Schwartz's (1992) proposed structures, Openness to Change values are located adjacent to each other. The factor structure confirms Schwartz's (1992) predicted structure, as Stimulation, which is the furthest away from the Self-Transcendence values, has the lowest value of the four.

Table C: Factor Analysis Results Schwartz values dimensions

	Component			
	1	2	3	4
Self-Direction	-.261	**.507**	**.534**	.117
Power	.235	**.746**	-.198	.272
Universalism	.046	-.150	**.788**	.210
Achievement	.167	**.822**	.086	.038
Security	**.614**	.253	.136	.044
Stimulation	-.067	.206	**.410**	**.704**
Conformity	**.828**	.200	-.104	-.012
Tradition	**.738**	-.143	.225	.249
Hedonism	.225	.112	-.076	**.864**
Benevolence	.317	.073	**.669**	-.103

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 7 iterations.

(iv) Factor Four: Schwartz's (1992) factor structure is further supported in this context as Hedonism and Stimulation are found to load on the same factor, reflecting Schwartz's (1992) conceptualisation that these values are adjacent to each other in structure. The only difference that is clearly noticeable is that Self-Direction (an Openness to Change dimension), in this context, loads both with the adjacent Self-Enhancement values of Achievement and Power and also with the Self-Transcendence values adjacent on the 'other side' of the structure. This might also indicate that in this context Self-Direction may transcend the differentiation between Self-enhancement and Self-transcendence, and is differentiated from the other Openness to Change dimensions of Stimulation and Hedonism, unlike the structure expected in different contexts. Notwithstanding these minor differences, Schwartz's (1992) circumplex structure of values is considered to be reasonably well replicated in this context. In a professional context where range restriction might be present (Sackett & Yang, 2000), the Schwartz values dimensions are found to be relatively robust to potential range restriction; the Schwartz value structure is found to replicate itself relatively well in this cohort of academic professionals. The tests of the assumptions of the multiple linear regression model are now reported as follows.

8.1.3 TESTS OF THE ASSUMPTIONS: MULTIPLE LINEAR REGRESSION PROCESS

In order to test the conformity of the multiple linear regression analysis with the assumptions of these tests, a comprehensive process of testing was followed. The outcome of the process

was an indication that bootstrapping was necessary. Bootstrapping was therefore applied. The processes followed, and the steps taken, that led to this conclusion are reported as follows.

In each of the seven MLR models, the models were first run without a transformation of the dependant variable, and without outliers removed. These models were run in an exploratory manner, using backward elimination. The results of the univariate analysis were used to inform the process of applying a transformation to the dependent variables. For positive and moderate skewness, the appropriate transformation is typically the square root transformation, and if the skewness is moderate and negative then the variable should be reflected and transformations applied (Tabachnik & Fidel, 2007). For more serious cases of skewness a logarithmic transformation is appropriate and for extreme cases the inverse transformation is appropriate (Tahachnik & Fidel, 2007). The Department of Higher Education accredited journal article, as a dependent variable, is used to provide an example of the process undertaken. This dependent variable is an important component of the composite variable gross research productivity, but is not a composite variable itself. This variable was considered the 'core' of the journal article publication variables because of its recognition by the South African Department of Higher Education, and because the South African university system itself largely runs these journals. Publication in a DOE journal article is taken to represent exposure to a set of 'gatekeepers' or reviewers that are located within the South African context. If this dependent variable was taken to require bootstrapping, then gross research productivity, which includes this variable as an important component, was also taken to require bootstrapping in its testing. In terms of the plot of the regression standardised residuals by frequency, the histogram reflected a relatively unskewed distribution that was not platykurtic but leptokurtic in its distribution. The Probability-Probability plot revealed a slight curvilinear deviation from the line. In terms of the univariate analysis of skewness, all seven of the dependent variables were found to have significant Kolmogorov-Smirnov and Shapiro-Wilk test scores for skewness. All of the research productivity measures were positively skewed, and following the prescriptions of Tabachnik & Fidel (2007) all these measures, as dependent variables, were first transformed using inverse transformations. Because certain values of the argument were zero, the standard adjustment of +1 was added to the values (Tabachnik & Fidel, 2007). The inverse formula was used: $1/(x+1)$. After transformation of the dependent variables using the inverse function the histogram distributions improved in their resemblance to normality and the Probability-Probability plots were more closely aligned to the diagonal. With a significant improvement, this

transformation was taken to be appropriate. DOE self-efficacy, membership of professional associations, masters supervision and South African origin are found to be significantly and positively associated with DOE journal article publication in the model. The Mr./Ms. designation and a preference for quantitative methods were all found to be negatively associated with DOE journal article publication. The model statistics revealed an improvement in the adjusted R squared value to .262. In addition, outliers and influential points were removed due to their potential to influence the model. Cases were therefore identified according to the following criteria and removed: (i) standardised (ZRE) and studentised (SRE) residuals with an absolute value of greater than plus or minus two; (ii) cases exceeding the absolute cut-off value of DFFITS (DFF) tests, according to the formula $2\sqrt{[p/n]}$ where p represents the number of variables in the equation, intercept included; (iii) cases identified as falling outside the acceptable range of leverage values (LEV), defined as being between 1/n and 2p/n in value; (iv) cases reasonably far from the value of one according to tests of the covariance ratio (COV); (v) cases exceeding the Mahalanobis (MAH) distance cut-offs; (vi) cases exceeding the Cook's distance cut-off values (COO); cases exceeding the limits of the DFBETA values, which reflect the change in absolute value in the estimated coefficient due to the deletion of a variable, differing from the Cook's distance which tests the influence of a deleted case on all predicted variables.

According to these tests, the following cases were identified as having standardised residuals larger than |2|: 90; 142; 148. These values were also outliers according to the studentised residuals. The cut-off value for the DFFITS tests was estimated to be $2\sqrt{[p/n]} = 2\sqrt{[7/225]} = |.352|$. None of the cases were found to exceed this absolute value. According to the leverage tests of the distance of values of the independent variables in relation to each other, values outside of the range of between $1/n=1/225=0.004$ and $2p/n=0.062$ were identified for exclusion. According to this exclusion threshold, the following cases were identified as potentially problematic: 68; 75; 88; 90; 96; 104; 169; and 177. Cases that different reasonably from the value of one were identified for removal. Case 96 was found to differ from this value, with a value of 2.65, whereas the other cases did not deviate more than slightly from this value. According to the tests of Mahalanobis distance, according to the table of Chi-squared statistics with seven degrees of freedom, and points requiring a significance level of $p<.05$, values of over 14.07 were taken to represent outliers. According to this criterion, cases 68; 75; 88; 90; 96; 104; and 169 were identified for removal. According to the Cook's distance cut-off criterion of 4/n, or 0.018, values greater than this were identified for removal. Cases 68; 90; 96; 148; and 169 were taken to be potentially

problematic. Case number 96 was found to have a value of .614 and was identified as the largest of these values. DFBETA values of over one were identified for removal, and also those that exceeded a value of $2/\sqrt{n}=2/15=0.133$. These values were checked for all of the coefficients and also for the intercept. No values were found to exceed this value. Case 44 was also removed due to incomplete data. With these eleven cases removed, the model was run again, with the inverse transformed dependent variable and with the outliers removed. The adjusted r squared value was found to have increased to .310 and the r squared value to .340.

