

UNIVERSITY OF KWAZULU-NATAL

**THE EFFECT OF PERSONAL, CONTEXTUAL AND
MOTIVATIONAL FACTORS ON RESEARCH
PRODUCTIVITY AMONG ACADEMIC STAFF AT THE
UNIVERSITY OF KWAZULU- NATAL**

By

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DECLARATION

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ABSTRACT

As the educational expenditure rises including the costs of research, institutions of higher education compete for high-quality academic staff research and external funding causing an extensive debate on issues surrounding academic staff members' research productivity. There exists a robust research literature on research productivity, largely featuring external organizational characteristics as predictors but few theory-driven studies focus on academic staff members' motivation for research. However, cultural and policy differences challenge generalisability across national boundaries. A few previous studies of factors influencing academic staff research productivity have integrated effects of personal and contextual characteristics. Other academic staff productivity research has taken a life cycle development approach to investigating motivation. A number of institutional and contextual factors theoretically and empirically present implications for academic staff members' motivation with regard to research. However, motivational, personal, and contextual factors have not been previously been documented together in a South African context to show how the interaction between these three factors affects academic staff members' research productivity at an institute of higher learning.

This study investigates motivational, personal, and contextual factors that influence academic staff members' research productivity across disciplines. The participants were 154 academic staff members randomly drawn from a total of 2,200 academic staff members across the five campuses of the University of KwaZulu-Natal. Data was collected from self-administered questionnaires and analysed using SPSS to test a model of factors contributing to academic staff members' research productivity. Quantitative data was coded to identify themes related to the research hypotheses. The data represented a positive skew indicating most participants clustered around positive responses to the various questions. The three factors, motivational, personal and contextual, worked well together with regard to measurement. This indicates that not one contributing factor was an outlier or represented opposite results to the other factors. Thus these three factors in conjunction with each other have an influence on academic staff members' research productivity.

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Chapter One

Introduction and overview of the study

1.1 Introduction

The creation of knowledge is understood today to be an essential factor in the growth of societies. New knowledge assists not only in the constant development of new technologies and products, but also aids in the education of future generations. Thus, universities, being knowledge creating institutions, have assumed modern roles. They have transformed from being institutions for teaching and the delivery of knowledge to creators of knowledge. Some universities have started specialising in research. In these universities, research supports teaching, which has a knock-on effect on researchers, who continuously generate knowledge. This gives rise to the need to maintain high-quality research in universities, making institutions highly resource intensive (Chatterjee, 2011). In addition, because of the worldwide economy and social imperatives, universities all over the world are re-conceptualising their public roles (Geiger, 1986). The higher education industry of the twenty-first century is significantly different from that of the late nineteenth and twentieth centuries. This has been brought about by changes in the internal and external environments of academic institutions, which have resulted in differences in which the institutions express their mission (Geiger, 1986).

The changes undergone in South African universities are supported by national government, since institutions of higher learning are required to contribute to the solution of important technological and social problems (Hill, 1993). This has resulted in increased pressure on departments in these institutions to extend their research activities within an environment of shrinking resources. There is a current expectation from government for universities to become more efficient and effective in terms of research productivity. Various government policies have been created to focus universities on strong research areas. Universities are encouraged to develop their research as the creation of new knowledge and to prepare the country for a knowledge-based society by providing academic support. Thus the major responsibilities of academic staff in modern day universities include teaching, research and community service (Marsh and Hattie, 2002; Perkins, 1973). The perceptions of faculty

members about the relationship between teaching and research were investigated by Rowland (1996). It was found that teaching and research should exist parallel to each other within a department. University lecturers should conduct research as well as transfer knowledge as part of their job since the constant involvement in research would positively affect their teaching.

The American Assembly of Collegiate Schools of Business (AACSB) states four justifications for conducting research: (i) the general knowledge of society is improved; (ii) research has a direct link to effective teaching; (iii) it improves the practice in the real world; and (iv) it is necessary to perpetuate and individual's own self-image (Jacobs, Reinmuth and Hamada, 1987). Levy and Cooke (1990, 35) quote the Vice-Chancellor of Berkeley University, John Heilbron, as stating: 'The people who tend to be our distinguished teachers and who are most interested in improving undergraduate education also tend to have distinguished research records.'

There have been numerous factors associated with research productivity in the research literature. Blackburn and Lawrence (1995) have listed the following as factors: socio-demographic and career factors, self-knowledge, social knowledge and environmental aspects. Williams (2003) investigated research productivity of human resource education and workforce development, finding three categories of factors, namely, environmental factors, institutional factors and individual interest and ability factors. Life and career stages fall into the individual and situational differences, individual motivation and incentives as well as external funding also influencing faculty research productivity (Blackburn and Lawrence, 1995; Jackson, 2004; Lee and Rhoads, 2004; Levin and Stephan, 1989). These inconsistent findings indicate that gender and family commitments may have differential effects on research productivity (Sax, Hagedorn, Arredondo & Dicrisi, 2002). Some other studies have also found extrinsic rewards to have a strong correlation to research productivity (Diamond, 1993; Fairweather and Rhoads, 1995), in comparison to other studies which have conclusively found strong positive relationships between intrinsic factors (motivation and self-efficacy) and research productivity (Bailey, 1999). Further studies have found that dissertation involvement (Blackburn and Lawrence, 1995) or student research influences research productivity. These can be associated with faculty self-knowledge and social knowledge (Hardré, Miller, Beasley, Pace, Maxwell & Xie, 2007).

1.2 Background

The government and several universities employ incentive strategies to increase research productivity. Thus, for example, 50 awards were given out to the 39 Stellenbosch academics that made the biggest contribution to accredited publications in 2011. Publications can be seen as a critical contribution to extending any university's reputation as an excellent research institution. Researchers who publish their findings in quality expert journals are regarded as some of the most important assets of any university. The government's incentive system works by funding universities for articles published in accredited journals. Some use the money for general research funds while others give a proportion to the faculty (Tongai, 2013).

Between 2000 and 2010, South Africa more than doubled the number of papers published from 3617 to 7468, according to research by the director of the Institute for Technological Innovation at the University of Pretoria (Tongai, 2013). Research incentive schemes are believed to be one of the drivers of the increase. Providing incentives is not about money only. Incentive schemes help to increase the number of international publications without compromising quality and to motivate staff to publish regularly and improve the quality of their publications. The incentive scheme has seen a marked increase in output from 52% in 2008 to 66% in 2012 (Tongai, 2013).

Patricia Lucas, communications manager at the University of Cape Town, states that no direct financial incentive was given to their academic staff to publish in international or local journals. Instead annual block grants were awarded to faculties, in which the money was used to support post-doctoral researchers, buy equipment or to refurbish laboratories (Tongai, 2013). The above universities are being used as a benchmark for how motivational incentives can be used to increase research productivity. Looking at the way other universities reward their academic staff provides necessary knowledge for this study and influences the direction of this investigation regarding the drivers of research productivity at the University of KwaZulu-Natal (UKZN).

UKZN makes use of the following motivational incentives to encourage its academic staff to conduct research, whether it may be for the benefit of a specific department or the benefit of a field of study or for the benefit of the university as a whole. Doctoral grants are used to encourage the registration of postgraduate students, providing continuous support up until the

completion of the degree. Funds are made available by the University for research-related Costs of candidates accepted by the various faculty higher degrees committees and ethics committees. In addition, by means of competitive research grants, funding is made available for outstanding doctoral students who are interested in pursuing a research career. These students are required to prepare journal articles from their theses for submission to accredited journals. The above practice plays an important role in increasing research at UKZN. Competitive research grants involve the selection of research proposals; funding is offered to staff who have graduated with PhD degrees during the previous five years, staff appointed in the previous three years or any staff member interested in a research career. Any prospective applicant who has no prior research record is assigned a mentor by the Faculty Research Committee (FRC). Another incentive is the use of the Research Development Equipment fund, which was created to provide funding for research equipment exceeding 50,000 rand through infrastructural development in order to provide equipment and to develop research capacity of future researchers and postgraduate students. Finally, recently retired academic staff members who have a continuous track of research productivity may be recommended by the Head of School to the University Research Committee (UKZN) for consideration for appointment as Honorary Research Associates (HRAs). From these various motivational incentives it can be seen that there is recognition for research productivity (University of KwaZulu-Natal).

1.3 Statement of the problem

According to research conducted on prior studies, a link between motivational, personal, contextual factors and research productivity has not been explored in South African universities. There is as yet no information to verify and empirically support this claim. While the different universities have various forms of incentives to increase research productivity, there is a lack of research regarding the extent of influence between these variables. The current study aims to investigate how personal, motivational and contextual factors influence academic staff to be research productive and to empirically verify if a positive relationship between these variables does exist in the South African higher education industry in particular at UKZN.

1.4 Research questions

- How do personal factors (life and career changes, intrinsic interest, self-efficacy) impact on research productivity at UKZN?
- How do contextual factors (departmental support, teaching, advising, and external funding) impact on research productivity at UKZN?
- How do motivational factors (monetary and non-monetary incentives) impact on research productivity at UKZN?
- How do biographical differences (gender, school, discipline, title, years of experience) impact on research productivity at UKZN?

1.5 Research Objectives

- To investigate how personal factors (life and career changes, intrinsic interest, self-efficacy) impact on research productivity at UKZN.
- To investigate how contextual factors (departmental support, teaching, advising and external funding) impact on research productivity at UKZN.
- To investigate how motivational factors (monetary and non-monetary incentives) impact on research productivity at UKZN.
- To investigate how biographical differences (gender, school, discipline, title, years of experience) impact on research productivity at UKZN.

1.6 Hypotheses

H1 Null: There is no relationship between personal factors (life and career changes, intrinsic interest, self-efficacy) and research productivity among academics at UKZN.

Alternate: There is a relationship between personal factors (life and career changes, intrinsic interest, self-efficacy) and research productivity among academics at UKZN.

H2 Null: There is no relationship between contextual factors (departmental support, teaching, advising and external funding) and research productivity among academics at UKZN.

Alternate: There is a relationship between contextual factors (departmental support, teaching, advising and external funding) and research productivity among academics at UKZN.

H3 Null: There is no relationship between motivational factors (monetary and non-monetary incentives) and research productivity among academics at UKZN.

Alternate: There is a relationship between motivational factors (monetary and non-monetary incentives) and research productivity among academics at UKZN.

H4 Null: There is no relationship between biographical differences (gender, school, discipline, title, and years of experience) and research productivity among academics at UKZN.

Alternate: There is a relationship between biographical differences (gender, school, discipline, title, and years of experience) and research productivity among academics at UKZN.

1.7 Limitations of the study

The limitations of this study include the following:

- The study is restricted to the UKZN campuses of Westville, Howard, Medical School, Pietermaritzburg and Edgewood. The results are representative of the target population. However, the results cannot be generalised to all academics in South Africa.
- A single method approach is used for data collection instead of a mixed method approach therefore results cannot be generalised.
- Research productivity is sensitive in nature preventing the accuracy of results.

1.8 Chapter outline

Chapter Two comprises a literature review on the variables being studied, namely, personal, contextual and motivational factors included in a South African context. After a brief introduction to the intended topic, the discussion goes on to define research productivity and to examine previous studies on similar topics and industries. The factors affecting research productivity are discussed in great detail, specifically focusing on the measurement of research productivity, contextual factors, personal factors, motivational factors, efficacy theory and self-determination theory. Chapter Two ends with an in-depth discussion on research productivity in the South African context, explaining its importance for future growth on a nationwide basis.

Chapter Three provides an account of the research methodology used, including a discussion of hypotheses, sampling techniques, data collections, data analysis and descriptive statistics. In the descriptive statistics section, frequency graphs, measures of central tendency and the non-parametric test are explained. The inferential statistics section includes a discussion of factor analysis, reliability using Cronbach alpha, correlation, regression analysis and bivariate analysis. In the next chapter (Chapter Four), there is a discussion of the data analysis conducted using SPSS and the findings achieved. The specific tests conducted, which are mentioned in Chapter Three and used to interpret the questionnaire, are dealt with in depth.

This is followed by a discussion of results in Chapter Five, providing possible explanations for the results. Each hypothesis is discussed individually and specific reasoning is applied based on significant questions. These significant predictors are substantiated by means of comparison with similar results from prior studies. Chapter Six forms the conclusion of the study. It provides a summary and explains the theoretical and practical significance of the study as well as making possible suggestions for future research.

1.9 Conclusion

Chapter One briefly introduced the concept of the study, which was an examination of the impact of personal, contextual and motivational factors on research productivity, in the form of a case study of academic staff at UKZN. The background, the statement of the problem,

the research questions and objectives were introduced as well as the hypotheses and associated limitations. This chapter set the foundation of the research and explained how the issues will be addressed. The following chapter looks at a discussion of the literature contained in this study.

Chapter Two

Literature review

2.1 Introduction

Numerous factors can be associated with research productivity. Fox (1996) identifies three categories of correlation to research productivity, namely, individual characteristics including psychological characteristics, work habits and demographics, working environmental factors, and feedback from colleagues and mentors. Williams (2003), on the other hand, relates environmental factors, institutional factors and individual interest and ability factors to research productivity.

This chapter comprises the following: a discussion of studies previously conducted on research productivity; the measurement of research productivity, namely, quantity and quality measurement, contextual factors, personal factors and motivational factors, including monetary, non-monetary, extrinsic and intrinsic motivation, as well as a discussion of self-efficacy theory and self-determination theory; and finally, a discussion on research productivity in a South African context.

2.2 Defining research productivity

It is important for this investigation to define the term 'research productivity'. 'Research' is defined as careful study or investigation in order to discover new facts and information (Oxford University, 1995). 'Productivity' on the other hand is defined as the means of total production when compared to inputs over a period of time (Witzel, 1999). Combining these two phrases, research productivity can be defined as the relationship between the outputs generated by a system and the inputs provided to the system. The terms 'efficient' and 'effective' are often used to measure results of performance (Turnage, 1990). Print and Hattie (1997) define research productivity as "the totality of research performed by academics in universities and related contents within a given time period" (1997:454).

Research productive staff can be defined as those members who demonstrate on-going commitment to research and who meet the minimum threshold requirements of performance (Bland *et al.*, 2005). According to Creswell (1986), research productivity comprises research published in professional journals, the writing of a book, the gathering and analysis of original evidence, the supervision of post-graduate students on dissertations and projects, the obtaining of research grants, patents and licenses, the development of experimental designs, the creation of artistic/creative work and participation in public debates. For the purpose of this study, the influencing factors for research productivity have been classified into three main elements, namely, personal factors, contextual factors and motivational factors.

2.3 Previous studies examining research productivity

An exploratory study was conducted by Butler and Cantrell (1989) in which six extrinsically motivated rewards were compared to each other and were related to research productivity. The six rewards focused on were money, reduced teaching loads, tenure, mobility, recognition and promotion. Butler and Cantrell (1989) made use of Vroom's expectancy theory (Vroom, 1964). The expectancy theory explains the strength of a need as being represented by a negative function. The study concluded that money and reduced teaching loads had the greatest effect on research productivity, followed by recognition and promotion.

A qualitative and exploratory study was conducted by Baldwin (1990) to investigate individual and environmental factors affecting research productivity. The theory used in this study was career development. This theory suggests that many academic staff members have an initial career growth spurt after which they become less goal orientated and, after having reached the highest academic level, go through a career reevaluation phase. This study showed that professors who involve larger amounts of time in research and institutional activities show a greater diversification and balance in their professional lives.

Vasil (1992) conducted a study involving self-efficacy expectations and causal attributions among male and female university academic staff members. Vasil (1992) made use of the self-efficacy theory to study a sample of 284 out of a total population of 428 college faculties. A significant relationship was discovered between research self-efficacy and

productivity as well as between self-efficacy and causal attributes. A stronger relationship was shown by males in comparison with females in terms of stronger self-efficacy beliefs and longer research time spent.

An investigation focusing on faculty rank system, research motivation and faculty research productivity was undertaken by Tien and Blackburn (1996). Their study found that faculty rank is viewed as a reward system. The study made use of behavioural reinforcement theory, cognitive evaluation theory and expectancy theory. The participants were chosen based on their employment status, being either tenured or non-tenured. There was a total population of 2586 full time academic staff members. The production curve was derived by the addition and removal of promotion influencing the research productivity rate. Expectancy theory suggests that individual needs, values and perceptions about the environment determine one's behaviour.

It was stated by Tien and Blackburn (1996) assert that, for a faculty member to be motivated to conduct research, there has to be a belief that the research will lead to an outcome which has value attached to it. Behavioural reinforcement theory was used to explain that viewing promotion as fixed would have an effect on research productivity. Tien and Blackburn (1996) noted that publications were low in lower ranks of employment and increased with the prospect of promotion. However, once promotion was achieved, the research production rate decreased. Within the study it was shown that professors published a greater number of research papers when compared to assistant and associate professors. Academic staff members who remained in the same rank for more than six years produced fewer research papers than their colleagues in the same rank.

Chen, Gupta and Hoshower (2006) investigated the factors that motivate a business faculty to conduct research. The study found the faculty members who were non-tenured were positively motivated by extrinsic rewards while members who were tenured were motivated by intrinsic rewards. The number of years of academic employment negatively affected research conducted by these individuals. Interesting to note was that no relationship existed between research productivity and gender or academic discipline.

To summarise, previous research conducted in this area has found that various theories play an important role, namely, expectancy theory, need theory, socialisation theory, reinforcement

theory and efficacy theory. Several factors can be said to influence research productivity as evidenced by the previous work discussed. The frequently mentioned factors include personality (Hunter and Kuh, 1987), rewards (Butler and Cantrell, 1989), personal factors (Baldwin, 1990), institutional environment (Blackburn *et al.*, 1991), self-efficacy (Vasil, 1992) and rank system (Tien and Blackburn, 1996).

The next section will discuss factors which affect research productivity.

2.4 Factors affecting research productivity

2.4.1 Measurement of research productivity

The most topical issue with regard to measuring research productivity is the confusion between the quantity and quality of publications (Lawrence and Green, 1980). Furthermore, research productivity needs to be measured at an individual level as well as sub-department, department and university levels. A discussion of the measurement of quantity and quality follows.

2.4.1.1 *Quantity measurement*

A numerical count or journal count over a certain period is the most frequently used method to measure the quantity of research produced. This method can be narrowed down to include only the number of articles published or opened up to include also presentations and the number of postgraduate students given advice on their personal research papers or by going one step further and including editorial duties, conferences and public debates (Creswell, 1986). Rotten (1990) stated that the most common approach is to count the number of books and articles published as well as presentations given and grants received. Radhakrishma and Jackson (1993) note that publishing in refereed journals rank as the most important factor in research productivity. Radhakrishma, Yoder and Scanlon (1994) go further to note that not only the publication of articles in refereed journals but also paper presentations at conferences are considered very important components of faculty productivity. Demonstrating the complexity of this method, it should be noted that publications can be measured on a straight basis or on a weighted count basis. The straight basis refers to the actual number of publications published and weighted count refers to an average of the publications published over time. (Collins, 1993).

2.4.1.2 *Quality measurement*

It can be argued that simply counting all publications will ignore the quality of the paper produced. To counteract this, publications can be separated into non-refereed and refereed papers and single authored papers can be distinguished from multiple-authored publications (Brocato, 2001). Unpublished research can also be recognised as a form of research productivity; for instance, the presentation of papers at professional meetings as well as final reports of funded research may be considered as a significant type of unpublished research. However, a paper presented at a national conference will be viewed as more prestigious than one at a regional meeting (Creswell, 1986).

To examine the quality of research new tools such as peer review rating and citation analysis have recently emerged. Peer review can be defined as a process in which qualified persons professionally review a paper, usually for a journal publication (Upali, Hebert and Nigel, 2001). A statistical positive correlation was found by Kirkpatrick and Locke (1992) between individual peer rating and article or citation counts. However, it must be noted that peer review can be influenced by the personality of the researcher or even the institution affiliated with the researcher (Folger, Astin and Bayer, 1970). Citation measurements have also previously been used as a measure of faculty research productivity (Braskamp and Ory, 1994; Creamer, 1998). As indicated by Centra (1981), citation data can reflect the impact of faculty work.

2.4.2 *Contextual factors*

In research intensive universities all academic staff is considered professional people in comparison to non-research intensive universities in which academic staff are treated like employees. Therefore, non-research intensive universities have reduced opportunities to incorporate research activities into the daily practices (Colbeck, 1998). Bland and Ruffin (1992) state that universities should implement appropriate policies and practices to encourage the employment of highly motivated staff. Each faculty or department would have varying levels of required research productivity. It was stated by Meltzer and Slater (1962) that faculty members in lower levels of supervision experience greater job satisfaction.