After the inverse transformation of the dependent variable, yet before the removal of these cases, DOE self-efficacy, membership of professional associations, masters supervision and South African origin were found to be significantly and positively associated and the Mr./Ms. designation and a preference for quantitative methods over qualitative methods were found to be negatively associated with DOE journal article publication. After the removal of these cases, the Associate Professor designation item was found to be an additional variable included in the model that was positively associated with the outcome variable. Positive Affectivity and a home language of English were found to be additional variables in the model that negatively predicted DOE journal article publication. In order to verify the relationships identified as significant within this model, the model was run again for each half of the sample. The even numbered cases were removed from a copy of the sample and the odd numbers removed from the other. This provided a test of the extent to which overfitting was present in the statistical backward elimination process. Following the prescriptions of Tabachnik and Fidel (2007) predictors not found to be common to both of these split-half models were not considered for interpretation. The first split half sample tested (n=108) attained an adjusted r squared value of .263 for the final model, which included DOE publication Self-efficacy and Master degrees supervised as positive predictors and with the Mr./Ms. designation and English as a home language as negative predictors of the dependent variable. The model tested using the second split half sample revealed DOE Self-efficacy, the Associate Professor and Professor designations as positive predictors of DOE publication, and Positive Affectivity and a preference for quantitative analysis as negative predictors of DOE publication. The differences between the significant predictors of these split-half samples were taken to suggest evidence of overfitting as a result of the statistical backward elimination process. This indicated that bootstrapping would be necessary in order to address these problems (Tabachnik & Fidel, 2007). According to the evidence provided by the

Shapiro-Wilk and Kolgomorov-Smirnov tests, after the inverse transformation, normality was not attained. This also provided further evidence that bootstrapping would be needed. The model was re-run, with all the variables included, using the bootstrapping functionality of SPSS version 19. In each instance, the bootstrapped significance levels of the coefficients were found to differ markedly from the results without the bootstrapped application. This was taken to be further evidence of the need for bootstrapping in the analysis of the data.

With bootstrapping applied, none of the variables in this particular model were found to be significantly associated with DOE article publication. This was expected, because with too many irrelevant variables included in the model the 'true' associations between a minority of the variabels and the dependent variable can be undetectable (Field, 2009). A stepwise process was followed manually, where the variables were entered and the variable with the lowest significance was removed and the model re-run each time until only variables significant at the ten percent level of significance were left in the equation. Only variables significant at within the five percent level of significance, however, were interpreted and discussed. Bootstrapping was applied at each step. This process was taken to be acceptable because all of the variables included in the analysis had been justified for inclusion in the analysis on the basis of theory (Field, 2009). In the following sections these are termed 'justified variables'. These variables were the set of predictor, or independent, variables that were included (selected from all the independent variables) because they did not reflect the influence of singularity or multicollinearity. As such, this was taken to be the 'best possible' model that could be used with multiple linear regression analysis. This was the process followed for the analysis of all the other multiple linear regression models.

8.2 RESULTS: TABLES

The following are tables that report the results of statistical analyses. Each table is labeled according to the specific hypothesis being tested, and each table is referred to by this table number in the main body of the thesis.

Table C.1.1. The Multiple Linear Regression Model with all tested variables included for Gross Productivity as dependent variable: Bootstrap for Coefficients

Model	B	Bootstrap[a]				
					95% Confidence Interval	
		Bias	Std. Error	Sig. (2-tailed)	Lower	Upper
(Constant)	-60.850	1.835	28.557	.043	-115.083	-6.374
Job Satisfaction	-.788	-.035	.562	.175	-2.000	.237
Self-Efficacy Research	.102	-.003	.023	.001	.058	.146
Negative Affectivity	.311	.006	.337	.359	-.345	.980
Positve Affectivity	.031	-.025	.390	.934	-.824	.687
Locus of Control	.253	.000	.246	.337	-.199	.754
Gender 1=male	13.233	-.625	4.745	.016	3.202	22.301
Other countries lived in >1 year	-1.641	.126	1.518	.283	-4.710	1.427
Full-time work experience	1.140	-.001	.319	.003	.544	1.799
Professional Associations	2.932	.004	3.535	.402	-4.342	9.798
People reporting	.283	-.007	.409	.443	-.483	1.084
Masters Supervised	.150	.018	.330	.640	-.415	.916
PreferenceQuant=1	2.012	1.668	4.535	.485	-1.638	15.622
RSA=1	-3.720	.343	4.810	.437	-13.150	6.132
English=1	6.391	-.322	4.875	.194	-3.193	15.806

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table C.1.2. MLR with all tested variabels included: Gross Productivity as dependent variable: Collinearity Statistics

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-60.850	21.831		-2.787	.006		
Job Satisfaction	-.788	.610	-.089	-1.293	.198	.663	1.509
Self-Efficacy Research	.102	.022	.304	4.576	.000	.711	1.406
Negative Affectivity	.311	.358	.058	.868	.386	.709	1.411
Positive Affectivity	.031	.340	.006	.091	.927	.733	1.364
Locus of Control	.253	.211	.075	1.195	.233	.795	1.259
Gender 1=male	13.233	4.313	.185	3.068	.002	.859	1.164
Other countries lived in > 1 year	-1.641	1.682	-.067	-.976	.330	.669	1.496
Full-time work experience	1.140	.214	.341	5.328	.000	.762	1.312
Professional Associations	2.932	5.454	.032	.538	.591	.863	1.158
People reporting	.283	.340	.051	.833	.406	.832	1.202
Masters Supervised	.150	.257	.040	.582	.561	.664	1.507
PreferenceQuant=1	2.012	2.913	.041	.691	.491	.904	1.106
RSA=1	-3.720	4.852	-.052	-.767	.444	.688	1.454
English=1	6.391	4.341	.090	1.472	.143	.847	1.181

Table C.1.3. The Multiple Linear Regression Final Backward Elimination Model for Gross Productivity as dependent variable: Bootstrap for Coefficients

Model	B	Bootstrap[a]				
					95% Confidence Interval	
		Bias	Std. Error	Sig. (2-tailed)	Lower	Upper
(Constant)	-47.426	.191	9.198	.001	-66.966	-29.629
Self-Efficacy Research	.107	-2.153E-5	.020	.001	.070	.150
Gender 1=male	10.923	-.038	4.034	.005	3.287	18.672
Full-time work experience	1.285	-.016	.265	.001	.762	1.774

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table C.1.4. Bootstrapped Coefficients for model with DOE publication as dependent variable

Full Model: all final variables included	B	Bootstrap (with 1000 iterations)				
		Bias	Std. Error	Sig. (2-tailed)	95% Confidence Interval	
					Lower	Upper
(Constant)	-.926	-.716	7.170	.901	-16.903	10.875
Job Satisfaction	-.092	.002	.182	.624	-.440	.287
Self-Efficacy DOE Publications	.052	-6.214E-6	.035	.168	-.020	.121
Negative Affectivity	-.074	.007	.096	.444	-.265	.123
Positive Affectivity	-.048	.008	.114	.671	-.243	.217
Locus of Control	-.008	.004	.050	.879	-.090	.103
Gender 1=male	1.736	-.079	1.736	.342	-1.383	5.268
Other countries lived in > a year	.027	.003	.413	.946	-.862	.798
Full-time work experience	.245	.002	.158	.171	.020	.574
Professional Associations	1.323	-.137	1.052	.230	-.955	3.140
People reporting	-.023	.009	.129	.854	-.238	.259
Masters Supervised	.003	-.002	.103	.965	-.211	.193
Dependent Children	.194	.008	.600	.785	-.997	1.311
Preference Quantitative=1	.281	.186	1.057	.659	-1.142	3.066
RSA=1	.428	-.079	1.434	.769	-2.544	3.021
English home language=1	.793	.073	1.361	.586	-1.528	3.706

Table C.1.5. Model with DOE publication as dependent variable: Coefficients and Collinearity Statistics

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-.926	7.153		-.129	.897		
Job Satisfaction	-.092	.205	-.036	-.451	.652	.650	1.538
Self Efficacy DOE Publications	.052	.029	.128	1.780	.077	.813	1.230
Negative Affectivity	-.074	.117	-.049	-.631	.529	.712	1.405
Positive Affectivity	-.048	.110	-.033	-.438	.662	.758	1.319
Locus of Control	-.008	.070	-.009	-.119	.906	.799	1.251
Gender 1=male	1.736	1.405	.086	1.236	.218	.879	1.138
Other countries lived in >1 year	.027	.556	.004	.048	.961	.660	1.516
Full-time work experience	.245	.071	.258	3.431	.001	.744	1.344
Professional Associations	1.323	1.783	.052	.742	.459	.873	1.146
People reporting	-.023	.112	-.015	-.205	.838	.827	1.210
Masters Supervised	.003	.084	.002	.031	.975	.668	1.497
Dependent Children	.194	.551	.024	.352	.725	.871	1.149
PreferenceQuantitative methods=1	.281	.946	.020	.297	.767	.927	1.078
RSA=1	.428	1.606	.021	.267	.790	.682	1.467
English=1	.793	1.455	.039	.545	.586	.817	1.223

a. Dependent Variable: Accredited DOE Journals

Table C.1.6. Backward Elimination model run manually with Bootstrapped stepwise process with DOE publication as Dependent Variable

Model	B	Bootstrap[a]				
					95% Confidence Interval	
		Bias	Std. Error	Sig. (2-tailed)	Lower	Upper
(Constant)	-4.171	-.007	2.764	.151	-10.120	1.142
Self-Efficacy DOE Publication	.061	.000	.027	.044	.006	.112
Full-time work experience	.266	-.001	.120	.041	.078	.537

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table C.1.7. The Multiple Linear Regression Model for ISI/IBSS accredited journal article publication as dependent variable with all final variables included

Model	B	Bootstrap[a]				
					95% Confidence Interval	
		Bias	Std. Error	Sig. (2-tailed)	Lower	Upper
1 (Constant)	-11.924	.146	11.520	.299	-33.707	10.837
Job Satisfaction	-.383	.002	.237	.102	-.873	.046
Self-Efficacy ISI/IBSS publish	.180	.004	.040	.001	.108	.270
Negative Affectivity	.038	.012	.151	.777	-.231	.359
Positive Affectivity	-.022	-.022	.142	.875	-.383	.183
Locus of Control	.041	8.037E-5	.092	.645	-.135	.229
Gender 1=male	5.937	-.407	2.064	.012	1.575	9.581
Other countries lived in>1 year	-.649	-.008	.680	.340	-2.019	.640
Full-time work experience	.530	-.002	.144	.001	.273	.819
Professional Associations	1.689	-.051	1.793	.343	-1.914	4.875
People reporting	.061	-.025	.169	.705	-.340	.337
Masters Supervised	-.140	.013	.131	.289	-.371	.143
Dependent Children	-1.509	.046	.803	.063	-3.265	.000
PreferenceQuant=1	1.065	1.220	2.604	.542	-.626	8.226
English=1	1.778	-.108	1.998	.387	-2.354	5.407
RSA=1	-1.470	-.059	2.073	.476	-5.688	2.495

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table C.1.8. The Multiple Linear Regression Model (full model) for ISI/IBSS accredited journal article publication as dependent variable: Standardised Coefficients and Collinearity Statistics

Model	Unstandardised Coefficients		Standardised Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-11.924	9.144		-1.304	.194		
Job Satisfaction	-.383	.264	-.104	-1.452	.148	.648	1.543
Self-Efficacy ISI/IBSS publish	.180	.039	.308	4.661	.000	.757	1.321
Negative Affectivity	.038	.151	.017	.251	.802	.710	1.409
Positive Affectivity	-.022	.143	-.010	-.155	.877	.741	1.350
Locus of Control	.041	.091	.029	.451	.652	.786	1.272
Gender 1=male	5.937	1.822	.201	3.258	.001	.865	1.156
Other countries lived in>1 year	-.649	.723	-.064	-.898	.370	.647	1.545
Full-time work experience	.530	.092	.385	5.762	.000	.741	1.350
Professional Associations	1.689	2.281	.045	.741	.460	.884	1.132
People reporting	.061	.144	.027	.425	.671	.826	1.211
Masters Supervised	-.140	.108	-.091	-1.294	.197	.671	1.490
Dependent Children	-1.509	.713	-.131	-2.118	.035	.863	1.159
PreferenceQuant=1	1.065	1.225	.052	.869	.386	.916	1.092
English=1	1.778	1.867	.060	.952	.342	.822	1.216
RSA=1	-1.470	2.067	-.050	-.711	.478	.681	1.468

Table C.1.9. The Multiple Linear Regression Model for ISI/IBSS accredited journal article publication as dependent variable: Final Backward Elimination Model: Bootstrap for Coefficients

Model	B	Bootstrap[a]				
		Bias	Std. Error	Sig. (2-tailed)	95% Confidence Interval	
					Lower	Upper
(Constant)	-13.161	-.073	2.807	.001	-19.351	-7.789
Self-Efficacy ISI/IBSS publish	.167	.001	.033	.001	.106	.234
Gender 1=male	5.566	-.198	1.798	.009	2.045	9.098
Full-time work experience	.524	-.003	.123	.001	.300	.778
Dependent Children	-1.724	.073	.702	.025	-3.109	-.345

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table C.1.10. The Multiple Linear Regression Model for Conference Proceedings publication as dependent variable all variables included: Bootstrap for Coefficients

Model	B	Bootstrap[a]				
		Bias	Std. Error	Sig. (2-tailed)	95% Confidence Interval	
					Lower	Upper
(Constant)	-4.728	.230	4.693	.336	-13.538	4.463
Job Satisfaction	-.053	-.003	.120	.673	-.288	.182
Negative Affectivity	-.011	-.001	.083	.904	-.169	.158
Positive Affectivity	-.008	-.007	.063	.904	-.146	.107
Locus of Control	.037	.001	.049	.481	-.055	.136
Gender 1=male	2.378	-.143	.784	.009	.794	3.917
Other countries lived in>1year	.308	-.004	.338	.347	-.361	1.058
Full-time work experience	.128	-.002	.038	.005	.053	.203
Professional Associations	.541	-.010	.725	.457	-.995	1.913
People reporting	-.074	-.002	.069	.223	-.215	.068
Masters Supervised	.087	.001	.055	.111	-.009	.208
Dependent Children	.292	.010	.352	.430	-.350	1.013
PreferenceQuant=1	.878	.438	.986	.212	.202	3.707
RSA=1	-1.137	.000	.927	.215	-3.136	.600
English=1	.390	-.034	.789	.643	-1.085	1.949
Self-Efficacy Proceedings	.033	-.001	.015	.033	.002	.061

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table C.1.11. The Multiple Linear Regression Model for Conference Proceedings publication as dependent variable: all variables included: Standardised Coefficients and Collinearity Statistics

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-4.728	3.981		-1.188	.236		
Job Satisfaction	-.053	.113	-.035	-.464	.643	.650	1.539
Negative Affectivity	-.011	.065	-.012	-.162	.871	.712	1.404
Positive Affectivity	-.008	.061	-.009	-.134	.893	.750	1.333
Locus of Control	.037	.039	.064	.947	.345	.801	1.248
Gender 1=male	2.378	.779	.196	3.053	.003	.875	1.143
Other countries lived >1 year	.308	.308	.074	1.000	.318	.661	1.512
Full-time work experience	.128	.039	.226	3.241	.001	.744	1.344
Professional Associations	.541	.986	.035	.549	.584	.874	1.144
People reporting	-.074	.062	-.079	-1.200	.232	.827	1.210
Masters Supervised	.087	.046	.137	1.869	.063	.674	1.483
Dependent Children	.292	.305	.062	.957	.340	.870	1.149
PreferenceQuant=1	.878	.528	.105	1.662	.098	.910	1.099
RSA=1	-1.137	.889	-.093	-1.279	.202	.681	1.467
English=1	.390	.807	.032	.484	.629	.814	1.228
Self-Efficacy Proceedings	.033	.017	.129	1.947	.053	.820	1.219

Table C.1.12. The Multiple Linear Regression Model for Conference Proceedings publication as dependent variable final backward elimination model: Bootstrap for Coefficients

Model	B	Bootstrap[a]				
					95% Confidence Interval	
		Bias	Std. Error	Sig. (2-tailed)	Lower	Upper
(Constant)	-2.360	.016	1.307	.071	-4.994	.069
Self-Efficacy proceedings	.043	-6.437E-5	.013	.004	.018	.070
Gender 1=male	2.416	-.002	.743	.004	1.030	3.928
Full-time work experience	.167	.000	.040	.001	.092	.253
RSA=1	-1.908	-.026	.750	.015	-3.447	-.506

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table C.1.13. The Multiple Linear Regression Model for Conference Presentations as dependent variable: all variables included: Bootstrap for Coefficients