These discrepancies can be attributed to the historical development of knowledge as well as the continuous development of technology (Kyvik, 1990). Each institution sets the research

productivity for each of their different faculty members. The employment of new faculty members forms part of a critical process in the continuous development and strengthening of research. This is relevant as universities which find research to be highly valuable would obtain more research grants to continue producing research, in turn increasing the reputation of the university.

Salary

Many previous studies (Athey and Plotnicki, 2000; Blackburn *et al.*, 1991; Brocato and Mavis, 2005; Caffarella and Zinn, 1999) have shown a relationship between research productivity and salary earned by the academic staff members. A higher salary would be expected to result in higher levels of research productivity while there is also the effect of trying to reduce the possibility of losing highly productive researchers to other universities by offering higher pay (Jacobson, 1992; Tornquist and Kallsen, 1992). A salary is not the only contextual factor which affects faculty research productivity. Kelly and Warmbrod (1986) have found that perceived institutional and departmental support for research are also considered important to enable research productivity. Direct expenditure on supporting materials can be used as an indicator of research output as reported by Jones, Lindzey and Coggeshall (1982). This was confirmed by the findings of Etzhowitz (1992), who showed that the securing of research funding is the path to success. Giving a faculty member financial support encourages self-motivation and more allocation of time to research (Slaughter and Rhoades, 1990). Oklahoma State Regents for Higher Education (1993) compiled a report stating that faculty members feel as if too much time is spent on administrative duties, leaving little time for research duties and personal development. In a study conducted by Williams (2003), it was found that the balance of time between teaching, research, service and administration can be used to explain the discrepancies in time to conduct research. The time academic staff members spend on research activities also directly affects their research productivity (Cohen and Gutek, 1991; Vasil, 1992).

Time availability

Many other contextual factors have been found to have influence on research productivity, namely, the amount of work time spent on research (Bland *et al.*, 2005), research culture (Pratt *et al.*, 1999), research support (Allison and Long, 1990) and the reward system (Hemmings, Rushbrook and Smith, 2007).

The need for sufficient time for research is examined by a study conducted by Brocato and Mavis (2005). Due to the excessive pressure experienced by academic staff members to teach, conduct research, participate in community work and counsel students, these responsibilities compete for time, resulting in reduced time being available to spend on each responsibility. Sufficient time is essential for scholarly advancement (Hemmings, Rushbrook and Smith, 2007). Ramsden (1994) reported two distinct patterns. Thus, a group which actively conducts research is more research productive than a group which does not actively conduct research. Active research is described in terms of time spent on research.

Some scholars support the claim that more time allocated to research has a positive impact on research performance. From previous studies on research productivity, time constraint was the most frequently mentioned variable influencing research productivity (Wood, 1990). A Canadian study showed a high positive correlation between research output and the time allocated for research; however, freeing up time to allocate more research time was negatively correlated to research productivity. This can be interpreted as indicating that the limited available time was used rather than compromising teaching time to allocate to research. The authors came to the conclusion that more time being allocated to research did not necessarily stem from a reduction in time spent on other responsibilities; it could just be that academic staff members were increasing the time spent on research activities in order to increase their research outputs. Therefore, the increased time spent on research did increase research outputs but not at the risk of compromising other academic duties (Ito and Brotheridge, 2007). This finding may be seen as being relevant to the notion of research culture.

Research Culture

‘Research culture’ is a term used to describe many institutional and departmental factors and many researchers define research culture differently. Williams, Dobson and Walters (1993) describe research culture to be a set of beliefs in an organisation. This definition could be used to describe an organisation’s culture in terms of viewing research as important and as supporting, encouraging and rewarding research efforts (Pratt *et al.*, 1999). On the other hand, Bland *et al.* (2005) view an organisation’s research culture as the bonding of academic staff members through the sharing of research related values and knowledge. Borg (2007) investigated research communication and collaboration amongst academic staff members in which the availability of resources and financial support were seen as making up the research

culture within the institution. Bracato and Mavis (2005) include leadership also as a component of a rich research culture.

Thus, although research culture may be conceptualised in different ways, a general conclusion can be drawn that a stable and supportive working environment encourages academic members to conduct research, thereby enhancing research productivity. The lack of a rich research culture results in research productivity being negatively impacted. By contrast, Pratt *et al.* (1999) conducted a study on a teaching intensive university in New Zealand. The university incorporated a rich research culture by changing their academic staff members' beliefs and perceptions about research. The change resulted in a significant increase in the university's overall research output. There is, therefore, a perception that a rich research culture positively impacts research productivity (Hemmings, Rushbrook and Smith, 2007; Hiep, 2006; Pratt *et al.*, 1999).

2.4.3 Personal factors

Personal factors relate to academic and personal qualifications. Personal, career and developmental factors include aspects such as an individual's ability, interest and attitude towards conducting research. Other aspects that could also be included are research experience, skill and type of higher degree obtained. The reason why researchers are productive can be attributed to the value they place on research to create new knowledge (Hardré *et al.*, 2007). Pfeffer and Langton (1993) reported that a positive relationship exists between job satisfaction and research productivity. It must also be noted that personal opinions and personal circumstances have the ability to influence the research conducted. Opinions may vary from job satisfaction, research and training or even possible appropriate funding and freedom of collaboration. It has been previously stated that interest in research to begin with is a great predictor of possible research productivity (Noser, Manakyan and Tanner, 1996; Ramsden, 1994).

Academic qualifications and Training

Prior academic and professional training is called cumulative advantage (Bracato, 2001). Cumulative advantage creates greater success in achieving publications due to previous project experience (Collins, 1993; Creswell, 1985; Fox, 1996). Finkelstein (1984) states that academic rank may be a significant predictor of research productivity as higher ranked

academic staff generally have more control over their workload, allowing them to be more research productive than more junior staff members. Bailey (1992) agrees with these findings, conclusively stating that rank appears to be a significant predictor of research output. Dundar and Lewis (1998) found that departments with highly ranked faculty staff members produce higher research output.

The possession of a higher qualification has a significant effect on research productivity. Fox and Milbourne (1999) found that academics who held a higher degree were more research productive in comparison to academics who were not in possession of higher qualifications. However, academic members who were not exposed to proper research training could develop problems while conducting their research; this was established by Smeby and Try (2005), whose study was primarily focused on departmental factors and their impact on research productivity. They concluded that formal training had a positive impact on research for individuals as well as departments, with considerable emphasis on structured support from supervisors.

Academic collaboration

Academics exist in a community. The networking of influential academic staff tends to encourage the collaboration of top researchers and leads to academics being able to publish work more easily than staff members who prefer to work alone (Williamson and Cable, 2003). The suggestion that networking has an impact on research productivity has been empirically supported. Networking has been defined by Bland *et al.* (2005) as the existence of members who are part of a network of colleagues with whom frequent communication is made both of a formal and informal nature in and outside of the institution and can be included as an institutional factor. Bland *et al.* (2005) found a distinction between an internal and external network. The external network was positively correlated to research productivity compared to internal communication which was found to be negatively correlated to research productivity. This discovery was explained by the researcher who suggested that external communication served as a form of frame of reference for academics to compare themselves. The internal network did not work in the same way, resulting in the negative correlation.

Academic rank

Academic rank can be used to explain the variance in research productivity. Hattie, Print and Krakowski (1994), Ho (1998) and Tien and Blackburn (1996) all concluded that academic

staff members who rank higher produced more research papers than the lower ranked academic staff. Ho's (1998) study conducted on research productivity in six Hong Kong universities revealed that professors continually remained at the top of the research productivity list compared to other lower ranked members (Ho, 1998); the lower the rank of staff, the lower the number of research papers published. Tien (2007) conducted a study focusing on the degree to which promotion was rewarded for research productivity. Hattie, Print and Krakowski (1994) provide an explanation for professors showing greater research productivity, suggesting that higher ranked staff have certain advantages over lower ranked members such as professional research networks, postgraduate students, familiarity with journal norms and the involvement in research teams. Another explanation is that higher ranked staff members are highly internally motivated and do not cease research when the prospect of promotion is no longer available (Hattie, Print and Krakowski, 1994; Ho, 1998; Tien and Blackburn, 1996).

2.4.4 Motivational factors

Motivation is the predominant factor which causes all human beings to want to achieve their goals. Increased motivational incentives improve employee performance (Ngu, 1998). People work for many different reasons but universities worldwide function with the same set of goals, being the imparting of knowledge through the medium of teaching, research and community services. To ensure the effective deliverance of knowledge, the need for well-qualified and competent academics staff arises. However, academic staff are not only driven by their ability or knowledge gained over the years but also by motivation, which implies that academic staff have a higher chance of reaching increased productivity when sufficiently motivated.

One part in the study of motivation which has shown positive results is incentives. An incentive is a promise given in order to encourage greater action. Graffin and Ebert (1993) have defined incentive schemes as special programmes designed to increase performance. Motivational incentives can be described as goals being externally influenced (Herbet, 1990). Motivational incentives have been linked to increased productivity in many organisations with great success (Paul and Marc, 2007). An incentive, such as special benefits, additional remuneration or job promotion, is given to employees to recognise their achievements or to encourage better work performance. An action-reward combination can result in the creation

of a habit. Incentives are given over and above salaries and wages and can be understood as additional remuneration or benefit recognition of a high standard of work. Therefore, a reward is a powerful motivational tool. Money is not the only incentive which can be used. Other motivational tools include promotions, job satisfaction and job security. Blackburn and Lawrence (1995) suggest that incentives can function in many ways such as:

- To increase productivity
- To enhance commitment in work performance
- To psychologically satisfy a person
- To shape the behaviour towards work
- To create enthusiasm towards work.

Blackburn and Lawrence (1995) distinguish between positive and negative incentives. Thus, positive incentives focus on the psychological aspects of employees; negative incentives are used to correct the mistakes of employees in order to get effective results. Positive assurance is provided by positive incentives. Positive incentives are most often used to satisfy the psychological requirements of employees. For example, promotion and praise is positive by nature (Blackburn and Lawrence, 1995). Negative incentives are used to correct the mistakes of employees in order to get effective results. The only time when negative incentives are used is when positive incentives do not work due to the employee having a psychological setback such as demotion or penalties (Blackburn and Lawrence, 1995).

Motivational incentives are grouped into monetary and non-monetary incentives. Money incentives create satisfaction by offering rewards to employees. People see money as the main source of need satisfaction. Therefore, social needs are satisfied in the process as it is possible to obtain material items. In terms of Maslow's theory, money satisfies both psychological as well social and security needs. As a result, many different forms of salary and bonus schemes are offered to motivate employees (Blackburn and Lawrence, 1995). Monetary incentives, according to Hongoro and Normand (2002), are given to employees to influence a specific behaviour. In addition to monetary incentives there are non-monetary incentives that also bring about the feeling of satisfaction (Blackburn and Lawrence, 1995). Non-monetary incentives include job promotion, job security and job satisfaction. They are focused towards the best interest of the community by moral motivation.

2.4.4.1 Categories of motivational incentives

2.4.4.1.1 Monetary incentives

Money incentives create satisfaction by offering rewards to employees. People see money as the main source of need satisfaction. Therefore social needs are satisfied in the process as it is possible to obtain material items. In terms of Maslow's theory, money satisfies both psychological as well social and security needs. As a result many different forms of salary and bonus schemes are offered to motivate employees (Blackburn and Lawrence, 1995). Cash incentives are schemes based on established performance criteria. Payment could be a sum of money or a money equivalent, such as savings bonds or shares.

2.4.4.1.2 Non-monetary incentives

Non-monetary incentives are used only to satisfy the psychological needs of employees. Listed below are different types of non-monetary incentives:

- Job security – This incentive provides great motivation to employees. Maximum effort will be utilised to achieve company goals if employees know their jobs are secure. This also reduces employee mental tension as employees have peace of mind.
- Recognition – This type of non-monetary incentive represents satisfaction of the employee's ego. Employee praise can be the most effective incentive as employees respond better to their jobs if given praise or recognition. Annual dinners or banquets can be held to recognise high-achievers and performers. Other methods of recognition include certificates or gold nameplates or being featured in the company newsletter or magazine.
- Job enrichment – Increasing responsibilities, content or nature of work will create job enrichment. This allows efficient employees to constantly challenge themselves and prove their importance in the organisation. This technique greatly improves the motivation of very efficient workers. Special benefits include paid leave or commissions earned over and above basic salary.
- Promotion options – An increase in work spirit is created by offering promotion opportunities. Promotion options satisfy the employees' need for advancement and growth in their careers and the creation of contentment allows employees to become

more committed to the organisation (Blackburn and Lawrence, 1995).

A combination of financial and non- financial incentives together effectively help in creating a motivated work environment (Blackburn and Lawrence, 1995).

2.4.4.2 *The role of motivation*

Previous studies conducted on research productivity have predominantly focused on external factors, including working environments and job characteristics (Buchheit, Collins and Collins, 2001). However, other factors such as internal and individual factors have also been suggested as having an influence on the working environment through perceptions (Boice, 1992; Deci and Ryan, 1987; Diamond, 1993). It is of importance to investigate both contextual and individual differences. Motivation theory can shed additional light on the personal and social dynamics that may promote or inhibit faculty members' research productivity (Hardré *et al.*, 2007). The current study makes use of three strands of motivation theory, namely, intrinsic versus extrinsic motivation, self-determination and social support, and self-efficacy.

2.4.4.2.1 Intrinsic and extrinsic motivation

Intrinsic and extrinsic motivation are two different types of motivation which provide reasons why certain outcomes can be predicted across different life stages and working environments (Deci, 1995; Pintrich and Schunk, 1996; Sansone and Harackiewicz, 2000). Intrinsic motivation is what leads an individual to engage in a specific activity from interest or enjoyment of that activity. On the other hand, extrinsic motivation leads an individual to participate in an activity because of external pressures or incentives (Reeve, 1995; Sansone and Harackiewicz, 2000).

In all types of environments, whether academic or work based, intrinsic motivation tends to predict effort, enjoyment and achievement. Extrinsic motivation tends to predict the lack of enjoyment and reduced performance as well as a tendency to take risks (Deci and Ryan, 1987; Pintrich and Schunk, 1996; Reeve, 1995). A study by Colbeck (1992) provides evidence that salary plays no role in productivity and that no relationship exists between incentives and the motivation of faculty staff members.

Intrinsic motivation can be described as consumption motivation and extrinsic motivation can be described as investment motivation (Chen, Gupta and Hoshower, 2006). Researchers who are consumption based tend to place more focus on psychological satisfaction and self-actualisation through the completion of research papers and the addition to knowledge in the field. This type of research is considered self-rewarding (Levin and Stephan, 1991).

In contrast, researchers who are investment based tend to be motivated by external factors such a promotion or payment (Tien, 2000).

Both intrinsic and extrinsic motivation have an impact on research productivity. Chen, Gupta and Hoshower (2006) investigated the influence of faculty motivation on research productivity. The faculty members fell into two distinct groups: tenured and non-tenured. Non-tenured academic staff were extrinsically motivated to conduct research by salary increases or promotion opportunities whereas tenured staff members were intrinsically motivated to conduct research. Extrinsic factors can be said to be short term forces when compared to intrinsic motivation which are long term forces.

Motivation is affected by how those in positions of leadership and influence communicate values and contingencies (Bland *et al.*, 2005; Deci and Ryan, 2000), as well as by the explicit or implicit social norms of the group (Deci and Ryan, 2000; Lazear, 1998). According to self-determination theory (Deci and Ryan, 1987), individuals' perceptions of themselves as autonomous (given choice and freedom in their work) predict their well-being, work effort and performance (Deci and Ryan, 2000). Similarly, individuals' perceptions of themselves as competent (capable) in their work cause them to put forth effort and engage fully in work-related tasks (Deci and Ryan, 2000). The third element of self-determination, that is, relatedness, refers to the degree to which individuals feel interpersonally supported by supervisors and others and also predicts job performance and satisfaction (Deci and Ryan, 2000).

The following theories assist in the explanation of how these factors are interlinked and why they have a significant effect on research productivity.

2.4.5 Self-Efficacy theory

Task-specific self-efficacy has previously been thought to predict positive motivation resulting in positive outcomes (Bandura, 1997). Self-efficacy is defined as individuals'

perception of their ability to take on and complete tasks, achieve personal goals and face challenges (Bandura, 1997; Reeve, 1995). Across many higher education institutions, self-efficacy was found to be significantly related to research productivity (Blackburn *et al.*, 1991). Although self-efficacy theory may not be considered a motivation theory, previous studies conducted by Blackburn and Lawrence (1995) and William (2003) have successfully used this theory. Self-efficacy theory can be closely linked to expectancy theory (Bandura and Locke, 2003; Vancouver, Thompson and Williams, 2001). Bandura (1977, 1982, 1986, 1997) introduced the notion of self-efficacy in studies of self-regulation. He describes it as the confidence individuals have in their own abilities to organise and execute a course of action in order to achieve their goals (Bandura 1997). He suggests that self-efficacy plays a vital role in an individual's self-regulation (Bandura, 1991). Bandura (1977) explains that individuals' behaviour is motivated by self-review of their own actions; individuals partake in activities in which they either have the ability to handle situations or they avoid situations they feel they may not be able to handle. Thus, a comparison is made between what comes easily and activities which may be perceived to be more difficult. According to Bandura, the allocation of resources also plays a part in the completion of a task. Self-efficacy theory can be used to illustrate how much effort will be expended and how much time will be spent on challenges being faced in relation the attainment of goals (Bandura, 1977).

Self-esteem and self-concept are different from self-efficacy. Self-esteem and self-concept tend to be relevant across various situations. Self-efficacy on the other hand is task-specific. Self-efficacy varies with experience, learning, and performance feedback (Bandura, 1977). Gist and Mitchell (1992) made a bold statement indicating that efficacy is derived from four important sources, namely, performance accomplishment, vicarious experiences, verbal persuasion and physiological arousal. Bandura (1982) states that a person's behaviour patterns are created through observation of other people, resulting in a type of guide for further action. The discussion above indicates that highly efficacious individuals act and think differently to individuals who perceive themselves as inefficacious (Bandura 1986). This suggests that personal achievement requires skill and a belief in the individual's ability to use this skill and experience.

Self-efficacy is shown to be directly linked to academic research productivity in a study by Taylor, Locke and Gist (1984). In this study, self-efficacy is positively linked to the setting of goals since the achievement of an individual's goals has the ability to reaffirm confidence

levels, which will in turn positively affect the setting of more challenging goals in the future. In accordance with this, Landino and Owen (1998) found that faculty's research productivity was positively correlated with self-efficacy. Interestingly Vasil (1992) found that an increased perception of self-efficacy increased academic research productivity.

Research self-efficacy is gained from personal performance experience (Bandura, 1997). Thus, research training would provide academics adequate opportunities to acquire research and publication skills (Williamson and Cable, 2003). These acquired skills would impact on the individual's confidence to conduct, write and publish research (Bazeley, 2003).

Therefore, research training has a direct impact on the research productivity of academic staff members. Indirectly the academic staff members' confidence can also be improved through adequate research training before attempting to conduct research. Many empirical studies have used self-efficacy as an explanation for research productivity. For example, Bieschke, Herbet and Bard (1998) adopt a social, cognitive framework by examining factors such as demographics, self-efficacy, research outcome perceptions and interest in research. They conclusively state that self-efficacy plays a central role in research productivity.

2.4.6 Self-determination theory

According to Deci and Ryan (1991), self-determination theory is a humanistic theory of well-being and motivation. The description below is drawn from their account of self-determination.

The main idea behind the theory is that individuals have tendencies towards personal growth that are either thwarted or satisfied by their immediate environment. The prime conditions which exist for these tendencies to be enacted are the satisfaction of psychological needs. These psychological needs include the need for competence in individuals' ability to correctly choose an environment which is important to them. The full satisfaction of these needs results in optimal individual motivation and well-being. However, if these needs are not fully satisfied, an individual experiences high deficits in both well-being and motivation.

Self-determination theory distinguishes between two types of motivation, namely, amotivation, which is the lack of motivation, and motivation. Amotivation is the intention

not to perform an action. Motivation, on the other hand, is the intention to perform a task. Self-determination theory further breaks down motivation into autonomous motivation and controlled motivation. Autonomous motivation deals with intrinsic motivation and extrinsic motivation which is well externalised. Therefore, autonomous motivation is the result of being interested in the activity or task. Controlled motivation involves external regulation. Thus controlled motivation is due to the degree an individual is the result of external forces (Deci and Ryan, 1991).

Autonomous motivation, controlled motivation, and amotivation are concerned with an individual's relation to the specific task or activities on hand. These motivational concepts are predicted both from aspects of the social environment and individual differences. The social environment or working climate is characterised as being autonomously supportive, controlling or amotivating. Individual differences are considered to be more trait-like concepts. Therefore, the degree of autonomous motivation in a job context is predicted by autonomy support and causality orientation. Similarly, the degree of controlled motivation is predicted by control of work and an individual's own controlled causality orientation. Amotivation is predicted from amotivating aspects of work and impersonal orientation. Finally, the concept of basic psychological needs for competence specifies aspects necessary for a social environment to be classified as autonomy supportive, controlling, or amotivating (Deci and Ryan, 1991).