Model	B	Bootstrap[a]				
		Bias	Std. Error	Sig. (2-tailed)	95% Confidence Interval	
					Lower	Upper
(Constant)	-33.517	.926	18.518	.101	-69.576	4.070
Job Satisfaction	-.440	.010	.275	.133	-1.024	.078
Self-Efficacy Presentations	.132	6.907E-005	.038	.004	.056	.213
Negative Affectivity	.212	-.008	.209	.359	-.159	.635
Positive Affectivity	.329	-.045	.270	.263	-.240	.754
Locus of Control	.157	.004	.166	.359	-.145	.527
Gender 1=male	7.406	-.336	2.605	.037	2.303	12.292
Other countries lived in >1 year	-.702	.044	.735	.358	-2.202	.725
Full-time work experience	.374	.004	.120	.007	.169	.633
Professional Associations	1.377	.041	1.912	.485	-2.109	5.246
People reporting	.102	-.021	.184	.582	-.317	.434
Masters Supervised	.300	.008	.162	.080	.012	.659
Dependent Children	-1.290	-.016	.800	.126	-3.125	.057
PreferenceQuant=1	1.464	.800	2.241	.372	-.439	7.948
RSA=1	-1.689	.404	2.212	.465	-5.660	3.156
English=1	2.571	-.232	2.473	.312	-2.238	7.473

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table C.1.14. The Multiple Linear Regression Model for Conference Presentations as dependent variable with all variables included: Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-33.517	10.905		-3.074	.002		
Job Satisfaction	-.440	.307	-.105	-1.432	.154	.650	1.538
Self-Efficacy Presentations	.132	.051	.169	2.564	.011	.807	1.239
Negative Affectivity	.212	.177	.084	1.200	.232	.710	1.408
Positive Affectivity	.329	.167	.135	1.973	.050	.743	1.346
Locus of Control	.157	.105	.099	1.501	.135	.800	1.250
Gender 1=male	7.406	2.096	.221	3.533	.001	.891	1.122
Other countries lived > 1 year	-.702	.835	-.061	-.841	.402	.661	1.513
Full-time work experience	.374	.107	.239	3.488	.001	.744	1.344
Professional Associations	1.377	2.713	.032	.508	.612	.852	1.174
People reporting	.102	.168	.039	.605	.546	.827	1.210
Masters Supervised	.300	.125	.172	2.396	.017	.680	1.471
Dependent Children	-1.290	.831	-.099	-1.551	.122	.864	1.157
PreferenceQuant=1	1.464	1.435	.063	1.021	.309	.910	1.099
RSA=1	-1.689	2.415	-.050	-.699	.485	.680	1.470
English=1	2.571	2.191	.077	1.173	.242	.813	1.230

Table C.1.15. The Multiple Linear Regression Model for Conference Presentations as dependent variable final backward elimination model: Bootstrap for Coefficients

Model	B	Bootstrap[a]				
		Bias	Std. Error	Sig. (2-tailed)	95% Confidence Interval	
					Lower	Upper
(Constant)	-15.305	-.223	4.027	.002	-24.288	-8.556
Self-Efficacy presentations	.170	.002	.038	.001	.104	.252
Gender 1=male	6.334	-.035	2.005	.016	2.696	10.587
Full-time work experience	.374	.008	.122	.007	.163	.658
Masters Supervised	.302	-.004	.141	.045	.033	.584

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table C.1.16. The Multiple Linear Regression Model for Book Publication as dependent variable: all variables included: Bootstrap for Coefficients

Model	B	Bootstrap[a]				
		Bias	Std. Error	Sig. (2-tailed)	95% Confidence Interval	
					Lower	Upper
(Constant)	-.994	.047	2.897	.801	-8.336	3.241
Job Satisfaction	.131	-.003	.105	.432	-.008	.397
Self-Efficacy Research	.005	2.812E-005	.006	.478	-.002	.019
Negative Affectivity	.072	-.006	.091	.516	-.044	.277
Positive Affectivity	-.108	.006	.086	.407	-.312	.000
Locus of Control	.026	-.002	.032	.527	-.015	.107
Gender 1=male	-.845	.094	.808	.451	-2.770	.280
Other countries lived in >1 year	-.036	.007	.177	.859	-.474	.279
Full-time work experience	.114	-.004	.090	.411	-.004	.323
Professional Associations	-2.794	.123	2.797	.471	-8.910	.472
People reporting	.155	.018	.172	.460	-.004	.612
Masters Supervised	-.103	.001	.111	.474	-.354	.035
Dependent Children	.156	-.027	.247	.621	-.239	.719
PreferenceQuant=1	-.645	-.211	.840	.407	-3.198	-.007
RSA=1	-.635	.019	.535	.362	-1.802	.459
English=1	1.143	-.042	.652	.367	.226	2.738

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table C.1.17. The Multiple Linear Regression Model for Book Publication as dependent variable: all variables included: Standardised Coefficients and Collinearity Statistics

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-.994	4.991		-.199	.842		
Job Satisfaction	.131	.141	.076	.927	.355	.650	1.538
Self-Efficacy Research	.005	.005	.082	1.046	.297	.710	1.409
Negative Affectivity	.072	.081	.070	.880	.380	.703	1.422
Positive Affectivity	-.108	.077	-.109	-1.392	.165	.725	1.380
Locus of Control	.026	.048	.041	.546	.586	.800	1.250
Gender 1=male	-.845	.981	-.062	-.862	.390	.856	1.169
Other countries lived in >1 year	-.036	.384	-.008	-.094	.925	.658	1.521
Full-time work experience	.114	.049	.179	2.320	.021	.742	1.348
Professional Associations	-2.794	1.236	-.162	-2.260	.025	.861	1.161
People reporting	.155	.077	.147	2.013	.045	.827	1.209
Masters Supervised	-.103	.058	-.145	-1.772	.078	.659	1.518
Dependent Children	.156	.380	.029	.410	.682	.869	1.150
PreferenceQuant=1	-.645	.661	-.068	-.975	.331	.901	1.110
RSA=1	-.635	1.106	-.046	-.574	.567	.682	1.467
English=1	1.143	1.002	.084	1.141	.255	.818	1.223

Table C.1.18. The Multiple Linear Regression Model for Book Chapter Publication as dependent variable model with all variables included:Bootstrap for Coefficients

Model	B	Bootstrap[a]				
		Bias	Std. Error	Sig. (2-tailed)	95% Confidence Interval	
					Lower	Upper
(Constant)	-1.830	-.100	1.806	.319	-5.652	1.440
Job Satisfaction	.032	-.002	.057	.602	-.067	.154
Self-Efficacy Research	.002	.000	.002	.147	-.001	.006
Negative Affectivity	.007	-.003	.029	.817	-.052	.057
Positive Affectivity	-.027	.006	.021	.211	-.064	.021
Locus of Control	.024	-.001	.015	.124	-.006	.053
Gender 1=male	.325	.029	.470	.511	-.490	1.350
Other countries lived in >1 year	-.052	.010	.166	.783	-.392	.278
Full-time work experience	.012	.001	.020	.589	-.026	.054
Professional Associations	.534	-.006	.285	.085	-.039	1.079
People reporting	.087	-.002	.074	.238	-.050	.248
Masters Supervised	.109	.001	.053	.045	.030	.232
Dependent Children	-.109	-.004	.166	.519	-.420	.238
PreferenceQuant=1	-.135	-.188	.471	.643	-1.487	.211
RSA=1	-.912	.048	.511	.107	-1.877	.059
English=1	.630	-.023	.373	.136	-.086	1.345

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table C.1.19. The Multiple Linear Regression Model for Book Chapter Publication as dependent variable model with all variables included: Standardised Coefficients and Collinearity Statistics

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-1.830	2.116		-.865	.388		
Job Satisfaction	.032	.060	.039	.536	.592	.650	1.538
Self-Efficacy Research	.002	.002	.080	1.143	.254	.710	1.409
Negative Affectivity	.007	.034	.014	.205	.838	.703	1.422
Positive Affectivity	-.027	.033	-.057	-.830	.408	.725	1.380
Locus of Control	.024	.020	.078	1.191	.235	.800	1.250
Gender 1=male	.325	.416	.050	.783	.435	.856	1.169
Other countries lived in >1 year	-.052	.163	-.023	-.317	.752	.658	1.521
Full-time work experience	.012	.021	.039	.574	.567	.742	1.348
Professional Associations	.534	.524	.064	1.019	.310	.861	1.161
People reporting	.087	.033	.171	2.655	.009	.827	1.209
Masters Supervised	.109	.025	.317	4.390	.000	.659	1.518
Dependent Children	-.109	.161	-.043	-.679	.498	.869	1.150
PreferenceQuant=1	-.135	.280	-.030	-.482	.630	.901	1.110
RSA=1	-.912	.469	-.138	-1.945	.053	.682	1.467
English=1	.630	.425	.096	1.484	.139	.818	1.223

Table C.1.20. The Multiple Linear Regression Model for Book Chapter Publication as dependent variable model final backward elimination model: Bootstrap for Coefficients

Model	B	Bootstrap[a]				
					95% Confidence Interval	
		Bias	Std. Error	Sig. (2-tailed)	Lower	Upper
(Constant)	-1.612	.036	.961	.112	-3.487	.377
Locus of Control	.029	-.001	.013	.029	.002	.054
Professional Associations	.727	-.008	.267	.010	.217	1.244
Masters Supervised	.138	.003	.051	.015	.052	.245
RSA=1	-.895	-.003	.405	.049	-1.739	-.132
English=1	.696	-.003	.347	.064	.038	1.395

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

8.3 QUALITATIVE CODES

The lists of codes used in the process are reported in Tables D, E, F and G, below.

Table D. Research Productivity Qualitative Codes: Organisational Culture Codes

GENERAL CODE	ASPECT	SPECIFIC CODE	PROPOSITION
Organisational Culture (OC)	Publish or Perish	OCPP	Proposition A
OC	Constraints to Innovation	OCINNOV	A
OC	Publish or Perish as antithetical to knowledge creation	OCPKC	A
OC	Bureaucracy as a constraint to research productivity	OCB	A
OC	Organisational systems of support for research	OCSUP	A
OC	Protecting researchers from administration	OCPR	A
OC	Cultural influence of practitioner field	OCPROF	A
OC	Differences in quality of research	OCDIFFQ	A
OC	Recommendations	OCREC	A
OC	Financial resources constraints	OCFINR	A
OC	Autonomy cultural resistance	OCRESIST	A
OC	Transmission of organisational culture	OCTRA	A
OC	Avoidance of teaching- disintermediation from activities	OCAV	A
OC	Qualitative versus Quantitative methodology	OCQ	A
OC	Differences between fields	OCDIFF	A
OC	Transmission of culture via hierarchy	OCHIER	A
OC	Individualism versus Collectivism	OCIVC	A
OC	Elitism	OCE	A
OC	Academic Holding	OCAH	A
OC	Conformity	OCCON	A
OC	Research versus Teaching	OCRVT	A
OC	Uncertainty Avoidance	OCUA	A
OC	In-Group Collectivism	OCIGC	A
OC	Collectivism	OCCOLL	A
OC	Power Distance	OCPD	A
OC	Performance Orientation	OCPO	A

Table E. Research Productivity Qualitative Codes: Values Codes

GENERAL CODE	ASPECT	SPECIFIC CODE	PROPOSITION
Values Code (V)	Selfishness	VSE	Proposition B
V	Altruism	VALT	B
V	Universalism values; a broad concern for others, the environment etc.	VUNI	B
V	Benevolence values; a concern for the welfare of people that one is in daily contact with	VBEN	B
V	Self-Direction values	VSD	B
V	Acheivement values	VACH	B
V	Hedonism values	VHED	B
V	Power values	VPOW	B
V	Self-Enhancement values	VSEEN	B
V	Openness to Change values	VOPEN	B
V	Self-Transcendence values	STRANS	B
V	Values Transmission to others	VTRA	B
V	Values Trust	VTR	B
V	Transmission influence of values on research productivity	VVRP	B

Table F. Research Productivity Qualitative Codes: Individual-level Codes

GENERAL CODE	ASPECT	SPECIFIC CODE	PROPOSITION
Research Productivty (RP)			
RP	Motivation	RPMOT	A; B; C.12.
RP	Satisfaction	RPSAT	B. C.1.
RP	Research Satisfied; someone who derives their primary job satisfaction from research	RPRSAT	B. C.13.
RP	Teaching Satisfied; someone who derives their primary satisfaction from teaching	RPRSAT	C.13.
RP	Research Satisfied & Teaching Satisfied hybrid; someone who is derives their primary job satisfaction from both teaching and resarch	RPHYB	C.13.
RP	Ambition and its relationship to research productivity	RPAMBIT	B
RP	Management effects on rsearch productivity	RPMAN	C.9.
RP	Passion	RPPAS	A; b
RP	Hard work/Conscientiousness	RPHWK	B
RP	Endurance	RPEND	
RP	Self-Drive	RPDRV	A; B;
RP	Research Incentives	RPINC	A
RP	Excuse Discourse	RPED	A
RP	Research versus teaching	RPRVT	C.4. C.13.
RP	Change over time	RPCH	A;
RP	Bureaucracy as a constraint to research	RPBU	A;
RP	Recommendations	RPREC	A;
RP	Influence of professional or practitioner field	RPPROF	A;
RP	Collaborations/group effects	RPCOL	A; B; C.10.
RP	Constraint to innovation	RPINNOV	A;
RP	Multidisciplinary benefits	RPMULT	B
RP	Time constraints to research productivity	RPTIM	C.4. C.5.C.9.
RP	Institutional support services	RPSUP	A

Table G. Research Productivity Qualitative Codes: Individual-Level Codes (Continued)

GENERAL CODE	ASPECT	SPECIFIC CODE	PROPOSITION
Research Productivity (RP)	Self-Efficacy	RPSEF	A; C.2.
RP	Fund raising	RPFUND	B
RP	Self Publicity	RPPUB	B
RP	Reputation	RPPEER	B
RP	Quantitative versus qualitative	RPQVQ	C.11.
RP	Disposition	RPDIS	C.3.
RP	Specialist knowledge	RPSPEC	B
RP	Virtuous Circle	RPVC	C.2.
RP	Change over time	RPCH	C.7.
RP	Affectivity	RPAFF	C.3.
RP	Experience of the international context	RPINTER	C.6.
RP	Formal education	RPED	C.7.
RP	Supervision	RPSUPERV	C.14.
RP	Time Effects	RPTIM	A; C.4.
RP	Family Spill-overs	RPFAM	C.4.
RP	Autonomy	RPAUT	A

8.4 QUALITATIVE RESEARCH INTERVIEW QUESTIONS

Please note: *if necessary, please use your own perception of terms used*, and provide your *own definitions* of terms according to your perceptions of each term used. Please allocate the time that you see fit.

THE QUESTIONS START HERE

1. According to your perception, what factors (in order of importance) cause higher levels of research productivity and what factors constrain levels of research productivity:(i) at the individual level and (ii) at the organisational level?

2. "In your academic area, what are the most important measures of research productivity and how do they differ from those used in other academic fields?

3.
    a. "In your experience of being a researcher, what are the important differences between different academic fields in terms of organisational culture (if any)?"

    b. "If so, according to your perceptions, what could be the causes of such differences and how might such differences influence organisational-level research productivity?

4. "In your experience of being a researcher, what are the differences in the values of an individual that might influence individual research productivity and how is research productivity influenced by these underlying values of a researcher?

5. "According to your experience of being a researcher, what factors might influence a researcher's values over time?"
6. "In your experience, what factors are required for journal article acceptance in your field?

8.5 THE QUANTITATIVE QUESTIONNAIRE AND DOCUMENTS

8.5.1 THE CONSENT FORMS

8.5.1.1 The consent form for participation

Consent Form

I, on this date……, state that I voluntarily choose to participate in this study. I understand that participation is my choice. I do so knowing that my identity will be protected, and my name is not to be part of the information I give. I understand that this form will be kept separate from the information collected.