The main reason research receives so much attention at many universities is due to the reward structures they are supported by (Hum, 2000; Sharobeam and Howard, 2002). Rewards in many tertiary institutions could be categorised to include promotions, employment, tenure and possible salary increases (Fan, 1997; Ho, 1998). Tien (2007b) conducted a study in a Taiwanese University to determine how research productivity was rewarded. It was found that the higher the number of publications published, the higher the rate of promotion. Highly research productive staff were receiving more promotions, irrespective of rank, compared to non-productive staff members.

Another study conducted by Tien (1994) in which motivation was investigated as an influential factor on research productivity also supports the finding that research productivity and rewards are positively correlated. Melguizo and Strober (2007) focused on explaining how salaries paid to faculty members by using the prestige maximisation model. The main

focus was to see if faculty members were being paid according to the prestige they brought to the university. Prestige brought to the institution can be described as research inputs and outputs.

Research inputs are measured by the institutions in which staff members obtained their qualifications and research outputs are measured by publications in journals and books as well as patents. Through regression analysis it was shown that the two were positively associated with each other in that the prestige brought to an institution was financially rewarded; some academics thought financial rewards a stimulating factor in enhancing research productivity (Hemmings, Rushbrook and Smith, 2007).

Because many research studies have been conducted on research productivity in different industries, indicating a large number of possible factors as affecting research productivity, there is some difficulty in drawing generalisations from this work. Although many of the studies discuss the categories of factors, the results still vary from study to study. Another problem which arises is that not all the studies conducted are theory based, making it impossible to make a cross-study comparison. Most of the studies are based on specific disciplines or departments and what may be a significant influence in one department may not have the same effect in a different discipline. There are additional contextual differences which vary between institutions as well as across continents. In addition, while quantitatively based studies have a tendency to use correlation analysis, correlation does not allow for a link to be drawn between the variables in question (Creswell, 2008). Researchers can only argue about the influences the different factors have on research productivity. This could possibly compromise the study.

2.5 A South African context

In this section the discussion focuses on the state of South Africa's research productive environment and why it is imperative for South Africa to identify specific factors to increase the current standard. The discussion begins with an examination of why change is so important and the policies and legislation that have been put in place to enforce the required change. This is then followed by an in-depth discussion of South Africa's research funding, working conditions, academic remuneration, management of tertiary institutions, equity and excellence, and institutional collaboration within the higher education industry. Subsequently,

the transformation of the higher education department from the pre-apartheid to a post-apartheid situation is discussed. Finally, an explanation of the gap this study intends to fill is provided.

Academic research is in crisis in South Africa according to the Department of Science and Technology's (DST's) National Research and Development Strategy (R and D Strategy). This strategy has indicated that South African research spending has declined from 1.1% of Gross Domestic Product (GDP). This percentage is noteworthy in comparison with the spending by the Organisation for Economic Co-operation and Development (OECD) countries of an average of 2.15% of GDP across all sectors (Government of the Republic of South Africa, 2002). However, the problem is much greater than the overall spending of the country since there is also a decline in South Africa's international research productivity.

South Africa's public research productivity has stagnated over the last fifteen years according to independent assessments (Pouris, 2003). South Africa's current researchers are getting old while at the same time there are no researchers ready to replace them in order to maintain productivity. This accounts for the steady decrease in the country's research productivity. The current research population is mainly made up of older white male individuals and insufficient researchers of other races. Unfortunately, due to South Africa's history, this situation will continue until equality is achieved (Government of the Republic of South Africa, 2002).

Recently the government has moved into gear to reduce this crisis and possibly turn it around. The government is focusing on many different initiatives, one being the reorganisation and redirecting of funding towards academic research. A conference organised for the Department of Science and Technology by the Africa Institute and the Human Sciences Research Council (2005) focused on revitalising South Africa's research productivity. This is the result of the government's uneasiness concerning the consequences of the current situation for economic development, political democracy and tertiary education. The conference will be discussed in greater detail in the next section.

2.5.1 The conference agenda and plan of action

The conference was conducted by way of a summit in which conversations took place among different stakeholders in order, firstly, to come up with the most important objectives which

need to be addressed to better the country's research output and, secondly, to put a strategic plan in place and ensure its implementation. The conference adopted a plan consisting of the following objectives (Department of Science and Technology and Department of Education, 2005b):

- Recruitment and retention of high-level scientific and technological personnel, and the promotion of partnerships between universities, research councils and industry in support of this agenda.
- Careful attention to the support of advanced study, to its form and content, and appropriate incentives.
- Linking the research agenda to national priorities, and allocating funding accordingly.
- Increasing national investment in research in ways that also leverages quality overseas and domestic involvement.
- Promoting South Africa's role in Africa as a leader in scientific research for continental development.
- Engaging with scientific globalisation so that South Africa becomes a hub in appropriate research areas, and attracts talented researchers.

The above plan has been put into place in order to retain good academic staff members and students within the higher education system as well as to create a new generation of scholars in the research field. Encouragement is being given to research areas which will benefit the economy and society as a whole. There is also a focus on the promotion of collaboration among institutions across national boundaries. The implementation of the plan needs to overcome four related aspects, namely, the inadequacy of academic remuneration and difficult working conditions, the tension amongst the equity participants involved, the obstacles that prevent collaboration amongst tertiary institutions and the poor quality of management at higher education institutions.

2.5.2 Research funding, academic remuneration and working conditions in the higher education sector

A quality workforce within the higher education system can be developed and maintained in the following ways: firstly, the academic staff members need to be fairly remunerated; secondly, the availability of financial resources needs to be adequate; and, finally, working

conditions should be appropriate. If these factors are not present, system incentives will not be enough to retain the good academic staff members required to maintain and increase the research productivity standard.

Three changes are urgently needed to the way academic staff members are remunerated. One is that the standard of payment at the various institutions needs to be raised overall. Salary scales paid to academic staff have declined significantly over the last twenty years. A study conducted by Kubler and Roberts (2005) showed that South African academic salaries are between those of the commonwealth countries of Malaysia and the United Kingdom, Canada, Australia and New Zealand. In relation to other professions, tertiary related salaries have significantly declined. The South African Universities' Vice-Chancellors Association (SAUVCA) reported that, viewing the trends over time, tertiary related salaries cannot be compared to those in the private sector and that they increase at a much slower rate when compared to other industries (SAUVCA, 2004).

The problem lies in the fact that in other industries graduates are being employed as directors and being paid a salary equivalent to that of a professor with twenty years' experience. Research is no longer being viewed as an occupational need any more. This has resulted in top achieving postgraduate students moving away from research occupations and in established researchers, who should be focused on rearing the next generation of researchers, having to supplement their current salaries by performing commissioned and consultancy research (Department of Science and Technology and Department of Education, 2005a).

Management at tertiary institutions have paid careful attention to ensuring that all salaries are market related but have paid no attention to salaries being a fair remuneration for well-established researchers (Kubler and Roberts, 2005). If this issue is not resolved, research productivity will continue to decline in the future. However, it must be noted that an isolated salary increase will not solve the current situation at hand. Money will not solve the problem as there are inadequate resources available to remunerate appropriately all academic staff of different ranks.

South Africa has based remuneration on a British system defined by standardised and egalitarian patterns of payment packages at the different research levels. However, this comes with the price tag of rewarding hard-working and productive researchers with money.

It should be noted that it is not necessary to link remuneration and research productivity in order to maintain research productive staff members (Kubler and Roberts, 2005).

The American tertiary industry has set a precedent in allowing senior professors to negotiate their salaries on an individual basis. This system may not result in balance or equality but it does result in higher productivity. South Africa has also set its own precedents. There have been two examples of this worth noting in the recent past, one being the Human Sciences Research Council (HSRC) approach and the other that of the University of KwaZulu-Natal, a merger of the previous University of Durban Westville (UDW) and the University of Natal. The HSRC had gained many quality social researchers by using inflated salaries in comparison to tertiary institutions. This method resulted in the institution's productivity, which was measured using peer reviewed journal publications, significantly jumping from 0.18 units per researcher in 1997 to 0.8 per researcher in 2004 (Human Sciences Research Council, 2005). UDW put a different type of reward system in motion in 2002. This reward system made use of rewards linked to academic research codes. This system resulted in the productivity of the Natal component of the university increasing from 448 to 582 SAPSE units between the years of 2001 and 2003 (University of KwaZulu-Natal, 2004). The above mentioned scenarios indicate that monetary rewards can significantly increase research productivity.

Nevertheless, it is not realistically affordable to remunerate productive researchers at an inflated rate. It has been seen over many years of research that the production of research papers does not follow a normal bell shaped distribution but rather an exponential one. This is confirmed by the fact that many researchers produce papers at a low rate and very few produce at a high rate. Therefore if remuneration is linked to productivity, it will only reward a few researchers within the field resulting in it becoming more affordable. Resources would then be directed towards a reduced numbers of researchers. This would encourage young and upcoming researchers to become more research productive, so leading to an overall increase in the country's research productivity and contributing to national knowledge.

The architecture of tertiary remuneration needs to be transformed. Currently the system is structured in such a way as to give preference to managerial positions rather than the core functions required, such as teaching and research (Macfarlane, 2004). This type of system encourages academic staff members to focus on becoming part of management if they wish

to earn higher salaries. Thus staff members tend to migrate towards managerial positions because of the higher payment packages. This has many consequences, one being the loss of senior academic staff members within the core objectives of teaching and research. The result is detrimental to the higher education industry in terms of demographic representation and to the country because of damage to the national intellectual reputation, as well as to economic growth and development.

However, transformation of the remuneration of academic staff will not be sufficient to increase the country's research productivity. In addition to the above changes, working conditions need to change appropriately as well. Previous studies have shown that South Africa's professional environment has become more stressful and pressurised over the last ten years. In a study conducted by Webster and Mosoetsa (2002), the results show that academic members teach and mark more and that a more commercial approach to management has demoralised and stressed staff to the point that research output has declined. Thus working conditions need to be radically changed as soon as possible in order to increase research output.

The changes suggested above do not imply that teaching and marking are not important as they make up the core functions of any tertiary institution, resulting in stability and future prosperity. However, there is a demand to encourage the new generation of students to be involved in research. Without better remuneration and working conditions the coming generation will not be attracted to becoming involved in research. Therefore, good working conditions and fair remuneration are important to a productive education system.

2.5.3 Management of higher education and research

When the management of tertiary institutions is in question, various issues come into focus. Firstly, the inequality of salaries between academic staff and administrative staff has a negative effect on research productivity; secondly, South Africa uses a system whereby researchers are financially rewarded for their successful research in ways that differ among the various institutions; thirdly, any shock or adjustment to society also affects universities; and finally, empowerment policies tend to have unexpected influences on universities.

Many programmes and departments aim to balance their racial and gender differences. This

normally means the incorporation of more black candidates. Given the historical nature of educational privilege, this has a great effect, resulting in important positions not being filled for lengthy periods of time due to the need to fill them with black candidates. Another consequence is the influx of young and inexperienced black academics that are not able adequately to perform the function required (Habib, 2001).

Higher level management is filled by publicly advertising available positions. However, this does not mean that there are no other influences due to the nature of the position. Second level management vacancies in research are generally filled by candidates who have held managerial positions in previous institutions rather than those who meet the needs of the post itself, creating a dynamic research administration. The process of hiring has various effects on the type of management to be implemented. It can be said that research managers know how the world works and what makes up the world, yet on the other hand top management publishes fewer academic papers (Habib, 2001). The main issue with management is that little or no attention is paid to the history and legacies of the country, including our unequal higher education system and research environments. It stands to reason that formal power does not mean real power. The higher education department has become more bureaucratic and less focused on core values, functions and objectives (Habib, 2001).

2.5.4 Equity and excellence

In contemporary South Africa, equity is a key theme. Equity comprises many dimensions but the most significant element in South Africa is race. Universities and research councils have to deal with issues of racial equity. This also affects the maintenance of tertiary institutions' research profiles. Thus the transformation of South Africa's knowledge system is made up of two parts, the first aspect being racial equality and the second being the quality of research.

Before these aspects can be discussed in detail, it is important to mention that the quality of research produced has nothing to do with the colour of an individual's skin. Going one step further, the constitution and the legislation regarding redress specifically state that racial equality should not be sought at the expense of quality. However, in practice tension still exists between these two elements. As a result, there is increasing pressure on the higher education and research departments to address racial equality, with the main aim being to focus on empowerment of the previously disadvantaged rather than to focus on

egalitarianism. The challenge is now to manage the tension so as to not cause further harm and to attempt to make progress towards a more racially equal knowledge system without causing irreversible damage to research productivity (Cloete, 2005).

Research productivity has no direct link to democracy except that democratic policies enable the availability of information and education which will encourage the emergence of young talented researchers. Democratic environments provide researchers with the tolerance required to flourish. Research is dependent on merit and not a specific representation. Merit in a research context consists of many different elements. These elements include imagination, judgement, experience and intelligence. Productive researchers change over time and intelligent researcher's only peak once they have attained their Ph.D. qualification. Merit used in research cannot be defined using a single approach. Studies, even in similar areas or fields, indicate that merit makes use of various approaches, such as different types of evidence, judgements, methodologies and conclusions (Cloete, 2005).

There are many issues which arise in working towards equity in research in a contemporary South Africa. Institutional and personal research profiles in South Africa relate significantly to racial origins and social class, even though this is not necessarily reflected in the research approaches chosen by them (Jansen, 2004). The current national research profile consists of ageing white males as mentioned previously (Jansen, 2004). This situation cannot be changed immediately, given the nature of education as a gradual process. The current structure needs to be gradually dismantled and modified on an incremental basis. There is excessive pressure to balance researchers' racial profiles as quickly as possible. Targets have been set to try and achieve this objective but departments are struggling. A method enforced to speed up the process is to encourage retirement and many tertiary institutions have changed their retirement age from 65 to 60 in order to open up space for new academic researchers so as to achieve a more equal demographic representation (Jansen, 2004). Positions are often not filled for long periods of time due to difficulties in identifying previously disadvantaged individuals who are adequately qualified. The diminishing of academic titles is a direct consequence of premature promotions. Previously disadvantaged individuals who are talented and highly qualified are being sought after and offered attractive financial rewards, outside the research profession (Jansen, 2004). Jonathan Jansen has argued that a university will cease to exist if it is only an empty shell of racial representation at the expense of academic substance and intellectual imagination (Jansen, 2004).

It may be said that normality will eventually be achieved in time and of its own accord. An increase in previously disadvantaged researchers will emerge and the pressure of having to appoint previously disadvantaged candidates will slowly diminish. Eventually there will be an equal representation at all the levels of research as seen in other professions and the need for affirmative action will fall away. This indeed is the ultimate goal for a young democracy continuing to right the country's previous wrongs. Nevertheless, South Africa cannot realistically wait for this issue to be corrected over time. Research is very important to many aspects of life and South Africa cannot afford to fall behind international research standards. South Africa is in real danger of not being able to replace its current research profile. Another option is make use of the research talent available in other countries especially on the African continent; however, South Africa is not in a financial position to pay these researchers attractive sums of money for their assistance on large scale (Kahn and Blankley, 2005).

From the above discussion it is evident that there is an uneasy balance between equity and excellence in the country. It is imperative that South Africa gets this balance right. Equity will not benefit in the long run if research is damaged to the extent that it causes a downward spiral. It is also important to maintain the current expertise to support the upcoming generation of researchers (Fiske and Ladd, 2004).

2.5.5 Institutional collaboration

The Human Resources for Knowledge Production in South Africa has emphasised the essential need, under current conditions, for collaboration in focused groups (Habib, 2001). It is not always possible to expect such focused groups to be formed within a single institution. Therefore in order to form groups, institutional boundaries need to be crossed. Many forms of collaboration can occur. One form of collaboration involves the joining of research institutes through logical need and not as a result of formal pressure or requirements. Another form would result from the desire to make use of the expertise and facilities available in various national, regional or even international institutions.

South Africa has recently overcome certain barriers preventing collaboration amongst different research institutions through the recent restructuring of the higher education system. Fundamentally, the most significant factor is the reduction in costs. This was achieved by cutting through the racial inequality previously evident in the division of the higher education

system (Gibbon, 2001a, 2001b; Habib and Parekh, 2000). Nevertheless, the process has not been without difficulties and the consequences are still being felt (Jansen, 2003). Top tertiary institutions are highly complex and the adjustment shocks felt due to their realigning leave a significant mark even if it is for only a short period.

The uncertainty experienced in the working environment has the effect of diverting attention away from the core functions, of which research is one. However, the uncertain nature of the academic structure and internal bureaucracy often makes it difficult for successful research collaboration to take place. The issues of introspection and self-absorption tend to have been directly linked to the low level of institutional collaboration between tertiary institutions and research councils. This is only one of the many reasons that could explain the situation currently being experienced.

The current movement towards investment recovery and self-reliance in the contemporary academic industry is especially evident in the science councils. Science councils are required to generate most of their funding from their research activities. This has the effect that the councils cannot allow any of their employees to be tied up in research that will not contribute towards their vital revenue generation. However, it must be noted that this does not prevent collaboration with universities; it just makes the collaboration a little more difficult. This increased pressure to produce puts a price tag on adequate research and turns the focus away from excellent research. With all that needs to be done, it is almost impossible to make time for the mentoring of postgraduate students, which happens to be the heart of any tertiary institution's research agenda (Council on Higher Education, 2004).

The collaboration among different tertiary institutions reaches far beyond national boundaries. South Africa is currently at an intersection. On one side, there are powerful regional and continental institutions whose research weight can be felt far into the African continent. On the other side, there is the issue of societies who are vulnerably insignificant and the rate of whose research productivity is declining. The Council on Higher Education report released the following comment: "South Africa has the best developed national research and innovation system on the African continent, although its standing in the wider international research array has weakened" (Council on Higher Education, 2004).

Globalisation implies that South African research must operate in a context in which knowledge is fluid and immediately communicable. It was mentioned in the conference of

the Human Resources for Knowledge Production in South Africa that collaboration with the rest of the African continent will assist in the development of the African continent. These aspirations need to be realistically assessed by taking note of regional and continental situations. Although across Sub-Saharan Africa there may be pockets of research excellence, the reality is that most of the continent is severely under-resourced and not up to date with the latest research developments. The best of the African researchers are severely under-remunerated and therefore are forced to make the choice of leaving their home towns and institutions and finding employment in other countries, many choosing South Africa. Many of the research activities conducted in African countries are to earn a sustainable living. However, in South Africa this process works very differently. Academic members in high positions are remunerated to a greater extent in comparison to productive researchers (Lebeau and Ogunsanya, 2000). Collaboration in domestic, regional and international contexts means that the availability of adequate resources is crucial but it takes different forms in these three environments.

The reduced support offered by the government, especially in the science councils but also in universities, favours funding obtained from domestic or international donors, whether industry or commerce. Research funding has never been an easy process. However, the reduced funding received from the government has limited the options available for collaboration and reveals research agendas that are not always formed with the South African public's best interest at heart. Research institutions should encourage collaboration as it has many benefits. Collaborating allows larger scale projects to be undertaken and it enables the use of many excellent researchers, therefore saving on staff expenses. The use of resources plays an essential role in collaboration between South African, regional and continental researchers. South Africa holds the power in this regard. Due to the limited research base across the continent, African research institutions cannot negotiate for equality, therefore allowing South Africa to have full control of the relationship. South Africa needs to ensure that research relationships are fair and equal in all respects, despite political and economic obstacles (Council on Higher Education, 2004).

This approach may be considered idealistic; however, it is the only possibility in this situation. In an international context South Africa does not have all the control in terms of research and research productivity. South Africa needs to focus on its research needs and identify what it may and may not do. South Africa also needs to identify its comparative

advantages. Many South African researchers find themselves in a much better position to collaborate internationally in the context of equality compared to many other researchers from the African continent. In order to maintain and increase research productivity, South Africa needs to form a strong international network for collaboration (Kahn and Blankley, 2005).

2.5.6 Transformation in the Higher Education Department

Social inequalities are evident in all aspects of life in South Africa due to the previous exclusion of the black race during apartheid. The higher education industry is no stranger to these inequalities. Discrimination can be social, political or economic. Inequalities such as class, gender, race and the nature of the institution have significantly shaped and will continue shaping the higher education industry of South Africa into the foreseeable future. Nevertheless, the new democratic government of South Africa committed itself in 1994 to the transformation of the higher education industry by righting all the wrongs of apartheid's social and economic structure. In the post-apartheid era many changes have occurred within the higher education industry. Many initiatives have been implemented to effect change. These are included in the goals of higher education, namely, extensive policy research, policy formulation, adoption, and implementation in governance, funding, academic structure and programmes and quality assurance; the enactment of new laws and regulations; and major restructuring and reconfiguration of the higher education institutional landscape and of institutions (Republic of South Africa, 1996).

The 1996 Constitution of South Africa, The Act of 1997 and the White Paper have focused the tertiary institutions and the government on initiatives in and through the higher education system. The assumption was made that significant progression would thus be made in transforming and developing higher education and society. The South African Constitution forms the basis for the commitment by tertiary institutions to assert values of human dignity by achieving equality, advancing non-sexism and non-racialism as well as the human rights that the Bill of Rights proclaims. The Bill of Rights states the need to “respect, protect, promote and fulfil the rights” (Republic of South Africa, 1996). Thus the Higher Education Act (1997) has created a single coordinated higher education system, with restructuring and transformation of programmes to respond better to human resources, economical and developmental requirements in South Africa, realigning the history of discrimination, ensuring equal access and contributing to advancing different forms of knowledge in

maintaining international academic quality standards. The Act also proclaims that it would be ideal for higher education institutions to have freedom and autonomy of relationships with the government in the context of public accountability and the vital national requirement for the advancement of skills and scientific knowledge.

The White Paper has identified many social objectives which higher education intends to serve:

- Mobilisation of human talent through continuous learning” (DoE, 1997, 1.12), and the provision to the labour market with knowledge-driven candidates in an ever-changing society with expertise essential for growth and prosperity in a modern economy (ibid:1.3)
- The undertaking to produce, acquire and apply new knowledge as well as contributing towards creating, sharing and evaluating knowledge (ibid: 1.12, 1.3).
- Addressing the developing needs of society and identifying the obstacles and challenges faced on the African Continent (DoE, 1997:1.3, 1.4).
- Making a contribution towards a social, cultural and intellectual life in a complex society, and assist in laying a foundation of a civil society which includes a public debate culture and tolerance (ibid: 1.12, 1.3, and 1.4).

Essentially, the main purpose of the core functions of tertiary institutions is the delivery of knowledge and the production of valuable, skilful graduates who have the ability to apply and produce knowledge through research and development activities. These activities will contribute socially to developing the new democracy through teaching, learning, research and community endeavours.

As part of the “vision...of a transformed, democratic, non-racial and non-sexist system of higher education” (DoE, 1997:1.14), the higher education department was required to develop certain goals. These were as follows:

- Increasing and broadening the participation of greater access for black, women and the disabled as well as equality for chances in success, while simultaneously removing all forms of discrimination (DoE, 1997: 1.13, 1.14).
- The restructure of the higher education system to meet the ever-changing needs of a technologically advanced economy and the delivery of the perquisite research, highly

skilled people with the adequate knowledge to develop a society and address the national needs and to be able to participate in a complex and continuously changing global market (ibid:1.13).

- The conceptualisation and planning of the higher education in South Africa into a single, well-coordinated system, to ensure diversity in the organisation and the institution and the diversification of the system in the context of terms missions and programmes required to meet national and regional requirements for all round development (DoE, 1997: 1.27, 2.37).
- The creation and enabling of an institutional environment which is sensitive to and concretises diversity, promotion of reconciliation and respect for human life, the protection of individuals dignity including racial and sexual harassment as well as rejecting violent behaviour (ibid:1.13).
- The improvement in the quality of teaching and learning in the higher education system specifically in terms of a regional and national context and the promotion of quality assurance through accredited programmes (ibid:1.27).
- The development and implementation of funding mechanisms in supporting the goals of the national higher education plan (DoE, 1997:1.27).

The White Paper explicitly states the principles and values embodied and promoted by the higher education department. The principles and values referred to above include equity and redress, quality, development, democratisation, academic freedom, institutional autonomy, effectiveness and efficiency, and public accountability (DoE, 1997:1.18-1.25).

2.5.6.1 *Mediating competing goals*

There has been extreme tension among the various values and goals of higher education. The government has decided to address the issues of social equity and quality at tertiary institutions at the same time, giving rise to many social and political dilemmas, especially in terms of public finances and the development of academic initiatives to provide support for black students who come from disadvantaged backgrounds. If the government had only to focus on the redressing of social equity without public finance and development strategies, the quality of graduates produced would be negatively affected, compromising their

knowledge, competency and skills, which would in turn affect economic development. On the other hand, if attention was paid only to economic development and quality standards, then unfortunately the racial and gender structure embodying the apartheid era would still in place. The above example represents paradoxes which exist in the attempt to transform the higher education department towards achieving higher research productivity rates (Cloete, 2005).

It should be noted that such paradoxes and the difficulties caused by political and social dilemmas need to be solved with creative policy implementation to balance the competing goals in the pursuit of the desired goals.

2.5.6.2 *Post-school education*

During the year of 2008, there were only 874,680 students attending South African higher education institutions. Of these 799,490 were attending public institutions while 75,190 were at private institutions. It must be noted that 41.6% of 18 to 24 year olds are not in education or training and neither are they in employment. This does not constitute an educational crisis but rather a social and economic disaster (Cloete, 2005). These statistics indicate a significant need to expand opportunities for further education in terms tertiary education. The National Plan for Higher Education used the statistics to set a target of a 20% participation rate by 2016. Shockingly this rate had only increased by 1% by 2008, which demands significant intervention since this rate has detrimental consequences for social and economic development.

The Department of Higher Education and Training (DHET) intends to incorporate an additional 100 000 students into the higher education system. Even though the universities are currently packed to capacity, there is also a significant need to increase pass rates, graduation rates and the quality of graduates leaving the tertiary institutions. This in turn will positively affect the research productivity rate. The above discussion shows the importance of the expansion of the higher education system (Department of Education, 1997).

2.6 A gap in the literature

In this survey of the literature, personal factors (life and career changes, intrinsic interest, self-efficacy), contextual factors (departmental support, teaching, advising and external

funding) and motivational factors (monetary and non-monetary factors) were discussed in turn. There have, however, not been any studies dealing with all three of these factors together except for a study completed by Hardré *et al.* (2007), which was carried out across the US. Therefore, no study has been conducted in South Africa's tertiary education industry investigating the impact these three factors have in this specific environment. No assumption can be made that the results obtained in the Hardré *et al.* (2007) study will pertain to the South African environment considering that South Africa does not have as stable a working environment as other international industries. Therefore there exists a gap for further investigation which this study intends to fill.

Chapter Three

Research Methods

3.1 Introduction

This chapter explains the research methodology, and paradigms, the sampling techniques to be used, data collection method, validity, reliability, data analysis as well as descriptive and inferential statistics. The chapter reviews the objectives of the study, hypotheses and other detailed analysis pertaining to the study. This chapter describes the structure and guidelines followed and provides an understanding of the way in which the analysis differs according to the aspects being investigated.

3.2 Objectives of the study

The objectives of this study are:

- To investigate how personal factors (life and career changes, intrinsic interest, self-efficacy) impact on research productivity at UKZN.
- To investigate how contextual factors (departmental support, teaching, advising and external funding) impact on research productivity at UKZN.
- To investigate how motivational factors (monetary and non-monetary incentives) impact on research productivity at UKZN.
- To investigate how biographical differences (gender, school, discipline, title, years of experience) impact on research productivity at UKZN.

3.3 Research paradigms

Different approaches to research can be described as paradigms. A paradigm can be described as a combination of assumptions or a world view regarding how things work. The role of the

researcher and the manner in which research should be conducted vary depending on whether quantitative or qualitative research methods are used (Johnson and Onwuegbuzie, 2004). The three types of research outlined below fall into the category of either qualitative or quantitative research:

- **Exploratory research** is based on the concept of people and situations not known well by the researcher.
- **Descriptive research** involves people and situations in which the researcher has a faint idea but wants to describe an observation made.
- **Explanatory research** is based on hypotheses derived from various published theories.

Exploratory research is based on observations or interviews and therefore falls into the qualitative paradigm. Explanatory research involves hypothesis testing and is best described as quantitative research. Descriptive research deals with quantitative research techniques but may also contain a mix of qualitative or quantitative methods.

An explanatory research approach is to be used in this study. A quantitative research method is used in addressing the research questions to gain an understanding of the research problem. According to Johnson and Onwuegbuzie (2004:18), “research methods should follow research questions in a way that offers the best chance to obtain useful answers”.

3.3.1 Ontology

The term ontology can be described as the theory of being. It involves questioning if there is a real world which is independent of knowledge. A political context may differ in terms of the social and political knowledge acquired. Therefore either the world exists independent of our knowledge and provides a foundation for knowledge or the world is constructed and dependent on time. These distinctions led to two types of ontology, namely, objective and subjective. Objectivity is a central philosophical concept, related to reality and truth. Generally, objectivity means the state or quality of being true even outside of a subject's individual biases, interpretations, feelings, and imaginings. A proposition is generally considered objectively true (to have objective truth) when its truth conditions are met and are

"bias-free", that is, existing without biases caused by the feelings and ideas of a sentient subject. In this study the objective (objectivism) approach was used (Bartlett, Kotrlík and Higgins, 2001).

3.3.2 Epistemology

Epistemology is defined as the theory of knowledge. Epistemology refers to what we can know about the world and how we can go about gaining this knowledge (Marsh and Furlong, 2002). Positivism adheres to the view of only factual knowledge being obtained through observations. The role of the researcher in positivist studies is limited to data collection and interpretation through an objective approach (Collins, 2011). In positivist studies, the researcher is independent of the study and there are no influences from human interests. If a positivist approach is used in a study, it is believed that the researcher is independent and purely objective (Crowther and Lancaster, 2008). In other words, studies within a positivist paradigm are based purely on facts and consider the world to be external and objective. This study makes use of the positivist paradigm.

In the table below, the basic beliefs of alternative paradigms are explained.

Table 3.1 Basic beliefs (metaphysics) of alternative inquiry paradigms

Item	Positivism		Critical Theory	Constructivism
Ontology	Naïve realism – real reality but apprehendable	Critical realism- “real” reality but only imperfectly and probabilistically apprehendable	Historical realism- virtual reality shaped by social, political, cultural, economic, ethnic and gender values; crystallized over time	Relativism – local and specific constructed realities
Epistemology	Dualist/objectives; findings true	Modified dualist/objectivist; critical traditional/community; findings probably true	Transactional/subjectivist; value mediated findings	Transactional/subjectivist; created findings
Methodology	Experimental/manipulative; verification of hypotheses; chiefly quantitative methods	Modified experimental/manipulative; critical multiplism; falsification of hypotheses; may include qualitative methods	Dialogical/ dialectical	Hermeneutical/ dialectical

Adapted from: Guba and Lincoln (1994:105).

3.4 Hypotheses

The hypotheses set out in the introduction are repeated here:

H1 Null: There is no relationship between personal factors (life and career changes, intrinsic interest, and self-efficacy) and research productivity among academics at UKZN.

Alternate: There is a relationship between personal factors (life and career changes, intrinsic interest, and self-efficacy) and research productivity among academics at UKZN.

H2 Null: There is no relationship between contextual factors (departmental support, teaching, advising and external funding) and research productivity among academics at UKZN.

Alternate: There is a relationship between contextual factors (departmental support, teaching, advising and external funding) and research productivity among academics at UKZN.

H3 Null: There is no relationship between motivational factors (monetary and non-monetary incentives) and research productivity among academics at UKZN.

Alternate: There is a relationship between motivational factors (monetary and non-monetary incentives) and research productivity among academics at UKZN.

H4 Null: There is no relationship between biographical differences (gender, school, discipline, title, and years of experience) and research productivity among academics at UKZN.

Alternate: There is a relationship between biographical differences (gender, school, discipline, title, and years of experience) and research productivity among academics at UKZN.

3.5 Sampling techniques and description of the sample

Sekaran and Bougie (2010) defines a sample as a subset of the population. The sampling process can be broken down into five areas, namely, defining the population, the sample frame, the sample design, appropriate sample size and, lastly, the execution process. These will be discussed in turn below:

3.5.1 Population

A population is defined by Sekaran and Bougie (2010) as a group of people, events, or other things of interest to the researcher. The target population needs to be defined in relation to the elements that exist within it, the geographical population, and time. This study made use of only full time academic staff members, specifically lecturers and above. No administrative staff were used in this study. The academic staff members used in this study were chosen from the five campuses (Westville, Howard College, Edgewood, Pietermaritzburg and Medical School) of UKZN. The University of KwaZulu-Natal was chosen as the primary focus due to the researcher's accessibility for data collection purposes during the short time frame.

3.5.2 Sample frame

According to Sekeran and Bougie (2010), the sample frame is a physical representation of every element in the population from which the sample is taken. Concerning the population for the study, the sample frame consisted of UKZN academic staff members, including lecturers, senior lecturers, associated professors and professors. Any academic staff members lower in rank than a lecturer was not included in the sample frame. The names of the lecturers and more senior academics were identified from college handbooks.

3.5.3 Sample design

Collins (2011) states that two important types of a sample design exist, namely, probability and non-probability sampling. Probability sampling refers to a known probability of selection from the different population aspects; non-probability sampling has an unknown chance of selection. For this study the probability sampling technique was selected and within it the simple random sampling method was applied. Simple random sampling is a subset of individuals chosen from a large set of a population and each individual is chosen randomly. This technique allows each member of the population to have an equal and fair chance of being selected. One of the benefits of simple random sampling is the ease of assembling the sample. This allows generalisations to be made from the sample to the population. This is a major advantage because such generalisations are more likely to be considered to have external validity. For the study, names were chosen at random from the list of all

academic staff from the five campuses.

3.5.4 Sample size

An important feature of any study is the sample size. The goal of any study is to make inferences about a population from a sample. Practically, a sample size determination is based on the data collection expense and the need for sufficient statistical power. Complex studies can make use of many different sample sizes. Sample sizes may be obtained in various ways. Expedience requires that items are easy or convenient to collect. A target variance could be used for an estimation to be derived from the sample chosen. A target could be used for the power of a statistical test to be applied once the sample is collected (Bartlett, Kotrlik and Higgins, 2001). Sample size refers to the number that reflects the population and gives a meaningful result. For this study, through the use of the different college handbooks, it was ascertained that there are 2,200 academic staff members at the rank of lecturer and above on the five campuses. The sample size is 327 for the total population. Only 154 questionnaires were collected and analysed due to the sensitivity of the topic. Certain academic staff members refused to participate in the study, while other staff members accepted the questionnaire and agreed to participate but did not complete the questionnaire due to unavailability. According to Crowther and Lancaster (2008), the sample size for a given population size can be estimated. The sample size was obtained through simple random sampling. The names acquired and identified through the respective handbooks enabled easy access to the chosen academic staff members. Each staff members name was copied from the college handbook onto a separate piece of paper. All these names were cut into smaller individual pieces and places into a bin from this bin 327 names were chosen with researchers eyes closed.

3.5.5 Execution process

This stage is the plan of action and refers to the sampling being carried out. In this study the focus was on the five campuses of UKZN where a self-administered questionnaire was given out to academics at the rank of lecturer and above by knocking on their doors and asking if they would like to participate in the research being conducted. The chosen candidates by way of simple random sampling were approached door-to-door during their consultation hours and asked if they would be willing to participate in this study.

3.6 Data collection

Data can be obtained either from primary or secondary sources. Primary sources refer to the information the researcher gets first hand and secondary data is information that already exists. For the purpose of this study both sources of data were be used.

3.6.1 Data collection tool

A self-administered questionnaire was used as the data collection tool. A questionnaire is defined as a set of pre-formulated questions that are presented to respondents (Adams *et al.*, 2005). Questionnaires are known to be an efficient data collection method because researchers know exactly what they are looking for. Other methods, such as telephonic interviews, are too costly and interviews would not work as time availability becomes a problem. The expense and time involved in training interviewers and sending them to interview are reduced by using questionnaires.

A questionnaire is a means of eliciting the beliefs, experiences, perceptions, or attitudes of some sample of individuals. Questionnaires give the participant anonymity and they are given enough time to complete it. As a data collecting instrument, a questionnaire could be structured or unstructured. The questionnaire is most frequently a very concise, pre-planned set of questions designed to yield specific information to meet a particular need for research information about a pertinent topic. Each respondent receives the same set of questions phrased in exactly the same way. Questionnaires may, therefore, yield more comparable data than information obtained through an interview.

3.6.2 Process

The self-administered questionnaire used was very specific so as to obtain the results needed regarding the factors influencing research productivity. The questionnaire was broken down into five biographical questions and three categories, namely, personal, contextual and motivational factors. No ambiguous, recall, leading or loaded questions were included.

A Likert scale from point 1 to 5 was used as a scaling method. A Likert scale is a psychometric measurement commonly involved in research that employs questionnaires. It is

the most widely used approach to scaling responses in survey research. Responding to a Likert questionnaire item, respondents specify their level of agreement or disagreement on a symmetrical agree-disagree scale for a series of statements. Thus, the range captures the intensity of their feelings for a given item. A scale can be created as the simple sum of questionnaire responses over the full range of the scale. Thus, Likert scaling assumes that distances on each item are equal importantly (Sekaran, 2010). The factors are tested to find out if they impact on academic staff members' research productivity. The questionnaire was designed by making use of a previous study as a guideline but the questions are original and were created for the specific purpose of this study. A number of questions were combined to initiate the questionnaire process. From there, the questions were categorised and sifted through to identify the most accurate questions to answer the research objectives. The questions were viewed by more than one person, enabling many perspectives to be combined in creating the best possible questions focusing on specific areas. The final questions were then verified by a statistician so that the data could be analysed accurately.

3.6.3 Administration of data collection

The administration of the data collection occurred on the five UKZN campuses. All academic staff members from each school who agreed to complete the study were handed a copy of the questionnaire and collection times were discussed to enable ample time for them to complete as well as to ensure the staff members' availability for collection. The academic staff members were then revisited by the researcher on the chosen date for collection of the questionnaires. Questionnaires not yet completed were either handed back or collected on a later date. All questionnaires were completed anonymously and voluntarily.

3.6.4 Psychometric properties

3.6.4.1 Validity

Discussed here are two major forms of validity, namely, external and internal validity. The external validity of research findings is the data's ability to be generalised across persons, settings, and times. Internal validity is limited in this discussion to the ability of a research instrument to measure what it is purported to measure (Donald, Lazarus and Lolwana, 2006).

3.6.4.1.1 Construct validity

Construct validity is the appropriateness of conclusions drawn, generally by means of observations or measurements. It refers specifically to whether a test measures the intended construct. Constructs are abstractions that are deliberately created by researchers in order to conceptualise the latent variable, which is the cause of scores on a given measure (although it is not directly observable). Construct validity examines the questions (Donald, Lazarus & Lolwana, 2006).

Factor analysis attempts to identify underlying variables, or factors, that explain the pattern of correlations within a set of observed variables. It is often used in data reduction to identify a small number of factors that explain most of the variance observed in a much larger number of manifest variables. It can also be used to generate hypotheses regarding causal mechanisms or to screen variables for subsequent analysis (for example, to identify collinearity prior to performing a linear regression analysis). Factor analysis is considered to be the method of choice for interpreting questionnaires. Factor analysis is a multivariate statistical procedure that has many uses. Firstly, factor analysis reduces a large number of variables into a smaller set of variables or factors. Secondly, it establishes underlying dimensions between measured variables and latent constructs, thereby allowing the formation and refinement of theory. Thirdly, it provides construct validity evidence of self-reporting scales, (Thompson, 2004). The factor analysis used in the current study included the Kaiser-Meyer-Olkin and Bartlett's test, a total variance explained test and the rotational Varimax method. A factor analysis was conducted on four individual categories, namely, monetary incentives, non-monetary incentives, personal factors and contextual factors. Each individual category indicate the manner in which the questions were answered. All the questions answered in a similar manner loaded onto the same factor and any questions within the respective category answered in a different manner loaded onto a different factor. Some categories had more than two factor loadings, representing the fact that the questions in that category were answered in more than one manner.

3.6.4.2 Reliability

Before data can be interpreted, the reliability of the data must be checked. Testing reliability indicates how well the selected methods measure whatever concept is being measured or the

extent to which differences in scores reflect differences in the measured characteristic. According to Allpsych (2002), validity is ensured by testing how well an instrument measures the particular concept it is intended to measure and the extent to which a measurement is repeatable with the same results. Measurement may be reliable and not valid. If a measurement is valid, then it also is reliable and if it is not reliable, then it cannot be valid. One way for researchers to demonstrate reliability is to repeat a test with the same results and to ask if they are measuring what they think they are measuring (Donald, Lazarus & Lolwana, 2006). Reliability is extremely important to a study and, in order to gain reliable results, retesting is a good way to see if the results are similar or common. The validity and reliability of research depend on the measuring instrument. According to Cooper and Schindler (2003), the validity and reliability of collected data depend on the design of the questions, the structure of the questionnaire and the diligence of pilot testing.