Respondent's signature……

Researcher's signature…….

8.5.1.2 The consent form for audio recording

Consent Form for Audio Recording

I, on this date……, state that I voluntarily choose to participate in this study. I understand that participation is my choice. I do so knowing that my identity will be protected, and my name is not to be part of the information I give. I understand that this form will be kept separate from the information collected.

I hereby consent to the recording of this interview.

Respondent's signature……

Researcher's signature…….

8.5.2 THE COVER LETTER

University of the Witwatersrand

School of Economic and Business Sciences

Dear Colleague,

I am currently registered for the degree of Doctor of Philosophy, which I am completing by thesis in the Division of Human Resource Management and Management, School of Economic and Business Sciences.

I would like to invite you to take part in this research. My study is investigating the relationship between values and research productivity in the context of a South African university. The proposed research will include interviews with respondents and also survey research. The survey research will entail the distribution of questionnaires to certain the population of researchers employed by the University of the Witwatersrand.

The research will attempt to contribute to an improved understanding of some of the challenges faced by South African academic researchers in relation to research productivity.

The study is for academic publication purposes only. The results of the study will be reported in my thesis, which will be published by the University of the Witwatersrand. Confidentiality is ensured at all times, and details that might specifically identify an individual are not required at any stage. The questionnaires will be stored in my office for further data analysis and will thereafter be destroyed after a period of five years. I undertake to conduct myself and my research in a manner that reflects the professional ethics of the university.

Any queries regarding the questionnaire or any other aspect of the study can be directed to myself or to my supervisor, Professor David Coldwell, on the email addresses or telephone numbers listed below.

Yours sincerely,



C. W. Callaghan

Chris Callaghan
Chris.Callaghan@wits.ac.za

011 7178066
072 222 2190

Professor David Coldwell
David.Coldwell@wits.ac.za

011 717 8077

8.5.3 THE QUESTIONNAIRE

If using internal mail: please return to: '**The Research Productivity Project' c/o Molefe Rampa, 197 New Commerce Building, West Campus, University of the Witwatersrand**. An addressed envelope should accompany this survey instrument.

PLEASE NOTE THAT YOUR CONTRIBUTION IS IMPORTANT. The knowledge gained will increase understanding of research productivity. It will also guide the development of programmes designed to help people to manage the research process with which they have to cope.

THE INSTRUMENT

Introduction

The purpose of this research is to learn about research productivity, and the relationship between research productivity, organisational culture values and individual values. The questionnaire that you are asked to complete will take about fifteen to twenty minutes of your time.

The information that this research will provide will be useful for research students, practitioners and research supervisors. It is also hoped that it will contribute to a greater understanding of research productivity with regard to the differences between academic fields.

In the following questions, you will be given a choice of different statements that relate to values. There are also questions that relate to demographic factors. There are no right or wrong answers. Your responses will be kept completely confidential. No individual that completes this questionnaire will be identified to anyone else in any manner whatsoever.

General Questionnaire Instructions

There are three sections to this questionnaire. Sections 1 and 2 ask about values. Section 3 asks about individual factors.

Section 1- The way things generally <u>should be</u> in your academic discipline

Section Instructions

In this section, we are interested in your beliefs about what the norms, values and practices <u>should be</u> in the academic discipline in which you work as a researcher. Questions 1-18 are of this nature.

There are no right or wrong answers, and answers don't indicate goodness of badness of the academic discipline.

Please respond to the questions by circling the number that most closely represents your observations about your academic discipline.

There are two kinds of questions asked in section 1. Question 1.1 is an example of the first kind of question, which has three choices. For a question like this, you would circle the number from 1 to 7 that is closest to your level of agreement with the statement. For example, if you strongly agree that orderliness and consistency should be stressed in your academic field, even at the expense of experimentation and innovation, you would circle 1. If you generally agree with the statement but disagree slightly, you could circle either 2 or 3, depending on how strongly you agree with the statement. If you disagree with the statement, you would circle 5, 6, or 7, depending on how much you disagree with the statement.

Question 1.2 is an example of the second type of question. For a question like this, you would circle the number from 1 to 7 that is closest to your perceptions about what people in your academic field should be encouraged to be like. If you generally agree with the statement on the left, but disagree slightly, you could circle either 2 or 3, depending on how strongly you agree with the statement. If you agree more with the statement on your right, you would circle 5, 6, or 7, depending on how much you disagree with the statement. If you agree or disagree with both the statement on the left as much as that on the right, then circle 4.

SECTION 1 QUESTIONS START HERE

1.1. In this academic field, orderliness and consistency <u>should</u> be stressed, even at the expense of experimentation and innovation.

Strongly Agree			Neither agree or disagree			Strongly Disagree
1	2	3	4	5	6	7

Ua1

1.2. In this academic field, the accepted norm <u>should</u> be to:

Plan for future crises						Plan to deal with current crises
1	2	3	4	5	6	7

Fo1

1.3. I believe that in this academic field, managers <u>should</u> generally encourage collective objectives even if individual goals suffer.

Strongly agree			neither agree nor disagree			strongly disagree
1	2	3	4	5	6	7

Igc1

1.4. In this academic field, in order to achieve their goals people <u>should</u> be encouraged to be:

dominant						non-dominant
1	2	3	4	5	6	7

As1

1.5. In this academic field, the pay and bonus system <u>should</u> be designed to maximise collective goals over individual goals

Strongly agree			neither agree nor disagree			strongly disagree
1	2	3	4	5	6	7

Igc2

1.6. In this academic field, subordinates <u>should</u>:

obey their boss without question						question their boss when in disagreement
1	2	3	4	5	6	7

Pd1

1.7. In this academic field, people <u>should</u> be dominant in their relationships in order to achieve:

strongly agree			neither agree nor disagree			strongly disagree
1	2	3	4	5	6	7

As2

1.8. In this academic field, employees <u>should</u> be encouraged to strive for continuously improved performance at all times above all other objectives and priorities.

strongly agree			neither agree nor disagree			strongly disagree
1	2	3	4	5	6	7

Po1

1.9. In this academic field, the accepted norm <u>should</u> be to prioritise rules and ordered structure over uncertainty and experimentation:

Strongly Agree			Neither agree or disagree			Strongly disagree
1	2	3	4	5	6	7

Ua2

1.10. In this academic field, people should be encouraged to be:

very sensitive toward others						not at all sensitive to others
1	2	3	4	5	6	7

Ho1

1.11. I believe that in this academic field, work would be more effectively managed if there were:

many more women in positions of authority than men			about the same number of women in positions of authority as men			many more men in positions of authority than women
1	2	3	4	5	6	7

Ge1

1.12. In this academic field, instructions from higher ranking persons should be:

followed without question						challenged when in disagreement
1	2	3	4	5	6	7

Pd2

1.13. In this academic field, employees should feel loyalty and take pride to be working in this organisation.

strongly agree			neither agree nor disagree			strongly disagree
1	2	3	4	5	6	7

Icol1

1.14. In this academic field, the focus of activities should be:

Future crises						Current crises
1	2	3	4	5	6	7

Fo2

1.15. In this academic field, people should be encouraged to be:

very tolerant and sensitive toward others						not at all tolerant and sensitive toward others
1	2	3	4	5	6	7

Ho2

1.16. In this academic field, researchers <u>should</u> prioritise continually improved performance at all times above all else.

strongly agree			neither agree nor disagree			strongly disagree
1	2	3	4	5	6	7

Po2

1.17. Members of this academic field should:

take no pride in working for this organisation in this field		take a moderate amount of pride in working in this organisation in this field		take a great deal of pride in working in this organisation in this field
1	2	3	4	5	6	7

Icol2

1.18. In this academic field, opportunities for management positions <u>should</u> be:

more available for men than women		equally available for men and women		more available for women than for men
1	2	3	4	5	6	7

Ge2

1.19. In this academic field structure, rules and order should be encouraged, even at the expense of uncertainty and experimentation.