In this study, the reliability of the instruments was assessed by using Cronbach alpha. Face validity was administered to test the validity of the questionnaire. Cronbach alpha is an index of reliability associated with the variation accounted for by the true score of the underlying construct. The construct is the hypothetical variable that is being measured. The alpha coefficient ranges in value from 0 to 1 and may be used to describe the reliability of factors extracted from dichotomous (i.e. questions with two possible answers) and/or multi-point formatted questionnaires or scales (i.e. rating scale: 1 = strongly disagree to 5 = strongly agree). The higher the score, the more reliable the generated scale is (Hatcher, 1994). Since this study contains variables generated from a set of questions, Cronbach alpha was used to ensure that the responses were stable. The higher the score, the more reliable the generated scale is. Nunnally (1978) has indicated 0.7 to be an acceptable reliability coefficient. Any score lower than 0.7 would indicate an unreliable scale. The reliability testing in the current study was conducted on all three factors.

3.6.5 Pilot testing

According to Sekaran and Bougie (2010), a pilot test is conducted with the purpose of helping the researcher to identify problems with the process of gathering data. This increases long-term benefits because, if the test is done before data collection, the questionnaire can be changed before it is sent to respondents. The pilot test does not only help to identify if incorrect information is being gathered, but it also shows if proper research questions have

been formulated and asked, because if the question does not answer the main point of the research then the research will be deemed useless and it will be a cost to the researcher. The test helps also in pointing out if more in-depth research is required and to establish possible cost reduction or better justification for proceeding with a high cost project. The term 'pilot study' refers to a mini version of a full scale study as well as to the specific pre-testing of a particular research instrument, such as a questionnaire or interview schedule (van Teijlingen and Hundley, 2001). Pilot testing involves conducting a preliminary test of data collection tools and procedures to identify and eliminate problems, allowing programs to make corrective changes or adjustments before actually collecting data from the target population. A pilot test usually involves simulating the actual data collection process on a small scale to get feedback on whether or not the instruments are likely to work as expected in a real world situation. A pilot test involves the administering of questionnaires to a small group of eight academic staff members that have similar characteristics to the target population, and in a manner that simulates how data will be collected when the questionnaires are administered to the target population.

A pilot test was conducted for the current study and it led to re- wording of some of the questions for better understanding and also helped with the aim of the study. The completed questionnaire was provided to ten independent academic staff members to identify if the questions were worded appropriately and easily understood by the participant. Suggestions were also made to reorganise the categories by placing easier questions first, followed by the longer, more thought provoking questions. This valuable advice was considered and incorporated into the official questionnaire used in the study.

3.7 Data analysis

There are two main types of data analysis, namely, quantitative and qualitative. Quantitative data from questionnaires need to be revised. If any blank responses are found, they need to be handled and this implies that the data needs to be coded, categorised and keyed in. Qualitative data is data collected in the form of words. For this research, a quantitative analysis was conducted (Thompson, 2004). Data can be analysed and presented in a very visual way using data tables and other statistical analysis imported from SPSS, version 21, to the research document. SPSS does all statistical tests, including frequency tables and graphs. For this study the researcher used use SPSS.

In this study two groups of statistics are distinguished, namely, descriptive statistics, that is, statistics that describe the phenomena of interest, and inferential statistics, statistical results that allow the drawing of inferences from a sample. Both descriptive and inferential statistics can be obtained through computer programs that are already designed to produce results for various types of data. The different statistics are discussed.

3.7.1 Descriptive statistics

3.7.1.1 Frequencies and percentages

Frequencies refer to the number of times various subcategories of phenomena occur, from which the percentage and cumulative percentage of the occurrence of the subcategories can be easily obtained. This information can also be presented through histograms or bar charts (Sekeran and Bougie, 2010). Frequencies in the current study are obtained from nominal variables, such as gender, school, discipline, title and the number of years of experience from the biographical data.

3.7.1.2 Measures of central tendency

There are three measures of central tendency, namely, the mean, mode and median. Questions 1 to 54 were analysed using these measurements. The measurements are briefly explained below.

- The mean is the average value; it is a measure of central tendency that offers a general picture of the data without unnecessary focus on each of the observations in a data set. The most common expression for the mean of a statistical distribution with a discrete random variable is the mathematical average of all the terms. To calculate it, the values of all the terms are added up and then divided by the number of terms. This expression is also called the arithmetic mean. There are other expressions for the mean of a finite set of terms but these forms are rarely used in statistics. The mean of a statistical distribution with a continuous random variable, also called the expected value, is obtained by integrating the product of the variable with its probability as defined by the distribution. The expected value is denoted by the lower case Greek letter mu (μ) (Collins, 2011).

- The median is the central item in a group of observations when they are arranged in ascending or descending order. The median of a distribution with a discrete random variable depends on whether the number of terms in the distribution is even or odd. If the number of terms is odd, then the median is the value of the term in the middle. This is the value such that the number of terms having values greater than or equal to it is the same as the number of terms having values less than or equal to it. If the number of terms is even, then the median is the average of the two terms in the middle, such that the number of terms having values greater than or equal to it is the same as the number of terms having values less than or equal to it (Crowther and Lancaster, 2008).
- The mode is the score value which occurs most frequently. The mode of a distribution with a discrete random variable is the value of the term that occurs the most often. It is not uncommon for a distribution with a discrete random variable to have more than one mode, especially if there are not many terms. This happens when two or more terms occur with equal frequency and more often than any of the others (Sekaran, 2010).

3.7.1.3 The Wilcoxon Signed Rank Test

The Wilcoxon Signed Rank Test is a non-parametric test used to test, in this study, whether the average value was significantly different from a value of 3 (the central score). This was applied to Likert scale questions. It was also used in the comparison of the distributions of two variables. The questions highlighted in red represent significant agreement and those questions not highlighted in red do not represent significant agreement. The non-parametric test is beneficial in that it does not depend on the form of the parent distribution nor on its parameters.

3.7.1.4 Measures of dispersion

Shown below are measures of dispersion. Questions 1 to 54 will be analysed using these measurements, excluding biographical differences. The measurements are briefly explained below:

- The range refers to the extreme values in a set of observations. It is the highest minus the lowest score value (Sekaran and Bougie, 2010).

- The variance is calculated by subtracting each of the observations in the data set from the mean, taking the square of this difference and dividing the total of these by the number of observations. It is a measure of the dispersion of a set of data points around their mean value (Sekaran and Bougie, 2010).
- The standard deviation is calculated simply as the square root of the variance. It is a measure of the dispersion of a set of data from its mean. The more spread apart the data, the higher the deviation will be. A large dispersion indicates how much the return on the fund is deviating from the expected normal returns (Sekaran and Bougie, 2010).

3.7.2 Inferential statistics

The various forms of inferential statistics below were considered for use in conducting the current study.

3.7.2.1 Correlation

The Pearson correlation between two variables reflects the degree at which the variables are related. Correlation in this research was used to measure the relationship between the variables and the strength of the relationships and to describe the nature of the relationships. Correlation is computed using correlation coefficient (r), which ranges between -1 and +1. If the correlation coefficient is 0, it implies that there is no relationship. In this study, the correlation was determined between the independent and dependent variables, the independent variable being questions 1 to 54, which measure the three factors, and the dependent variable being question 55, which measures research productivity. Relationships between variables are summarised below (Sekaran and Bougie, 2010).

- **Statistical hypotheses and test:**

$H_0: \rho = 0$ (there is no relationship)

$H_1: \rho \neq 0$ (there is relationship)

Decision rule:

The decision rule requires at least 95% confidence to reject the null hypothesis. Level of significance of $(\alpha) = 0.05$, two-tailed. The null hypothesis is rejected if the SPSS-provided p-

value is ≤ 0.05 .

Questions 1 to 55 were analysed to identify if there was a correlation between any specific question and research productivity. Where the questions are denoted by a star, this indicates that a correlation exists between the respective question and research productivity. Pearson's correlation is used to identify the relationship between the significant variables.

3.7.2.2 *Mann-Whitney Test*

The Mann-Whitney test is one of many non-parametric tests and is the most powerful when comparing two populations. It is used to test the null hypothesis against the alternative hypothesis. It is not a requirement of this test to make use of the assumption that the differences between the two are normally distributed (Corder and Foreman, 2014).

3.7.2.3 *Regression*

Regression analysis is used as a descriptive tool in three types of situations. First, it is often used to develop a self-weighting estimating equation by which to predict values for a criterion (DV) from the values for several predictor variables (IVs). For example, company sales might be predicted on the basis of new housing starts, new marriage rates, annual disposable income and a time actor. Another prediction study might be one in which a student's academic performance in college is estimated from the variable of rank in high school class. Second, a descriptive application of regression calls for the controlling for confounding variables to better evaluate the contribution of other variables. For example, one might wish to control the brand of a product and the store in which it is bought to study the effects of prices as an indicator of product quality. A third use of regression is to test and explain casual theories. In this approach, often referred to a path analysis, regression is used to describe an entire structure of linkages that have been advanced from a casual theory. In addition to being a descriptive tool, multiple regressions are also used as an inference tool to test hypotheses and to estimate population values (Donald, Lazarus & Lolwana, 2006).

In the current study, regression analysis was conducted on the first fifty questions only, excluding biographical differences. Regression analysis was used to identify if the respective questions significantly predicted research productivity. The regression consisted of three

tables for each factor. These tables were the model summary table, the ANOVA table and coefficient table. There were a total of nine tables used for the regression analysis. The values were interpreted by making mention of the total variance, which is explained using R-squared values taken from the model summary table, the F values and the significance values taken from the ANOVA table. If the results are positive, the alternative hypothesis is accepted, indicating that a relationship does exist between the factors and research productivity and if the results are negative the null hypothesis is accepted indicating that no relationship exists between the factors and research productivity.

3.8 Ethical considerations

A consideration of ethics is of vital importance as every research study includes people. Particular issues such as confidentiality, informed consent and emotional safety require critical attention. Oka and Shaw (2000) have conducted research proving that people do not readily share private details and opinions on public documentation. Therefore confidentiality is to be a requirement to the researcher in order to achieve a successful study.

Informed consent relates to acquiring participant consent in order to use information gained for academic purposes. Therefore researchers are obliged to disclose the purpose of the study. Due to the flexible nature of qualitative research informed consent is a vital component as described by Bartunek and Louis (1996).

The main features of gaining consent from research participants are as follows:

- **Consent should be voluntary** – Consent for participation must be voluntary and given without any influence.
- **Consent should be informed** – Participation in research should be based on an informed decision after the provision of sufficient information.
- **Consent should be in writing** – Informed consent indicating participation in the research project should be given by written consent. If written consent is not possible, verbal consent in the presence of a witness is allowed.
- **Seeking informed consent** – All researchers obtaining consent from participants should

possess adequate knowledge of the study in order to brief individuals.

The University of KwaZulu-Natal is committed to ensuring the compliance and the ethical integrity of all research performed within its control. Through its Research Office, UKZN manages the approval and monitoring process for the use of humans and animals in research at UKZN and its associated research institutions. All research conducted must be approved by one of the UKZN Research Ethics Committees. The dissertation title first needs to be submitted for gatekeeper's approval through the completion of a formal document. The gatekeeper's letter is to allow the questionnaires to be handed out to academic staff members. The process is as follows: the completed letter goes to the respective supervisor, followed by Faculty Office and the higher degree and research committee and lastly to the Research Office, who replies to the student and supervisor. Once the gate keeper's agreement is obtained, the process to obtain ethical clearance begins. Ethical clearance is applied for through a document which requires detailed information about the research intended to be conducted. This detailed information includes the research questions and objectives as well as the methodology to be used including a copy of the questionnaire to be handed out.

The researcher submitted a formal document to obtain gatekeepers approval. This gatekeeper's letter allowed the researcher to hand out questionnaires to the academic staff members at the University of Kwa-Zulu Natal. Once the researcher obtained gatekeepers approval the researcher had to obtain ethical clearance. To apply for ethical clearance a formal document required detailed information about the intention of this study. In additional the document requires the research objectives and questions and the data methods to be used. To gain approval a copy of the questionnaire was attached to this document. The information of the academic staff members were kept confidential. Before the participant could complete the questionnaire the researcher informed the participant about the purpose of this study and obtained inform consent.

3.9 Conclusion

This chapter has provided an in-depth discussion of all the research methods and tests used in this study. Each test and method has been explained in terms of its nature and it how it was incorporated into this study. This detailed explanation assists in an easier understanding of the various methods and tests conducted and allows for better interpretation of the results reported in Chapter Four.

Chapter Four

Results

4.1 Introduction

It should be noted that this chapter was derived and analysed from the collection of only 154 questionnaires due to the sensitivity of the topic. Certain academic staff members refused to participate in the study, while other staff members accepted the questionnaire and agreed to participate but did not complete the questionnaire due to unavailability. This chapter takes an in-depth look at the analysis of the data collected through the use of the SPSS programme. The data was subjected to various tests in search of specific results. The results are reflected on many graphs and tables. The descriptive statistics include frequency distribution graphs, tables reflecting measures of central tendency and dispersion, and the non-parametric tests conducted on all fifty scale items excluding biographical differences. The inferential statistics include a validity measurement of factor analysis, reliability of Cronbach alpha, correlation, regression analysis and bivariate analysis conducted on all questions. Each of these tests represents a different element of the data analysis process. The tests were used with the intention of creating a meaningful set of results for this study.

4.2 Descriptive statistics

4.2.1 Frequency distribution

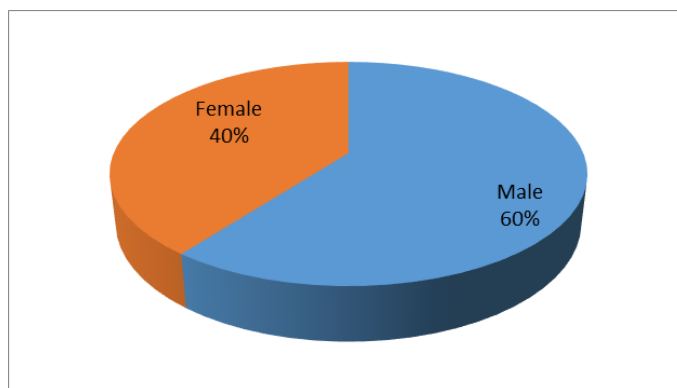


Figure 4-1 Frequency distribution for Gender

The graph above shows the difference between females and males in terms of their frequency distribution. Males represented 60% whereas females only represented 40%, indicating that there was more male academic staff.

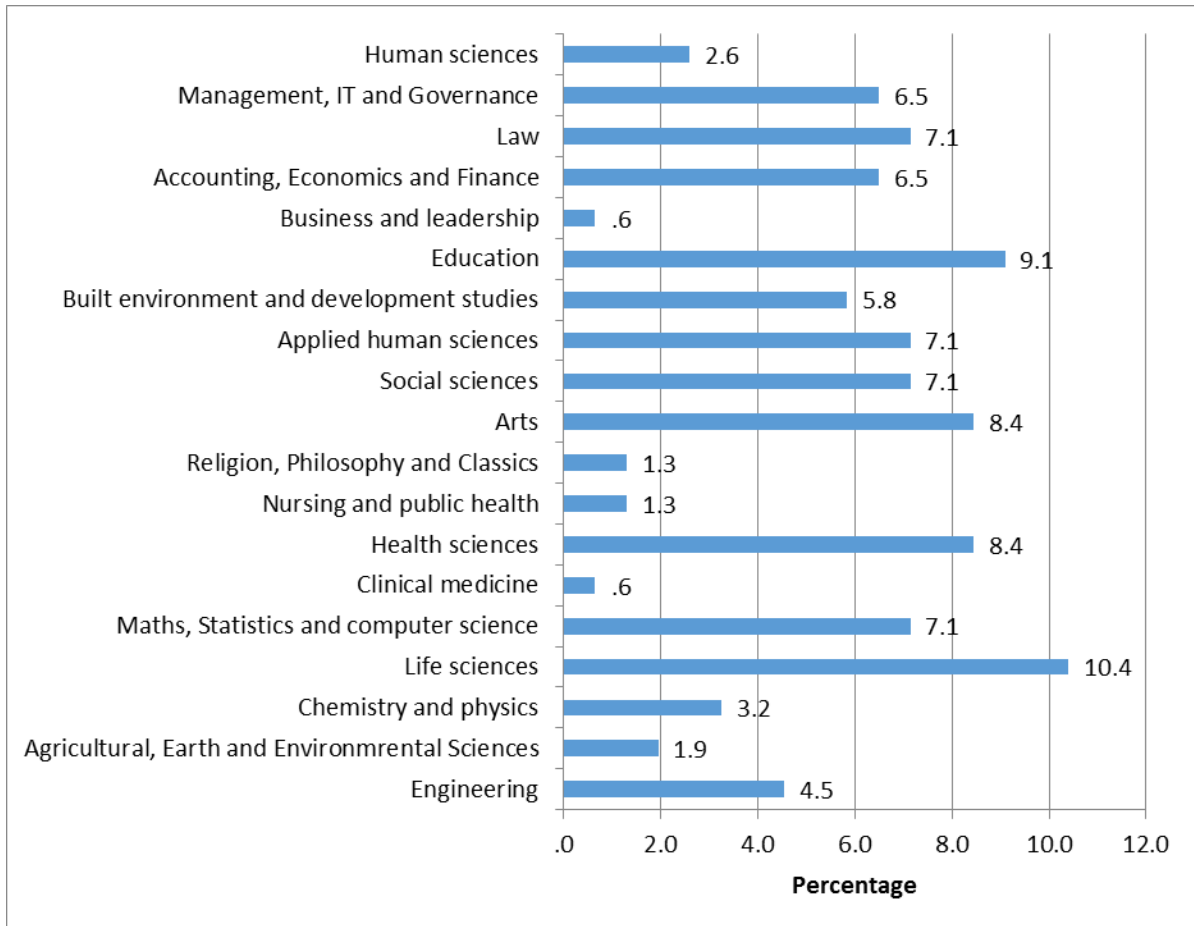


Figure 4-2 Frequency distribution for Schools

The above bar graph represents the schools used in the study. The school of Life Sciences revealed the highest completion of questionnaires with a percentage of 10.4. The schools of Business and Leadership as well as Clinical Medicine had the lowest percentage of questionnaire completions with 0.6% each. All school percentages added together give a total of 99.5%.

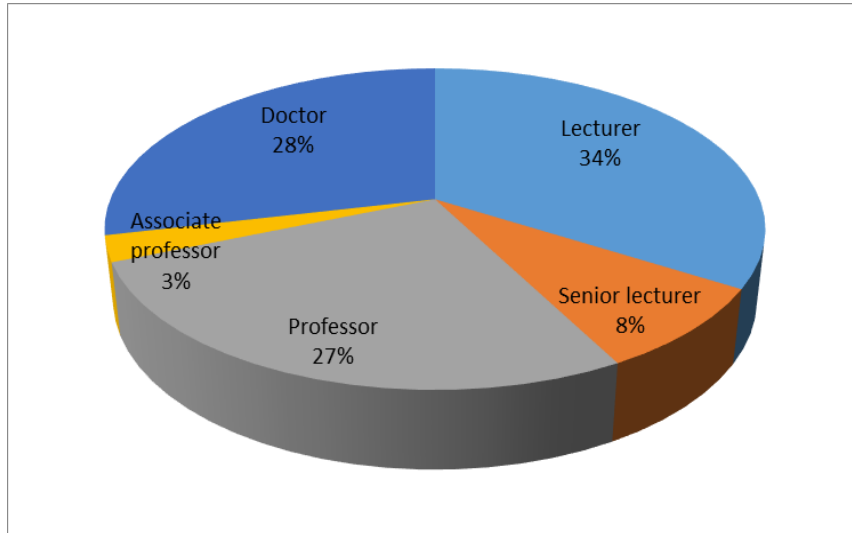


Figure 4-3 Pie chart representing title

The above pie chart represents the different job titles of lecturers and above used in the study. The title of doctor is incorporated with the title of professor.

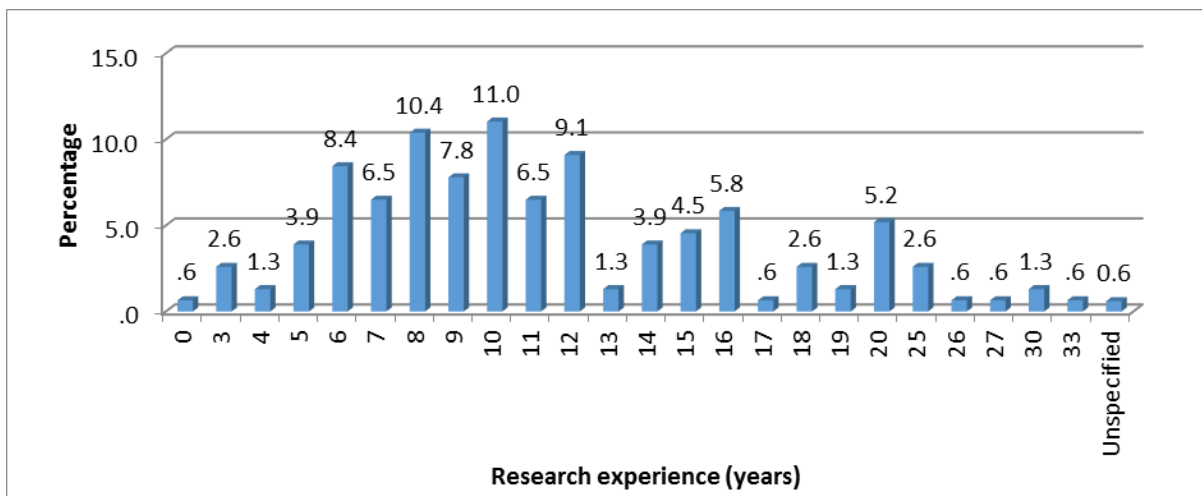


Figure 4-4 Frequency distribution for years of experience

The above frequency distribution table shows that ten years of experience was the most frequent with 11% and the lowest were zero years, 17 years, 26 years and 27 years with only 0.6%.

4.2.2 Measures of central tendency and dispersion

The questions administered to the academics are listed below and the related measure of central tendency and dispersion are discussed.

Abbreviations Questions

MI 1	Monetary incentives personally encourage me to be research productive.
MI 2	Research grants influence the number of research papers conducted within my school as a unit.
MI 3	A lack of monetary incentives would decrease the number of research papers I publish.
NMI 1	The tenure and promotion process causes me an unreasonable amount of stress to produce research papers.
NMI 2	Non-monetary incentives offered by my school motivate me to conduct research.
MI 4	As part of my position, I am expected to seek external funds to fund my research.
NMI 3	I am satisfied with the recognition I receive from my colleagues in my discipline.
NMI 4	I feel morally obligated to maintain the University-wide norm for my research.
NMI 5	I am self-motivated to produce research papers of a high quality.
NMI 6	If the publication of research was not a requirement of my job, I would not conduct any research.

MI – Monetary incentives

NMI – Non-monetary incentives

Table 4.1 Measures of central tendency and dispersion for questions 1 to 10

	MI 1	MI 2	MI 3	NMI 1	NMI 2	MI 4	NMI 3	MNI 4	NMI 5	NMI 6
N Valid	154	154	153	154	153	154	154	154	153	154
Missing	0	0	1	0	1	0	0	0	1	0
Mean	3.29	3.43	3.24	3.38	3.18	3.34	3.36	3.16	3.31	2.91
Median	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Mode	3	3	3	3	3	3	4	3	3	3
Std. Deviation	.995	.854	.918	.849	.892	.843	.934	.874	.997	.979
Skewness	-.117	.003	-.138	.016	-.087	.005	-.235	-.204	-.019	-.196
Std. Error of Skewness	.195	.195	.196	.195	.196	.195	.195	.195	.196	.195
Range	4	4	4	4	4	4	4	4	4	4

The table above shows the measurement of central tendency from question 1 to question 10. The mean value shows that each of the questions has a tendency to lean towards the right end of the scaling method, being strongly agree, except for question 10 which represents a disagreement. The median and mode show no significant differences.

Abbreviations Questions

- NMI 7 A graduate assistant would facilitate faster production of research publications by me.
- NMI 8 Family commitments hamper my research obligations.
- NMI 9 UKZN offer adequate resources to my college to perform research.
- NMI 10 The high cost of publishing research papers is demotivating to conduct research.
- NMI 11 I am satisfied with my opportunities for networking with my colleagues in my discipline.
- NMI 12 The publication process demotivates me.
- NMI 13 Access to data information hinders the standard of research produced.
- NMI 14 Easy access to required information encourages me to continuously conduct research.
- P 1 I find conducting research interesting and informative.

P 2 My research has attracted interest from my fellow researchers in the field.

NMI – Non-monetary incentives

P – Personal factors

Table 4.2 Measures of central tendency and dispersion for questions 11 to 20

	NMI 7	NMI 8	NMI 9	NMI 10	NMI 11	NMI 12	NMI 13	NMI 14	threes	P 1	P 2
N Valid	154	154	154	154	154	154	154	154	154	154	154
Missing	0	0	0	0	0	0	0	0	0	0	0
Mean	3.12	2.99	3.06	3.05	3.14	2.99	3.04	3.16	3.00	3.61	3.57
Median	3.00	3.00	3.00	3.00	3.00	3.00	3	3.00	3.00	4.00	4.00
Mode	3	3	3	3	3	3	3	4	3	4	4
Std. Deviation	.827	.936	.861	.955	.929	.925	.969	.991	.000	1.025	.885
Skewness	.047	.026	-.064	-.013	-.028	-.137	.227	.130		-.266	-.134
Std. Error of Skewness	.195	.195	.195	.195	.195	.195	.195	.195	.195	.195	.195
Range	4	4	4	4	4	4	4	4	0	4	3

The table above shows the measurement of central tendency from question 11 to question 20. The mean value shows that each of the questions has a tendency to lean towards the right end of the scaling method, being strongly agree, except questions 12 and 16, which represents a disagreement to the questions. The median is significantly different for questions 19 and 20 and the mode is different for questions 18, 19 and 20.

Abbreviations Questions

P 3 I consider research to be valuable.

P 4 I think it is necessary to continuously conduct research.

P 5 Conducting research is more rewarding than lecturing.

P 6 I feel a sense of personal achievement on the completion of a study.

P 7 I consider the opinions of others valuable to my current research.

P 8 I am satisfied in the way I conduct research.

P 9 Published research is an asset to the University.

P 10 My home environment is conducive to research activities after hours.

P 11 Time away from the office greatly increases my research productivity.

P 12 Supervising postgraduate students helps to improve the quality of my research.

P- Personal factors

Table 4.3 Measures of central tendency and dispersion for questions 21 to 30

	P 3	P 4	P 5	P 6	P 7	P 8	P 9	P 10	P 11	P 12
N	Valid	153	154	153	154	154	154	154	154	154
	Missing	1	0	1	0	0	0	0	0	0
Mean	3.64	3.63	3.32	3.42	3.36	3.31	3.32	3.17	3.22	3.12
Median	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Mode	4	4	3	4	3	4	3	3	3	3
Std. Deviation	.886	.878	.936	.941	.954	.952	1.035	.955	1.005	1.016
Skewness	-.147	-.198	-.098	-.224	-.223	-.279	.067	.019	.052	.066
Std. Error of Skewness	.196	.195	.196	.195	.195	.195	.195	.195	.195	.195
Range	3	4	4	4	4	4	4	4	4	4

The table above shows the measurement of central tendency from question 21 to question 30. The mean value shows that each of the questions has a tendency to lean towards the right end of the scaling method, being strongly agree. The median is higher for questions 21 and 22. Lastly, the mode is different for questions 21, 23 and 25.

Abbreviations Questions

- P 13 Conducting research motivates me to make a difference to the current information available in my respective field.
- P 14 The unavailability of resources negatively affects the ability to publish research papers.
- P 15 I publish high quality research within my discipline.
- P 16 My rank impacts the standard of research papers I produce.
- P 17 Experience positively influences my capability to conduct research.
- P 18 I am in constant competition to produce research of a high standard.
- P 19 My research positively contributes towards curriculum development.
- P 20 Personal convictions influence the topics I research.
- C 1 My research is valued by my school.

C 2 My working environment significantly affects my research productivity.

P – Personal Factors

C – Contextual Factors

Table 4.4 Measures of central tendency and dispersion for questions 31 to 40

	P 13	P 14	P 15	P 16	P 17	P 18	P 19	P 20	C 1	C 2
N Valid	154	154	154	154	154	154	154	154	154	154
Missing	0	0	0	0	0	0	0	0	0	0
Mean	3.24	3.29	3.26	3.30	3.31	3.18	3.21	3.13	3.77	3.83
Median	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00
Mode	3	3	3	3	3	4	3	4	4	4
Std. Deviation	.901	.928	.995	.879	.925	.960	.855	.995	.913	.748
Skewness	.049	-.119	.021	-.332	-.411	-.328	.016	-.103	-.614	-.758
Std. Error of Skewness	.195	.195	.195	.195	.195	.195	.195	.195	.195	.195
Range	4	4	4	4	4	4	4	4	4	4

The table above shows the measurement of central tendency from question 31 to question 40. The mean value shows that each of the questions has a tendency to lean towards the right end of the scaling method, being strongly agree. The median is different for questions 39 and 40. The mode is different for questions 36, 38, 39 and 40.

Abbreviations Questions

- C 3 Mentoring is important to me.
- C 4 My religious beliefs affect the type of research I conduct.
- C 5 I have a personal/emotional attachment to my research.
- C 6 Hobbies such as jogging or gyming stimulate my research ideas.
- C 7 My school encourages me to collaborate with my colleagues.
- C 8 My school provides me with choices in the research questions and issues that I investigate.
- C 9 I follow the correct ethical procedures when conducting research.
- C 10 External influences such as working environment and incentives outweigh my personal drive to publish research papers.
- C 11 The lack of support from colleagues demotivates me from conducting future research.

C 12

Training seminars assist me in conducting research.

C – Contextual Factors

Table 4.5 Measures of central tendency and dispersion for questions 41 to 50

		C 3	C 4	C 5	C 6	C 7	C 8	C 9	C 10	C 11	C 12
N	Valid	154	153	154	153	154	154	154	154	154	154
	Missing	0	1	0	1	0	0	0	0	0	0
Mean		3.68	3.51	3.56	3.39	3.42	3.21	3.50	3.10	3.2	3.17
Median		4.00	4.00	4.00	3.00	3	3.00	3.00	3.00	3.00	3.00
Mode		4	4	4	3	3	3	3	3	3	3
Std. Deviation		.905	1.001	.907	.926	.934	.922	.887	.927	.952	.995
Skewness		-.663	-.646	-.249	-.258	-.337	.017	.028	-.096	-.092	-.104
Std. Error of Skewness		.195	.196	.195	.196	.195	.195	.195	.195	.195	.195
Range		4	4	4	4	4	4	3	4	4	4

The table above shows the measurement of central tendency from question 41 to question 50. The mean value shows that each of the questions has a tendency to lean towards the right end of the scaling method, being strongly agree. The median and mode are different for questions 41 to 43.

Abbreviations Questions

RP 1 I have recently published in a recognized journal.

RP 2 I have attended or presented at least at two international conferences over the last three years.

RP 3 I have published several chapters or an entire book in my respective field.

RP 4 I am a productive researcher.

RP – Research productivity

Table 4.6 Measures of central tendency and dispersion for questions 51 to 54

		RP 1	RP 2	RP 3	RP 4
N	Valid	154	154	154	154
	Missing	0	0	0	0
Mean		3.36	3.18	3.06	3.37
Median		3.00	3.00	3.00	3.00
Mode		3	3	3	3
Std. Deviation		.941	.957	.912	.907

	RP 1	RP 2	RP 3	RP 4
Skewness	-.008	.048	-.286	.154
Std. Error of Skewness	.195	.195	.195	.195
Range	4	4	4	4

Looking at the table shown above, the measurement of central tendency is provided from question 51 to question 54. The mean value shows that each of the questions has a tendency to lean towards the right end of the scaling method, being strongly agreed. The median and mode have no significant differences.

4.3 The Wilcoxon Signed Ranks Test

4.3.1 Motivation

Table 4.7 The Non-Parametric test conducted on questions 1 to 6

	1 Monetary incentives personally encourage me to be research productive.	2 Research grants influence the number of research papers conducted within my school as a unit.	3 A lack of monetary incentives would decrease the number of research papers I publish.	4 The tenure and promotion process causes me an unreasonable amount of stress to produce research papers.	5 Non-monetary incentives offered by my school motivates me to conduct research.	6 As part of my position, I am expected to seek external funds to fund my research.
Z	-3.368 ^a	-5.552 ^a	-3.116 ^a	-5.106 ^a	-2.495 ^a	-4.702 ^a
Asymp. Sig. (2-tailed)	.001	.000	.002	.000	.013	.000

Table 4.8 The Non-Parametric test conducted on questions 7 to 12

	7 I am satisfied with the recognition I receive from my colleagues in my discipline.	8 I feel morally obligated to maintain the University-wide norm for my research.	9 I am self-motivated to produce research papers of a high quality.	10 If the publication of research was not a requirement of my job, I would not conduct any research.	11 A graduate assistant would facilitate faster production of research publications by me.	12 Family commitments hamper my research obligations.
Z	-4.424 ^a	-2.251 ^a	-3.781 ^a	-1.239 ^b	-1.842 ^a	-.169 ^b
Asymp. Sig. (2-tailed)	.000	.024	.000	.215	.066	.866

Table 4.9 The Non-Parametric test conducted on questions 13 to 18

	13 UKZN offer adequate resources to my college to perform research.	14 The high cost of publishing research papers is demotivating to conduct research.	15 I am satisfied with my opportunities for networking with my colleagues in my discipline.	16 The publication process demotivates me.	17 Access to data information hinders the standard of research produced.	18 Easy access to required information encourages me to continuously conduct research.
Z	-.931 ^a	-.678 ^a	-1.811 ^a	-.123 ^b	-.576 ^a	-2.006 ^a
Asymp. Sig. (2-tailed)	.352	.498	.070	.902	.565	.045

Analysis shows that there is significant agreement on the following: that monetary incentives encourage productive research ($Z(N=154) = -3.368, p=.001$); that research grants influence school paper output ($Z(N=154) = -5.552, p<.0005$); that a lack of monetary incentives decreases research output ($Z(N=154) = -3.116, p= .002$); that the tenure and promotion process causes an unreasonable amount of pressure to produce research ($Z(N=154) = -5.106, p<.0005$); that non-monetary incentives motivate research ($Z(N=154) = -2.495, p= .013$); that external funds are expected to be obtained to fund research ($Z(N=154) = -4.702, p<.0005$); that adequate recognition is received from colleagues ($Z(N=154) = -4.424, p<.0005$); that there is a moral obligation to maintain university wide norms ($Z(N=154) = -2.251, p= .024$); that high quality research papers are produced through self-motivation ($Z(N=154) = -3.781, p<.0005$); and that the easy access to information encourages continuous research ($Z(N=154) = -2.006, p= .045$).

4.3.2 Personal

Table 4.10 The Non-Parametric test conducted on questions 19 to 25

	19 I find conducting research interesting and informative.	20 My research has attracted interest from my fellow researchers in the field.	21 I consider research to be valuable.	22 I think it is necessary to continuously conduct research.	23 Conducting research is more rewarding than lecturing.	24 I feel a sense of personal achievement on the completion of a study.	25 I consider the opinions of others valuable to my current research.
Z	-6.364 ^a	-6.723 ^a	-7.203 ^a	-7.137 ^a	-3.941 ^a	-5.050 ^a	-4.283 ^a
Asymp. Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000

Table 4.11 The Non-Parametric test conducted on questions 26 to 32

	26 I am satisfied in the way I conduct research.	27 Published research is an asset to the University.	28 My home environment is conducive to research activities after hours.	29 Time away from the office greatly increases my research productivity.	30 Supervising postgraduate students helps to improve the quality of my research.	31 Conducting research motivates me to make a difference to the current information available in my respective field.	32 The unavailability of resources negatively affects the ability to publish research papers.
Z	-3.746 ^a	-3.859 ^a	-2.197 ^a	-2.745 ^a	-1.482 ^a	-3.237 ^a	-3.734 ^a
Asymp. Sig. (2-tailed)	.000	.000	.028	.006	.138	.001	.000

Table 4.12 The Non-Parametric test conducted on questions 33 to 38

	33 I publish high quality research within my discipline.	34 My rank impacts the standard of research papers I produce.	35 Experience positively influences my capability to conduct research.	36 I am in constant competition to produce research of a high standard.	37 My research positively contributes towards curriculum development.	38 Personal convictions influence the topics I research.
Z	-3.200 ^a	-3.950 ^a	-3.869 ^a	-2.254 ^a	-3.034 ^a	-1.608 ^a
Asymp. Sig. (2-tailed)	.001	.000	.000	.024	.002	.108

Analysis shows that there is significant agreement on the following: that research is found to be interesting and informative ($Z(N=154) = -6.364, p < .0005$); that research has attracted interest from fellow researchers ($Z(N=154) = -6.723, p < .0005$); that research is considered valuable ($Z(N=154) = -7.203, p < .0005$); that it is necessary to conduct research ($Z(N=154) = -7.137, p < .0005$); that conducting research is more rewarding than lecturing ($Z(N=154) = -3.941, p < .0005$); that there is a sense of personal achievement on completion of a study ($Z(N=154) = -5.050, p < .0005$); that opinions of others are valuable to current research ($Z(N=154) = -4.283, p < .0005$); that there is satisfaction in the manner research is conducted ($Z(N=154) = -3.746, p < .0005$); that published research is an asset to the university ($Z(N=154) = -3.859, p < .0005$); that home environments are conducive to research activities after hours ($Z(N=154) = -2.197, p = .028$); that time away from the office increases research productivity ($Z(N=154) = -2.745, p = .006$); that research motivates information development ($Z(N=154) = -3.237, p = .001$); that unavailability of resources negatively affects research output ($Z(N=154) = -3.734, p < .0005$); that high quality research is published ($Z(N=154) = -3.200, p = .001$); that rank impacts standard of research produced ($Z(N=154) = -3.950, p < .0005$); that experience positively influences capability to research ($Z(N=154) = -3.869,$

p<.0005); that there is constant competition to produce high standard research (Z(N=154) = -2.254, p=.024); and that research positively contributes to curriculum development (Z(N=154) = -3.034, p=.002).

4.3.3 Contextual

Table 4.13 The Non-Parametric test conducted on questions 39 to 44

	39 My research is valued by my school.	40 My working environment significantly affects my research productivity.	41 Mentoring is important to me.	42 My religious beliefs affect the type of research I conduct.	43 I have a personal/emotional attachment to my research	44 Hobbies such as jogging or gyming stimulate my research ideas.
Z	-7.733 ^a	-9.081 ^a	-7.316 ^a	-5.434 ^a	-6.476 ^a	-4.704 ^a
Asymp. Sig. (2-tailed)	.000	.000	.000	.000	.000	.000

Table 4.14 The Non-Parametric test conducted on questions 45 to 50

	45 My school encourages me to collaborate with my colleagues.	46 My school provides me with choices in the research questions and issues that I investigate.	47 I follow the correct ethical procedures when conducting research.	48 External influences such as working environment and incentives outweigh my personal drive to publish research papers.	49 The lack of support from colleagues demotivates me from conducting future research.	50 Training seminars assist me in conducting research.
Z	-4.931 ^a	-2.843 ^a	-6.108 ^a	-1.292 ^a	-2.567 ^a	-2.066 ^a
Asymp. Sig. (2-tailed)	.000	.004	.000	.196	.010	.039

Analysis shows there is significant agreement on the following: that research is valued by schools (Z(N=154) = -7.733, p<.0005); that the working environment significantly affects research output (Z(N=154) = -9.081, p<.0005); that mentoring is important (Z(N=154) = -7.316, p<.0005); that religious beliefs affect the type of research conducted (Z(N=154) = -5.434, p<.0005); that a personal/emotional attachment to research exists (Z(N=154) = -6.476, p<.0005); that hobbies, such as jogging and gyming, stimulate research ideas (Z(N=154) = -4.704, p<.0005); that there is encouragement from schools to collaborate with colleagues (Z(N=154) = -4.931, p<.0005); that schools provide choices of research questions and issues investigated (Z(N=154) = -2.843, p=.004); that correct ethical procedures are followed (Z(N=154) = -6.108, p<.0005); that a lack of support from colleagues decreases

research output ($Z(N=154) = -2.567, p=.010$); and that training seminars assist in conducting research ($Z(N=154) -2.066, p= .039$).

4.4 Inferential Statistics

4.4.1 Validity - Factor Analysis

4.4.1.1 Monetary Incentives

Table 4.15 The KMO and Bartlett's Test for monetary incentives

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.659
Bartlett's Test of Sphericity	Approx. Chi-Square
	155.237
	Df
	10
	Sig.
	.000

The Kaiser-Meyer-Olkin is .659 which indicates an acceptable result. The significance is represented by .000. This is suitable for factor analysis.

Table 4.16 The total variance explained for monetary incentives

Factor	Initial Eigenvalues	Extraction Sums of Squared Loadings	Rotation Sums of Squared Loadings						
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.233	44.669	44.669	1.838	36.763	36.763	1.656	33.119	33.119
2	1.042	20.849	65.517	.508	10.153	46.916	.690	13.797	46.916
3	.851	17.024	82.541						
4	.545	10.908	93.449						
5	.328	6.551	100.000						

Extraction method: Principle Axis Factoring

The five items were the subject of factor analysis. All the Eigenvalues which fall > 1 have been reported and all the Eigenvalues which fall < 1 have not been subject to rotation. Identified are two Eigenvalues > 1 . The two factors have a cumulative value of 46.92%.