strongly agree			neither agree nor disagree			strongly disagree
1	2	3	4	5	6	7

Ua3

1.20. I believe that in this academic field, there <u>should</u> be:

more opportunities for women than men		equal opportunities for women and men		more opportunities for men than women
1	2	3	4	5	6	7

Ge3

1.21. In this academic field, people should:

worry about current crises						worry about future crises
1	2	3	4	5	6	7

Fo3

1.22. In this academic field, collective goals should be prioritised, even at the expense of individual goals.

Strongly agree			Neither agree nor disagree			Strongly disagree
1	2	3	4	5	6	7

Igcol3

1.23. Members of this academic field should:

not feel pride in working for this organisation		take a moderate amount of pride in working for this organisation		feel a great deal of pride in working for this organisation
1	2	3	4	5	6	7

Icol3

1.24. In this academic field, people should be encouraged to be dominant in order to achieve their goals:

strongly agree			neither agree nor disagree			strongly disagree
1	2	3	4	5	6	7

As3

1.25. In this academic field, people should be encouraged to be.

very sensitive to the needs of others						not at all sensitive to the needs of others
1	2	3	4	5	6	7

Ho3

1.26. In this academic field, a focus to improve performance should be prioritised at all times above all other objectives:

strongly agree			neither agree nor disagree			strongly disagree
1	2	3	4	5	6	7

Po3

1.27. When in disagreement with superiors, subordinates in this academic field <u>should</u>:

obey and not question their superiors						question their superiors
1	2	3	4	5	6	7

Pd3

1.28. I am:

very dissatisfied with my job on the whole						very satisfied with my job on the whole
1	2	3	4	5	6	7

1.29. Overall, I have a preference for research rather than for teaching.

strongly agree			neither agree nor disagree			strongly disagree
1	2	3	4	5	6	7

1.30. <u>Overall</u>, I am

very satisfied with my job						very dissatisfied with my job
1	2	3	4	5	6	7

1.31. I am satisfied with the financial incentives I have for publishing research.

strongly agree			neither agree nor disagree			strongly disagree
1	2	3	4	5	6	7

1.32. On the whole I prefer teaching to doing research.

strongly agree			neither agree nor disagree			strongly disagree
1	2	3	4	5	6	7

1.33. I am generally....

dissatisfied with my job						satisfied with my job
1	2	3	4	5	6	7

1.34. I prefer teaching to doing research.

strongly agree			neither agree nor disagree			strongly disagree
1	2	3	4	5	6	7

1.35. Most of my satisfaction in my job comes from the teaching work I do.

strongly agree			neither agree nor disagree			strongly disagree
1	2	3	4	5	6	7

1.36. Most of my satisfaction in my job comes from the administration work I do.

strongly agree			neither agree nor disagree			strongly disagree
1	2	3	4	5	6	7

1.37. Most of my satisfaction in my job comes from the research work I do.

strongly agree			neither agree nor disagree			strongly disagree
1	2	3	4	5	6	7

1.38. If you were to perform research **at this point in time**, how certain are you that you can perform the following activities described below? Rate your degree of confidence by recording a number from 0 to 100 using the scale given below (next to each research activity).

Cannot do at all					Moderately certain can do					Highly certain can do
0	10	20	30	40	50	60	70	80	90	100

Research Activity (at this point in time)	**Confidence (0-100)**
Publish in a Department of Education Accredited Journal	_____
Publish in an ISI or other Internationally Accredited Journal	_____
Have conference proceedings published	_____
Present at a peer-reviewed conference	_____
Perform statistical analysis (at journal publication level)	_____
Perform qualitative analysis (e.g. case study, grounded theory etc.)	_____
Teaching at post-graduate level	_____

1.39. This scale consists of a number of words that describe different feelings and emotions. Please read each item and then mark the appropriate answer (between 1 and 5) in the space next to that word. INDICATE TO WHAT EXTENT YOU GENERALLY FEEL THIS WAY, THAT IS, HOW YOU FEEL ON AVERAGE. Please use the following scale to record your answers.

very slightly or not at all	a little	moderately	quite a bit	extremely
1	2	3	4	5

_____interested	**_____irritable**
_____distressed	**_____alert**
_____excited	**_____ashamed**
_____upset	**_____inspired**
_____strong	**_____nervous**
_____guilty	**_____determined**
_____scared	**_____attentive**
_____hostile	**_____jittery**
_____enthusiastic	**_____active**
_____proud	**_____afraid**

SECTION 2 QUESTIONS BEGIN HERE

Here we briefly describe some people. Please read each description and think about how much each person is or is not like you. Please tick the box to the right that shows how much the person in the description is like you.

How much is this person like you?

	very much like me	***like me***	***some-what like me***	***a little like me***	***not like me***	***not like me atall***
	1	*2*	*3*	*4*	*5*	*6*
C1 *Thinking up new ideas and being creative is important to him. He likes to do things in his own original way.*	☐	☐	☐	☐	☐	☐
C2 *It is important to him to be rich. He wants to have a lot of money and expensive things.*	☐	☐	☐	☐	☐	☐
C3 *He thinks it is important that every person in the world should be treated equally. He believes everyone should have equal opportunities in life.*	☐	☐	☐	☐	☐	☐
C4 *It's important to her to show his abilities. He wants people to admire what he does.*	☐	☐	☐	☐	☐	☐
C5 *It is important to him to live in secure surroundings. He avoids anything that might endanger his safety.*	☐	☐	☐	☐	☐	☐
C6 *He likes surprises and is always looking for new things to do. He thinks it is important to do lots of different things in life .*	☐	☐	☐	☐	☐	☐
C7 *He believes that people should do what they are told. He thinks people should follow rules at all times, even when no-one is watching.*	☐	☐	☐	☐	☐	☐
C8 *It is important to him to listen to people who are different from him. Even when he disagrees with them, he still wants to understand them.*	☐	☐	☐	☐	☐	☐
C9 *It is important to him to be humble and modest. He tries not to draw attention to himself.*	☐	☐	☐	☐	☐	☐

	very much like me	like me	some-what like me	a little like me	not like me	not like me at all
	1	2	3	4	5	6
C10 *Having a good time is important to him. He likes to "spoil" himself .*	☐	☐	☐	☐	☐	☐
C11 *It is important to her to make him own decisions about what he does. He likes to be free and not depend on others*	☐	☐	☐	☐	☐	☐
C12 *It's very important to him to help the people around him. He wants to care for their well-being.*	☐	☐	☐	☐	☐	☐
C13 *Being very successful is important to him. He hopes people will recognise his achievements.*	☐	☐	☐	☐	☐	☐
C14 *It is important to him that the government ensures his safety against all threats. He wants the state to be strong so it can defend its citizens.*	☐	☐	☐	☐	☐	☐
C15 *He looks for adventures and likes to take risks. He wants to have an exciting life.*	☐	☐	☐	☐	☐	☐
C16 *It is important to him always to behave properly. He wants to avoid doing anything people would say is wrong.*	☐	☐	☐	☐	☐	☐
C17 *It is important to her to get respect from others. He wants people to do what he says.*	☐	☐	☐	☐	☐	☐
C18 *It is important to him to be loyal to him friends. He wants to devote himself to people close to her.*	☐	☐	☐	☐	☐	☐
C19 *He strongly believes that people should care for nature. Looking after the environment is important to him.*	☐	☐	☐	☐	☐	☐
C20 *Tradition is important to him. He tries to follow the customs handed down by he religion or his family.*	☐	☐	☐	☐	☐	☐
C21 *He seeks every chance she can to have fun. It is important to him to do things.*	☐	☐	☐	☐	☐	☐

C22

The following questions concern your beliefs about jobs in general. They do not refer only to your present job.	Disagree very much	Disagree moderately	Disagree slightly	Agree slightly	Agree moderately	Agree very much
1. A job is what you make of it.	1	2	3	4	5	6
2. On most jobs, people can pretty much accomplish whatever they set out to accomplish	1	2	3	4	5	6
3. If you know what you want out of a job, you can find a job that gives it to you	1	2	3	4	5	6
4. If employees are unhappy with a decision made by their boss, they should do something about it	1	2	3	4	5	6
5. Getting the job you want is mostly a matter of luck	1	2	3	4	5	6
6. Making money is primarily a matter of good fortune	1	2	3	4	5	6
7. Most people are capable of doing their jobs well if they make the effort	1	2	3	4	5	6
8. In order to get a really good job, you need to have family members or friends in high places	1	2	3	4	5	6
9. Promotions are usually a matter of good fortune	1	2	3	4	5	6
10. When it comes to landing a really good job, who you know is more important than what you know	1	2	3	4	5	6
11. Promotions are given to employees who perform well on the job	1	2	3	4	5	6
12. To make a lot of money you have to know the right people	1	2	3	4	5	6
13. It takes a lot of luck to be an outstanding employee on most jobs	1	2	3	4	5	6
14. People who perform their jobs well generally get rewarded	1	2	3	4	5	6
15. Most employees have more influence on their supervisors than they think they do	1	2	3	4	5	6
16. The main difference between people who make a lot of money and people who make a little money is luck	1	2	3	4	5	6

SECTION 3 QUESTIONS BEGIN HERE

Individual Questions

Following are several questions about you, your background, and the place where you work. These questions are important because they help us to see if different types of people respond to the questions on the questionnaire in different ways. They are NOT used to identify any individual.