Table 4.17 Rotated factor matrix for monetary incentives

	Factor	
	1	2
1. Monetary incentives personally encourage me to be research productive.	.604	
2. Research grants influence the number of research papers conducted within my school as a unit.	.637	
3. A lack of monetary incentives would decrease the number of research papers I publish.	.932	
6. As part of my position, I am expected to seek external funds to fund my research.		.724
14. The high cost of publishing research papers is demotivating to conduct research.		

Extraction Method: Principle Axis Factoring

Rotation Method: Varimax with Kaiser Normalisation

a. Rotation converged into three iterations

All the factors were subject to the Varimax rotational method. A value above .4 is considered for factor loading. The questions load onto two factors with questions 1, 2 and 3 (monetary incentives) on factor 1 and question 6 (monetary incentives) on factor 2. Question 14 does not load strongly onto any factor. Together they account for 46.9% of the variance.

4.4.1.2 *Non-monetary incentives*

Table 4.18 The KMO and Bartlett's Test for non-monetary incentives

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.577
Bartlett's Test of Sphericity	Approx. Chi-Square
	88.926
	Df
	21
	Sig.
	.000

The Kaiser-Meyer-Olkin is .577, which indicates an average result. The significance is represented by .000. This is suitable for factor analysis.

Table 4.19 The total variance explained for non-monetary incentives

Factor	Initial Eigenvalues	Extraction Sums of Squared Loadings	Rotation Sums of Squared Loadings						
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.808	25.827	25.827	1.195	17.075	17.075	1.043	14.904	14.904
2	1.419	20.268	46.096	.857	12.242	29.317	.816	11.653	26.557
3	1.028	14.690	60.786	.439	6.267	35.584	.632	9.027	35.584
4	.867	12.382	73.168						
5	.735	10.504	83.672						
6	.596	8.517	92.189						
7	.547	7.811	100.000						

Extraction method: Principle Axis Factoring

The seven items were the subject of factor analysis. All the Eigenvalues which fall > 1 have been reported and all the Eigenvalues which fall < 1 have not been subject to rotation. Identified are three Eigenvalues > 1. The three factors have a cumulative value of 35.58%.

Table 4.20 The rotated factor matrix for non-monetary incentives

	Factor		
	1	2	3
4. The tenure and promotion process causes me an unreasonable amount of stress to produce research papers.		.830	
5. Non-monetary incentives offered by my school motivates me to conduct research.			
9. I am self-motivated to produce research papers of a high quality.	.581		
10. If the publication of research was not a requirement of my job, I would not conduct any research.			
16. The publication process demotivates me.			.568
31. Conducting research motivates me to make a difference to the current information available in my respective field.	.648		
36. I am in constant competition to produce research of a high standard.	.466		

Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations

All the factors were subject to the Varimax rotational method. A value above .4 is considered for factor loading as recommended by the statistician. The questions load onto three factors with questions 9, 31 and 36 (non-monetary incentives) on factor 1, questions 4 (extrinsic

motivation) on factor 2 and questions 16 (extrinsic motivation) on factor 3. Questions 5 and 10 do not load strongly onto any factor. Together they account for 35.58% of the variance.

4.4.1.3 Personal Factors

Table 4.21 The KMO and Bartlett's Test for personal factors

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.716
Bartlett's Test of Sphericity	Approx. Chi-Square
	278.461
	Df
	36
	Sig.
	.000

The Kaiser-Meyer-Olkin is .716, which indicates an above average result. The significance is represented by .000. This is suitable for factor analysis.

Table 4.22 The total variance explained for personal factors

Factor	Initial Eigenvalues	Extraction Sums of Squared Loadings	Rotation Sums of Squared Loadings						
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.790	31.002	31.002	2.177	24.186	24.186	1.802	20.021	20.021
2	1.702	18.910	49.912	1.155	12.830	37.016	1.530	16.995	37.016
3	.991	11.010	60.922						
4	.891	9.905	70.827						
5	.712	7.906	78.733						
6	.551	6.127	84.861						
7	.511	5.678	90.539						
8	.471	5.234	95.772						
9	.380	4.228	100.000						

Extraction Method: Principal Axis Factoring

The nine items were the subject of factor analysis. All the Eigenvalues which fall > 1 have been reported and all the Eigenvalues which fall < 1 have not been subjected to rotation. Identified are two Eigenvalues > 1. The two factors have a cumulative value of 37.016%.

Table 4.23 Rotated factor matrix for personal factors

	Factor	
	1	2
24. I feel a sense of personal achievement on the completion of a study.	.638	
28. My home environment is conducive to research activities after hours.	.630	
29. Time away from the office greatly increases my research productivity.	.708	
35. Experience positively influences my capability to conduct research.	.470	
38. Personal convictions influence the topics I research.		
39. My research is valued by my school.		
42. My religious beliefs affect the type of research I conduct.		.571
43. I have a personal/emotional attachment to my research.		.696
44. Hobbies such as jogging or gyming stimulate my research ideas.		.726

Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax with Kaiser Normalization.

- a. Rotation converged in 3 iterations

All the factors were subject to the Varimax rotational method. A value above .4 is considered for factor loading. The questions load onto two factors with questions 24, 28, 29 and 35 (self-efficacy) on factor 1, questions 42, 43 and 44 (intrinsic interest) on factor 2. Questions 38 and 39 do not load strongly onto any factor. Together they account for 37.016% of the variance.

4.4.1.4 Contextual factors

Table 4.24 The KMO and Bartlett's Test for contextual factors

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.641
Bartlett's Test of Sphericity	Approx. Chi-Square
	133.558
	Df
	15
	Sig.
	.000

The Kaiser-Meyer-Olkin is .641, which indicates an average result. The significance is represented by .000. This is suitable for factor analysis.

Table 4.25 The total variance explained for contextual factors

Factor	Initial Eigenvalues	Extraction Sums of Squared Loadings	Rotation Sums of Squared Loadings						
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.181	36.345	36.345	1.628	27.129	27.129	1.352	22.532	22.532
2	1.210	20.169	56.514	.709	11.824	38.953	.985	16.422	38.953
3	.868	14.471	70.984						
4	.731	12.188	83.173						
5	.603	10.048	93.220						
6	.407	6.780	100.000						

Extraction Method: Principal Axis Factoring

The six items were the subject of factor analysis. All the Eigenvalues which fall > 1 have been reported and all the Eigenvalues which fall < 1 have not been subject to rotation. Identified are two Eigenvalues > 1. The two factors have a cumulative value of 38.95%.

Table 4.26 Rotated factor matrix for contextual factors

	Factor	
	1	2
32. The unavailability of resources negatively affects the ability to publish research papers.		.642
37. My research positively contributes towards curriculum development.		.563
40. My working environment significantly affects my research productivity.		
45. My school encourages me to collaborate with my colleagues.	.613	
46. My school provides me with choices in the research questions and issues that I investigate.	.885	
50. Training seminars assist me in conducting research.		

Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax with Kaiser Normalization

a. Rotation converged in 3 iterations

All the factors were subject to the Varimax rotational method. A value above .4 will be considered for factor loading. The questions load onto two factors with questions 32, 37 (resources) on factor 1 and questions 45, 46 (departmental support) on factor 2. Questions 40 and 50 do not load strongly onto any factor. Together they account for 38.95% of the variance.

Below are the reliability tests conducted on the various items. All items which loaded onto one factor are perfectly reliable and have not been represented.

4.4.2 Reliability – Cronbach alpha

4.4.2.1 *Monetary incentives*

Table 4.27 The Cronbach alpha for monetary incentives

Cronbach's Alpha	N of Items
.781	3

The alpha coefficient for the three items is .781, which suggests that the items have a good measurement.

4.4.2.2 *Non-monetary incentives*

Table 4.28 The Cronbach alpha for non-monetary incentives

Cronbach's Alpha	N of Items
.566	3

The alpha coefficient for the three items is .566, which suggests that the items do not have good measurement.

4.4.2.3 *Personal factors*

Table 4.29 The Cronbach alpha of factor one for personal factors

Cronbach's Alpha	N of Items
.700	3

The alpha coefficient for the three items is .700, which suggests that the items have a satisfactory measurement.

Table 4.30 The Cronbach alpha of factor two for personal factors

Cronbach's Alpha	N of Items
.706	4

The alpha coefficient for the four items is .706, which suggests that the items have a satisfactory measurement.

4.4.2.4 Contextual factors

Table 4.31 The Cronbach alpha of factor one for contextual factors

Cronbach's Alpha	N of Items
.551	2

The alpha coefficient for the two items is .551, which suggests that the items do not have a satisfactory measurement.

Table 4.32 The Cronbach alpha for factor two for contextual factors

Cronbach's Alpha	N of Items
.715	2

The alpha coefficient for the two items is .715, which suggests that the items have a satisfactory measurement.

4.4.3 Correlation

Table 4.33 Correction of questions 1 to 7

Questions		RP1	RP2	RP3	RP4	RP5
MI1	Pearson's Correlation	.002	-.012	.253**	.099	-.117
	Sig (2 Tailed)	.980	.885	.002	.220	.149
	N	154	154	154	154	154
MI2	Pearson's correlation	.191*	.075	.081	.098	.009
	Sig (2 tailed)	.018	.353	.315	.229	.910
	N	154	154	154	154	154
MI3	Pearson's correlation	.057	-.034	.106	.073	-.113
	Sig (2 tailed)	.484	.678	.191	.372	.164
	N	153	153	153	153	153
NMI1	Pearson's correlation	.155	.070	.162*	-.016	-.038
	Sig (2 tailed)	.055	.391	.045	.848	.643
	N	154	154	154	154	154
NMI2	Pearson's correlation	-.061	-.028	.135	-.050	-.072
	Sig (2 tailed)	.455	.733	.095	.542	.376
	N	153	153	153	153	153
MI4	Pearson's correlation	.182*	.071	-.063	.089	-.058
	Sig (2 tailed)	.024	.385	.436	.274	.477
	N	154	154	154	154	154
NMI3	Pearson's correlation	.085	.090	-.004	.136	.043
	Sig (2 tailed)	.297	.265	.957	.092	.599
	N	154	154	154	154	154

Table 4.34 Correlation of questions 8 to 14

NMI4	Pearson's correlation	.032	-.081	.077	.039	-.050
	Sig (2 tailed)	.690	.318	.344	.630	.538
	N	154	154	154	154	154
NMI5	Pearson's correlation	.376**	.251**	.040	.284**	.164*
	Sig (2 tailed)	.000	.002	.622	.000	.043
	N	153	153	153	153	153
NMI6	Pearson's correlation	-.114	-.115	.153	-.124	-.025
	Sig (2 tailed)	.161	.154	.058	.126	.755
	N	154	154	154	154	154
NMI7	Pearson's correlation	.161*	.146	.015	.287**	.066
	Sig (2 tailed)	.045	.071	.851	.000	.413
	N	154	154	154	154	154
NMI8	Pearson's correlation *	.042	-.027	.078	-.025	-.023
	Sig (2 tailed)	.601	.743	.339	.757	.775
	N	154	154	154	154	154
NMI9	Pearson's correlation	.060	-.030	-.005	.069	-.057
	Sig (2 tailed)	.460	.714	.947	.392	.483
	N	154	154	154	154	154
NMI10	Pearson's correlation	.125	.026	.086	.000	-.042
	Sig (2 tailed)	.123	.752	.288	.997	.602
	N	154	154	154	154	154

Table 4.35 Correlation of questions 15 to 21

NMI11	Pearson's correlation	.228**	.083	-.118	.126	.011
	Sig (2 tailed)	.004	.305	.143	.120	.895
	N	154	154	154	154	154
NMI12	Pearson's correlation	.018	-.058	-.054	-.083	-.182*
	Sig (2 tailed)	.828	.477	.508	.307	.024
	N	154	154	154	154	154
NMI13	Pearson's correlation	.078	.007	.145	.058	-.152
	Sig (2 tailed)	.337	.935	.073	.476	.060
	N	154	154	154	154	154
NMI14	Pearson's correlation	.150	.295**	.054	.255**	.123
	Sig (2 tailed)	.063	.000	.508	.001	.130
	N	154	154	154	154	154
P1	Pearson's correlation	.308**	.230**	-.008	.444**	.103
	Sig (2 tailed)	.000	.004	.924	.000	.202
	N	154	154	154	154	154
P2	Pearson's correlation	.382**	.282**	.132	.337**	.053
	Sig (2 tailed)	.000	.000	.103	.000	.514
	N	154	154	154	154	154
P3	Pearson's correlation	.305**	.266**	-.011	.287**	.015
	Sig (2 tailed)	.000	.001	.889	.000	.856
	N	153	153	153	153	153

Table 4.36 Correlation of questions 22 to 28

P4	Pearson's correlation	.438**	.218**	.095	.239**	-.022
	Sig (2 tailed)	.000	.007	.239	.003	.788
	N	154	154	154	154	154
P5	Pearson's correlation	.167*	.228**	.158	.168*	-.078
	Sig (2 tailed)	.039	.005	.051	.038	.340
	N	153	153	153	153	153
P6	Pearson's correlation	.375**	.287**	.112	.329**	.061
	Sig (2 tailed)	.000	.000	.165	.000	.451
	N	154	154	154	154	154
P7	Pearson's correlation	.170*	.253**	.078	.390**	.061
	Sig (2 tailed)	.035	.002	.335	.000	.453
	N	154	154	154	154	154
P8	Pearson's correlation	.286**	.299**	.120	.239**	.046
	Sig (2 tailed)	.000	.000	.138	.003	.570
	N	154	154	154	154	154
P9	Pearson's correlation	.216**	.252**	.164*	.296**	.027
	Sig (2tailed)	.007	.002	.042	.000	.739
	N	154	154	154	154	154
P10	Pearson's correlation	.231**	.117	.227**	.222**	-.022
	Sig (2 tailed)	.004	.147	.005	.006	.790
	N	154	154	154	154	154

Table 4.37 Correlation of questions 29 to 35

P11	Pearson's correlation	.241**	.143	.155	.247**	-.043
	Sig (2 tailed)	.003	.077	.054	.002	.599
	N	154	154	154	154	154
P12	Pearson's correlation	.209**	.133	.090	.173*	.008
	Sig (2 tailed)	.009	.099	.264	.032	.926
	N	154	154	154	154	154
P13	Pearson's correlation	.292**	.178*	.045	.250**	.049
	Sig (2 tailed)	.000	.027	.583	.002	.544
	N	154	154	154	154	154
P14	Pearson's correlation	.104	.045	-.053	.212**	-.048
	Sig (2 tailed)	.198	.580	.511	.008	.554
	N	154	154	154	154	154
P15	Pearson's correlation	.305**	.247**	.032	.363**	.114
	Sig (2 tailed)	.000	.002	.696	.000	.159
	N	154	154	154	154	154
P16	Pearson's correlation	.115	.155	.155	.164*	-.018
	Sig (2 tailed)	.155	.055	.055	.043	.828
	N	154	154	154	154	154
P17	Pearson's correlation	.359**	.240**	.092	.274**	.236**
	Sig (2 tailed)	.000	.003	.257	.001	.003
	N	154	154	154	154	154

Table 4.38 Correlation of questions 36 to 42

P18	Pearson's correlation	.217**	.171*	.001	.140	-.005
	Sig (2 tailed)	.007	.034	.987	.084	.949
	N	154	154	154	154	154
P19	Pearson's correlation	.197*	.217**	.200*	.082	.037
	Sig (2 tailed)	.014	.007	.013	.309	.653
	N	154	154	154	154	154
P20	Pearson's correlation	.209**	.216**	.127	.113	-.044
	Sig (2 tailed)	.009	.007	.115	.163	.591
	N	154	154	154	154	154
C1	Pearson's correlation	.090	.077	.112	.294**	-.050
	Sig (2 tailed)	.266	.342	.165	.000	.538
	N	154	154	154	154	154
C2	Pearson's correlation	.318**	.270**	.284**	.305**	-.037
	Sig (2 tailed)	.000	.001	.000	.000	.646
	N	154	154	154	154	154
C3	Pearson's correlation	.042	.095	.270**	.136	-.046
	Sig (2 tailed)	.603	.242	.001	.092	.573
	N	154	154	154	154	154
C4	Pearson's correlation	-.077	.019	.291**	-.037	-.176*
	Sig (2 tailed)	.345	.817	.000	.652	.030
	N	153	153	153	153	153

Table 4.39 Correlation of questions 43 to 49

C5	Pearson's correlation	.199*	.314**	.303**	.165*	.086
	Sig (2 Tailed)	.014	.000	.000	.041	.286
	N	154	154	154	154	154
C6	Pearson's correlation	.134	.225**	.381**	.052	.118
	Sig (2 tailed)	.098	.005	.000	.524	.148
	N	153	153	153	153	153
C7	Pearson's correlation	.135	.240**	.336**	.056	.148
	Sig (2 tailed)	.095	.003	.000	.487	.068
	N	154	154	154	154	154
C8	Pearson's correlation	.100	.150	.302**	.061	.073
	Sig (2 tailed)	.219	.064	.000	.453	.366
	N	154	154	154	154	154
C9	Pearson's correlation	.372**	.235**	.170*	.434**	.164*
	Sig (2 tailed)	.000	.003	.036	.000	.042
	N	154	154	154	154	154
C10	Pearson's correlation	.162*	.143	.162*	.213**	-.066
	Sig (2 tailed)	.044	.078	.044	.008	.414
	N	154	154	154	154	154
C11	Pearson's correlation	.175*	.140	.323**	.057	-.124
	Sig (2 tailed)	.030	.083	.000	.483	.126
	N	154	154	154	154	154

Table 4.40 Correlation of questions 50 to 55

C12	Pearson's correlation	.242**	.154	.254**	.147	-.094
	Sig (2 tailed)	.002	.057	.001	.068	.247
	N	154	154	154	154	154
RP1	Pearson's correlation	1	.315**	.186*	.219**	.146
	Sig (2 tailed)		.000	.021	.006	.071
	N	154	154	154	154	154
RP2	Pearson's correlation	.315**	1	.316**	.384**	.326**
	Sig (2 tailed)	.000		.000	.000	.000
	N	154	154	154	154	154
RP3	Pearson's correlation	.186*	.316**	1	.192*	.019
	Sig (2 Tailed)	.021	.000		.017	.811
	N	154	154	154	154	154
RP4	Pearson's correlation	.219**	.384**	.192*	1	.162*
	Sig (2 tailed)	.006	.000	.017		.045
	N	154	154	154	154	154
RP5	Pearson's correlation	.146	.326**	.019	.162*	1
	Sig (2 tailed)	.071	.000	.811	.045	
	N	154	154	154	154	154

For the above tables refer to the abbreviations listed under 4.2.2 (measures of central tendency and dispersion).

All questions denoted by a single or double asterisk signify significance. Pearson's correlation was conducted on all 55 questions and compared to each individual question. The last five questions shown in the above table show greater significance as compared to the first 55 questions.

4.4.4 Regression analysis

4.4.4.1 Monetary incentives

Table 4.41 Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.175 ^a	.031	-.002	1.077	2.253

a. Predictors: (Constant), 14. The high cost of publishing research papers is demotivating to conduct research. 2. Research grants influence the number of research papers conducted within my school as a unit. 6. As part of my position, I am expected to seek external funds to fund my research. 1. Monetary incentives personally encourage me to be research productive. 3. A lack of monetary incentives would decrease the number of research papers I publish.

b. Dependent Variable: 55. How many papers have you published in the last five years?

Table 4.42 ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	5.386	5	1.077	.929	.464 ^a
Residual	170.497	147	1.160		
Total	175.882	152			

Table 4.43 Model

Model		Unstandardised coefficients		Standardised coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.676	.514		5.209	.000
	1. Monetary incentives personally encourage me to be research productive.	-.099	.110	-.092	-0.895	.372
	2. Research grants influence the number of research papers conducted within my school as a unit.	.184	.133	.146	1.380	.170
	3. A lack of monetary incentives would decrease the number of research papers I publish.	-.168	.135	-.143	-1.245	.215
	6. As part of my position, I am expected to seek external funds to fund my research.	-.061	.110	-.048	-.555	.580
	14. The high cost of publishing research papers is demotivating to conduct research.	-.006	.094	-.006	-.068	.946

Regression analysis was used to test whether the monetary incentive questions significantly predicted research productivity. Results show that these questions explain 3.1% of the variance ($R^2 = .031$, $F(5,147) = .929$, $p = .464$). This indicates that the monetary incentive questions do not significantly predict productivity.