3.1. How old are you? _____ years.

3.2. What is your gender? (please tick) ❑ Male ❑ Female

3.3. What country were you born in? _____(country).

3.4. How long have you lived in South Africa? _____years

3.5. Besides your country of birth, how many other countries have you lived in for longer than one year?_____ countries

3.6. What language/s was/were spoken in your home when you were a child?

_____(language/s)

3.7. How many years of full-time work experience have you had? _____years

3.8. How many years have you been a researcher? _____years

3.9. How long have you worked for the University of the Witwatersrand as a researcher?

_____years

3.10. Have you ever worked for a multinational corporation ❑ Yes ❑ No

3.11. Do you belong to any professional associations or networks? ❑ Yes No ❑

3.12. How many years of formal education do you have? _____years

3.13. What formal qualifications do you have?

_____

_____

_____

3.14. What is your title? (Please tick):

❑ Mr/Ms ❑Dr ❑ Associate Professor ❑ Assistant Professor ❑ Professor

3.15. At present, how many people report directly to you in the chain of command?

_____people.

3.16. How many (completed) Masters students have you supervised? _____students

3.17. How many (completed) PhD students have your supervised? _____students

3.18. How many Department of Education Local (South African but not ISI/IBSS) accredited journal articles (in total) have you had published (including those accepted for publication)

_____journal articles

3.19. How many International (ISI/IBSS or *internationally accredited)* journal articles (in total) have you had published (including those accepted for publication)

_____journal articles

3.20. How many of your published Department of Education accredited Local or ISI/IBSS accredited journal articles (including those accepted for publication) have been co-authored with another researcher or other researchers?

_____journal articles

3.21. How many times has your work been published (including those accepted for publication) in peer reviewed conference proceedings?_____conference proceedings

3.22. How many presentations have you made at peer reviewed

conferences?_____presentations

3.23. How many books have you had published?

_____books

3.23. How many books have you contributed book chapters to?

_____books

3.24. Do you (on average) prefer quantitative or qualitative methods in your

research?_____methods

3.25. Are you married?_____(Yes/No)

3.26. How many children do you support in your family?_____children

3.27. What subjects do you lecture?_____

_____

3.28. Please tick the academic field/division within which you teach. Please also tick the field within which your primary field of research lies.

	Please indicate the primary academic field in which you teach	Please indicate the primary academic field in which you research
FACULTY OF COMMERCE, LAW & MANAGEMENT	_	
SCHOOL OF ACCOUNTANCY	_	
SCHOOL OF ECONOMIC & BUSINESS SCIENCES	_	
SCHOOL OF LAW	_	
CALS		
GRADUATE SCHOOL OF BUSINESS ADMINISTRATION	_	
GRADUATE SCHOOL OF PUBLIC & DEVELOPMENT MANAGEMENT	_	
FACULTY OF ENGINEERING & THE BUILT ENVIRONMENT	_	
SCHOOL OF ARCHITECTURE & PLANNING	_	
SCHOOL OF CHEMICAL & METALLURGICAL ENGINEERING	_	
SCHOOL OF CIVIL & ENVIRONMENTAL ENGINEERING	_	
SCHOOL OF CONSTRUCTION ECONOMICS & MANAGEMENT	_	
SCHOOL OF ELECTRICAL & INFORMATION ENGINEERING	_	
SCHOOL OF MECHANICAL, INDUSTRIAL & AERONAUTICAL ENGINEERING'	_	
SCHOOL OF MINING ENGINEERING	_	
FACULTY OF HEALTH SCIENCES	_	
CENTRE FOR HEALTH SCIENCES EDUCATION	_	
STEVE BIKO CENTRE FOR BIOETHICS	_	
SCHOOL OF ANATOMICAL SCIENCES	_	
SCHOOL OF CLINICAL MEDICINE	_	
SCHOOL OF ORAL HEALTH SCIENCES	_	
SCHOOL OF PATHOLOGY	_	
SCHOOL OF PHYSIOLOGY	_	
SCHOOL OF PUBLIC HEALTH	_	
SCHOOL OF THERAPEUTIC SCIENCES	_	
FACULTY OF HUMANITIES	_	
SCHOOL OF EDUCATION	_	
SCHOOL OF HUMAN & COMMUNITY DEVELOPMENT	_	
SCHOOL OF LITERATURE AND LANGUAGE STUDIES	_	
SCHOOL OF SOCIAL SCIENCES	_	
WITS SCHOOL OF ARTS	_	
GRAD SCH OF HUMAN & SOCIAL SCIENCES	_	
WITS INST FOR SOCIAL & ECON RESEARCH	_	
FACULTY OF SCIENCE	_	
SCHOOL OF ANIMAL, PLANT & ENVIRONMENTAL SCIENCES	_	
SCHOOL OF CHEMISTRY		
SCHOOL OF COMPUTATIONAL & APPLIED MATHEMATICS		
SCHOOL OF COMPUTER SCIENCE		
SCHOOL OF GEOGRAPHY, ARCHAEOLOGY & ENVIRONMENTAL STUDIES		
SCHOOL OF GEOSCIENCES		
SCHOOL OF MATHEMATICS		
SCHOOL OF MOLECULAR & CELL BIOLOGY		
SCHOOL OF PHYSICS		
SCHOOL OF STATISTICS & ACTUARIAL SCIENCE		

THANK YOU FOR MAKING A CONTRIBUTION TO THIS RESEARCH

YOUR INPUT IS TRULY APPRECIATED

8.6 THE QUALITATIVE RESPONDENTS

On account of the ethical agreements made with the respondents, personal information was not recorded and transcripts are not included in this document, in order to support the anonymity of the respondents, who were well known in their fields. The transcripts and information that related to the gender, area of specialism, NRF rating and University were included for the purposes of thesis examination but are not included here. Table H shows the different categories and the definition and descriptions associated with each of the NRF ranking categories in South Africa.

Table H. Categories, definitions and descriptions of NRF rankings of respondents

Category	Definition	Sub-Category	Description
A	Researchers who are unequivocally recognised as leading international scholars in their field for the high quality and impact of their recent research outputs.	A1	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.
		A2	A researcher in this group is recognised by the overriding 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.
B	Researchers who enjoy considerable international recognition by their peers for the high quality and impact of their recent research outputs.	B1	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.
		B2	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.
		B3	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.
C	Established researchers with a sustained record of productivity in the field that are recognised by their peers as having: Produced a body of quality work; the core of which has coherence and attests to ongoing engagement with the field. Demonstrated the ability to conceptualise problems and apply research methods to investigate them	C1	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.
		C2	All or the overriding majority of reviewers are firmly convinced that the applicant is an established researcher (as described).
		C3	Most of the reviewers concur that the applicant is an established researcher (as described).

Source: National Research Foundation. 2013. Evaluation and Rating Available at: http://evaluation.nrf.ac.za/Content/Evaluation/Apply.htm Accessed 16 January 2013

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