4.4.4.2 Non-monetary incentives

Table 4.44 Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.309 ^a	.095	.052	1.028	2.075

a. Predictors: (Constant), 36. I am in constant competition to produce research of a high standard. 4. The tenure and promotion process causes me an unreasonable amount of stress to produce research papers. 10. If the publication of research was not a requirement of my job, I would not conduct any research. 31. Conducting research motivates me to make a difference to the current information available in my respective field. 5. Non-monetary incentives offered by my school motivate me to conduct research. 16. The publication process demotivates me. 9. I am self-motivated to produce research papers of a high quality.

b. Dependent Variable: 55. How many papers have you published in the last five years?

Table 4.45 ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	16.049	7	2.293	2.172	.040 ^a
Residual	152.030	144	1.056		
Total	168.079	151			

Table 4.46 Model

Model		Unstandardised coefficients		Standardised coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.544	.600		4.24	.000
	4. The tenure and promotion process causes me an unreasonable amount of stress to produce research papers.	.055	.105	.045	.525	.600
	5. Non-monetary incentives offered by my school motivate me to conduct research.	-.069	.100	-.058	-.692	.490
	9. I am self-motivated to produce research papers of a high quality.	.193	.094	.181	2.062	.041
	10. If the publication of research was not a requirement of my job, I would not conduct any research.	.020	.088	.019	.227	.821
	16. The publication process demotivates me.	-.321	.102	-.274	-3.153	.002
	31. Conducting research motivates me to make a difference to the current information available in my respective field.	-.034	.105	-.028	-.321	.749
	36. I am in constant competition to produce research of a high standard.	.018	.097	.016	.189	.851

Regression analysis was used to test whether the non-monetary incentive questions significantly predicted research productivity. Results show that these questions explain 9.5% of the variance ($R^2 = .095$, $F(7,144) = 2.172$, $p = .040$). This indicates that the non-monetary incentive questions are significant and these questions are predictors of productivity.

Self-motivation to produce papers of a high quality ($\beta = .181$, $p = .041$) is a significant predictor of high productivity and belief that the publication process is demotivating ($\beta = -.274$, $p = .002$) is a significant predictor of low productivity. The alternative hypothesis is partially accepted and the null hypothesis is partially rejected.

4.4.4.3 Personal factors

Table 4.47 Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.395 ^a	.156	.103	1.023	2.297

a. Predictors: (Constant), 44. Hobbies such as jogging or gyming stimulate my research ideas. 29. Time away from the office greatly increases my research productivity. 39. My research is valued by my school. 38. Personal convictions influence the topics I research. 35. Experience positively influences my capability to conduct research. 42. My religious beliefs affect the type of research I conduct. 28. My home environment is conducive to research activities after hours. 24. I feel a sense of personal achievement on the completion of a study. 43. I have a personal/emotional attachment to my research.

b. Dependent Variable: 55. How many papers have you published in the last five years?

Table 4.48 ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	27.485	9	3.054	2.918	.003 ^a
	Residual	148.594	142	1.046		
	Total	176.079	151			

Table 4.49 Model

Model		Unstandardised coefficients		Standardised coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.810	.554		3.268	.001
	24. I feel a sense of personal achievement on the completion of a study.	-.065	.110	-.057	-.592	.555
	28. My home environment is conducive to research activities after hours.	.056	.108	.049	.514	.608
	29. Time away from the office greatly increases my research productivity.	-.118	.103	-.110	-1.147	.253
	35. Experience positively influences my capability to conduct research.	.324	.105	.278	3.092	.002
	38. Personal convictions influence the topics I research.	-.055	.092	-.051	-.605	.546
	39. My research is valued by my school.	-.034	.101	-.029	-.339	.735
	42. My religious beliefs affect the type of research I conduct.	-.305	.099	-.283	-3.086	.002
	43. I have a personal/emotional attachment to my research.	.070	.115	.059	.608	.544
	44. Hobbies such as jogging or gyming stimulate my research ideas.	.252	.115	.212	2.204	0.03

Regression analysis was used to test whether the personal questions significantly predicted research productivity. Results show that these questions explain 15.6% of the variance ($R^2 = .156$, $F(9,142) = 2.918$, $p = .003$). This indicates that the personal questions are significant and these questions are predictors of productivity. Experience positively influences my capability to conduct research ($\beta = .278$, $p = .002$) and Hobbies such as jogging and gyming stimulate my research ideas ($\beta = .212$, $p = .029$) are significant predictors of high productivity. My religious beliefs affect the type of research conducted ($\beta = .283$, $p = .002$) is a significant predictor of low productivity. The alternative hypothesis is partially accepted and the null hypothesis is partially rejected.

4.4.4.4 Contextual factors

Table 4.50 Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.216 ^a	.046	.008	1.073	2.166

a. Predictors: (Constant), 50. Training seminars assist me in conducting research. 32. The unavailability of resources negatively affects the ability to publish research papers. 45. My school encourages me to collaborate with my colleagues. 40. My working environment significantly affects my research productivity. 37. My research positively contributes towards curriculum development. 46. My school provides me with choices in the research questions and issues that I investigate.

b. Dependent Variable: 55. How many papers have you published in the last five years?

Table 4.51 ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.243	6	1.374	1.194	.313 ^a
	Residual	169.107	147	1.150		
	Total	177.351	153			

Table 4.52 Model

Model	Unstandardised coefficients		Standardised coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.107	.586		3.594	.000
32. The unavailability of resources negatively affects the ability to publish research papers.	-.071	.103	-.062	-.691	.491
37. My research positively contributes towards curriculum development.	.076	.113	.060	.671	.503
40. My working environment significantly affects my research productivity.	-.058	.123	-.040	-.468	.641
45. My school encourages me to collaborate with my colleagues.	.197	.115	.171	1.710	.089
46. My school provides me with choices in the research questions and issues that I investigate.	.032	.117	.028	.275	.784
50. Training seminars assist me in conducting research.	-.146	.097	-.135	-1.497	.137

Regression analysis was used to test whether the contextual questions significantly predicted research productivity. Results show that these questions explain 4.6% of the variance ($R^2 = .046$, $F(6,147) = 1.194$, $p=.313$). This indicates that the contextual questions are significant and these questions are not predictors of productivity.

4.4.5 Bivariate analysis

A test was performed to identify whether publication productivity is significant for the categories of the demographic variables. A Mann Whitney test was applied for 2 categories and a Kruskal Wallis test was applied for more than 2 categories.

4.4.5.1 Gender

There are no significant differences between the genders with regard to productivity.

4.4.5.2 Job Title

Table 4.53 Average productivity scores

	N	Mean	Std. Deviation
Lecturer	52	1.83	.985
Senior lecturer	13	2.08	1.188
Professor	41	2.73	.949
Associate professor	4	1.75	.957
Doctor	44	2.25	1.102
Total	154	2.21	1.077

4.4.5.3 Rank

Table 4.54 Rank

	Title	N	Mean Rank
55. How many papers have you published in the last five years?	Lecturer	52	61.07
	Senior lecturer	13	69.50
	Professor	41	101.39
	Associate professor	4	59.75
	Doctor	44	78.64
	Total	154	

Table 4.55 Test statistics

	55. How many papers have you published in the last five years?
Chi-Square	21.779
Df	4
Asymp. Sig.	.000

a. Kruskal Wallis Test

b. Grouping Variable: title

Analysis shows that there is a difference in the productivity for different title classifications ($\chi^2(4, N=154) = 21.779, p < .0005$). Specifically, professors have a significantly higher productivity than lecturers ($Z(N=93) = -4.404, p < .0005$) and doctors have significantly higher productivity than lecturers ($Z(N=96) = -2.096, p = .036$); professors have a significantly higher productivity than senior lecturers ($Z(N = 54) = -2.441, p = .015$) and professors have a significantly higher productivity than doctors ($Z(N = 85) = -2.527, p = .012$).

The above interpretation is based on the output from the specific testing in pairs found below.

Table 4.56 Rank

	Title	N	Mean Rank	Sum of Ranks
55. How many papers have you published in the last five years?	Lecturer	52	36.50	1898.00
	Professor	41	60.32	2473.00
	Total	93		

Table 4.57 Test statistics

	55. How many papers have you published in the last five years?
Mann-Whitney U	520.000
Wilcoxon W	1898.000
Z	-4.404
Asymp. Sig. (2-tailed)	.000

a. Grouping Variable: title

Table 4.58 Rank

	Title	N	Mean Rank	Sum of Ranks
55. How many papers have you published in the last five years?	Lecturer	52	43.34	2253.50
	Doctor	44	54.60	2402.50
	Total	96		

Table 4.59 Test statistics

	55. How many papers have you published in the last five years?
Mann-Whitney U	875.500
Wilcoxon W	2253.500
Z	-2.096
Asymp. Sig. (2-tailed)	.036

a. Grouping Variable: title

Table 4.60 Rank

	Title	N	Mean Rank	Sum of Ranks
55. How many papers have you published in the last five years?	Senior lecturer	13	18.65	242.50
	Professor	41	30.30	1242.50
	Total	54		

Table 4.61 Test statistics

	55. How many papers have you published in the last five years?
Mann-Whitney U	151.500
Wilcoxon W	242.500
Z	-2.441
Asymp. Sig. (2-tailed)	.015

a. Grouping Variable: title

Table 4.62 Rank

	Title	N	Mean Rank	Sum of Ranks
55. How many papers have you published in the last five years?	Professor	41	49.71	2038.00
	Doctor	44	36.75	1617.00
	Total	85		

Table 4.63 Test statistics

	55. How many papers have you published in the last five years?
Mann-Whitney U	627.000
Wilcoxon W	1617.000
Z	-2.527
Asymp. Sig. (2-tailed)	.012

a. Grouping Variable: title

Table 4.64 Correlation

		55. How many papers have you published in the last five years?	Year experience
Spearman's rho	55. How many papers have you published in the last five years?	Correlation Coefficient	.235**
		Sig. (2-tailed)	.003
		N	153
	Year experience	Correlation Coefficient	1.000
		Sig. (2-tailed)	.
		N	153

** . Correlation is significant at the 0.01 level (2-tailed).

There was a significant positive correlation between the number of publications and the years of experience ($\rho = .235$, $N=153$, $p<.0005$). The more experience, the higher the productivity.

4.5 Conclusion

With regard to the tests conducted for descriptive and inferential statistics, descriptive statistics showed fair results in the graphs. The measures of central tendency collectively leaned towards the positive end and the Wilcoxon test identified questions pertaining to research productivity which the participants were in significant agreement with. The Pearson's correlations showed great significance when compared to the last five questions. Under inferential statistics, the factor analysis showed different factor loadings with different constructs and reliability collectively showed good results. The bivariate analysis only identified title to have a significant effect on research productivity. These results and findings will be discussed in greater detail in the following chapter.

Chapter Five

Discussion

5.1 Introduction

The data interpretations and discussion presented in this chapter link together the related data findings from Chapter Four which were derived from the questionnaires handed out to the participants dealing with factors that affect research productivity. The following discussion and interpretation are based on three groups of questions related to motivation, personal factors and contextual factors. These questions were developed based on the literature in order to assist in answering the research questions set out in Chapter One. This chapter focuses on the discussion and interpretation.

5.2 Discussion

This study is based on a similar study previously conducted by Hardré *et al.* (2007) and a later study conducted by Hadré *et al.* (2011). Both these studies focused on factors affecting research productivity. These studies found significant correlations and relationships among the three factors in question. These results created an expectation of what data findings could be expected in the present study. However, the current data findings are in complete contrast but once the specific industry and work climate was analysed it emerged that this was with good reason.

The categories of school, title, gender, discipline and years of experience were used in the descriptive statistics based on the five biographical questions in the questionnaire. Of these five categories only the title and years of experience showed significance. The results obtained from comparing title and research output have strongly shown that the higher the title of the academic staff member, the higher their research productivity. This finding makes sense theoretically as well as practically in that the higher up the educational ladder staff members are, the more involved they will be in research activities. This in turn links with the second finding, which is that years of experience directly affect research productivity. As

academic staff members begin their ascent up the educational ladder, the more experience is required to achieve the status of the prestigious title. The remaining categories of school, discipline and gender showed no significance.

Motivational factors were grouped and analysed separately as monetary and non-monetary incentives. Monetary incentives show that these questions were not significant predictors of research productivity and the null hypothesis, that there is no relationship between motivational factors and research productivity among academics, is accepted.

This is an unexpected finding considering the extent to which everything is money driven in this modern day and age and everyone is money focused. However, these results were obtained from one individual university and it is possible that the questions were not answered completely honestly. While the questionnaires were anonymously completed, the participants would not necessarily want to reveal the full picture as not to give the university a bad reputation. Money is directly linked to each individual by way of a salary and the participants would not want to be directly affected. The two Hardré studies focused on 28 different universities across 17 states in the United States (US). The results were obtained via an online, anonymous questionnaire, allowing the participants to be completely honest as the results could not be tied back to a specific university. Obtaining such results is why this study was conducted. There is a gap to see if similar factors could be stated to affect research productivity in a South African context (Hardré, Miller, Beasley, Pace, Maxwell, Xie, 2007).

Non-monetary incentives, on the other hand, significantly predict research productivity. The alternate hypothesis, that there is a relationship between motivational factors and research productivity among academics, is partially accepted. These questions were perhaps answered more honestly to show that non-monetary incentives such as departmental grants and the availability of valuable and necessary equipment had an effect on research productivity. This is not surprising, considering that monetary and non-monetary incentives are opposite in nature. It is suggested that protecting the academic staff members as well as the reputation of the university influenced the way the questions were answered. It may have been felt that it would make the university look bad if the results showed that money greatly influenced research output and therefore the participants answered favourably but held back to a certain degree. On the other hand, questions regarding non-monetary incentives were more liable to be answered honestly as this paints a much better picture of the university. This suggests that

academic staff members are not only focused on personal financial gain but also on the growth and the development of their respective departments. As stated in a study conducted by Paul and Marc (2007), motivational incentives have been the cause of increased productivity.

Self-motivation to produce papers of a high quality was a significant predictor of high research productivity. This finding reinforces the fact that academic staff members are not only focused on personal financial gain. Academic staff members find research to be important and valuable, therefore finding it not a task but rather a duty. Researchers are constantly producing papers of a higher quality with each paper they publish. This desire for increased quality for personal reasons increases research output and can be seen as a non-monetary incentive to conduct research.

The publication process was found to be demotivating and negatively affected research productivity. This is not unexpected as much red tape surrounds the publication of research. This does not only affect the end result but more importantly the beginning process. There are too many processes and documents to submit in order to officially commence the study. This is highly demotivating, causing academic staff members to be reluctant to conduct research.

The alternate hypothesis is partially accepted since the hypothesis states that there is a relationship between motivational factors and research productivity among academics. A relationship exists only between non-monetary incentives and research productivity, as no relationship existed between monetary incentives and research productivity among academic members. Therefore the hypothesis can only be partially accepted.

Personal factors were found to be significant predictors of research productivity and the alternate hypothesis, that there is a relationship between personal factors (life and career changes, intrinsic interest, and self-efficacy) and research productivity among academics at UKZN, is partially accepted.

Specifically mentioned was that experience positively influences the capability to conduct research. This makes sense as it can be argued that experience gained through the completion of each study will better prepare the researcher for the next study to be conducted. Each

study completed is different in its own right, in turn developing the researcher's skills and allowing each new study to be viewed from a fresh perspective. As mentioned in the Baldwin (1990) study, academic staff members who have consistent involvement in research activity tend to have a greater balance in their professional lives. As stated by the Middlewood (1999) study, research has been linked to the development and advancement of a professional career. Experience was also found to be a contributor to research productivity and it can be concluded that a low level of experience leads to low self-esteem as independent researchers.

Hobbies such as jogging and gyming stimulated research ideas and were found to be a significant predictor of high productivity. Jogging and gyming stimulate oxygen production to enable the brain to function at an optimal level allowing the easier creation of research ideas. Constant concentration and focus tires the brain, forcing it to work harder than necessary (Volkwein and Carbone, 1994). Time spent participating in enjoyable activities not only benefit the body but also the mind. A healthier and happier state of mind allows brain function to occur more regularly and frequently. Ideas flow better and work is completed sooner. It is good to see that academics make time to relax and to stimulate their minds before attempting or completing a strenuous task.

Religious beliefs affect the type of research conducted and were found to be a significant predictor of low productivity. There are many religions and each religion has its own beliefs and cultures. These beliefs are followed very strictly and therefore will have an effect on the type of research conducted by the researcher. Researchers will not investigate a topic their religion is against or which they do not believe in. This will have a significant effect on research output as it will limit the topics available to the researcher to investigate. However, this cannot be overcome, as a researcher cannot be forced to conduct research on a topic that goes against religious beliefs. According to Pfeffer and Langton (1993), personal opinions and circumstances were noted have an influence on research productivity.

The alternate hypothesis, that there is a relationship between personal factors (life and career changes, intrinsic interest and self-efficacy) and research productivity among academics at UKZN, is partially accepted. The hypothesis can only be partially accepted as the data analysis did not find enough questions in the personal category to be significant predictors of research productivity and therefore it cannot be completely accepted.

It is not uncommon to find personal factors affecting an individual's work performance. All working adults have two lives, one being their professional lives and the other their personal lives. Preferably these two should not be interlinked but in reality it is difficult to keep them apart. However, it is good to see that the effect personal factors have on research productivity among academic staff at UKZN is not detrimental to the university's overall research output.

Contextual factors were found not to be significant predictors of research productivity and the null hypothesis, that there is no relationship between contextual factors and research productivity among academics, is accepted.

It has been stated by Long and McGinnis (1981) that the working environment has the most powerful effect on research productivity, the atmosphere in a department or college being vital in the stimulation of increased research productivity, according to the participants of the questionnaire. A positive correlation between the working environment and research productivity was also found to exist in a study conducted by Braxton (1983). However, the responses obtained from the current study show that the working environment does not have an impact on research output. There is no encouragement for academics to conduct research activities. Academic staff members are not receiving adequate positive reinforcement from fellow colleagues to continue work and show ability to research. A positive atmosphere with colleagues could be a source of ideas and constructive criticism, providing strong motivation to succeed (Blackburn and Lawrence, 1995). Department leaders play a vital role in supporting staff in conducting research by being good role models. Departments with good role models see high productivity from academic staff members. It was found by Glueck and Jauch (1975) that the behaviour of administration has a great impact on the satisfaction of staff members.

Even though contextual factors are shown, from a statistical perspective, not to be a significant predictor of research productivity among academic staff at UKZN, this should not be viewed as a negative result. In fact, this result is greatly encouraging. South Africa is a new democracy and a developing country; this means that it is still in the process of stabilising itself. Taking this into consideration, it is reassuring to see that the working environment does not have a substantial effect on work performance, in this case research productivity at UKZN. It has also be stressed that these results have been obtained from a small sample of academic staff based only at UKZN and therefore a general statement cannot

be made on a nation-wide basis. If this same study was to be conducted at a different university also based in South Africa, the results could differ. Prior studies have shown contextual factors to play an imperative role in research productivity, even though at UKZN this is not the case.

Due to world-wide economic and social imperatives, universities all around the world are attempting to reconceptualise their public roles. For example, the national government of Thailand is looking at dealing with their vital technological and social issues by restructuring their traditional courses to include more of the population. Many other universities have been trying to extend their research activities by identifying areas of research strength. This investigation has attempted to understand if the factors identified internationally will have the same impact on research productivity in South Africa.

The major responsibilities of academic staff in the modern university include teaching and research as well as performing administration and community service. Many institutions are faced with the task of encouraging a large proportion of lecturers to be active in both teaching and research (Marsh and Hattie, 2002; Ramsden and Moses, 1992; Volkwein and Carbone, 1994). It has been noticed while studying the research productivity of academic lecturers that it is essential that the university give lecturers the opportunity to develop professionally. These research results are important in that they assist universities to identify ways to increase the number of lecturers who are interested in carrying out research projects and also ways of helping them to access new skills which will boost their professional standing. One essential step in this task is for universities to clearly recognise the factors that either encourage or block lecturers in making the shift to being research active.

It is important to discuss why some faculties are able to produce significant research outcomes whilst others cannot (Cresswell, 1985). Universities across the globe face similar problems in this regard, which makes any relatively simple answer to an institution's research productivity problem unlikely. Because each university is different in that they have a different environmental background affecting research productivity, this case study has mainly focused on the situation in a public university in South Africa, namely, UKZN.

Due to the major responsibilities of academic staff in the modern university, many authors hold that teaching and research are mutually supportive, if not inseparable, (Marsh and

Hattie, 2002; Ramsden and Moses, 1992; Volkwein and Carbone, 1994) and that teaching effectiveness and research outcomes are complementary.

As Gibbon, Ivancevich and Donnelly (1994) stated, self-directed motivation is a very important factor in encouraging lecturers to perform research tasks as it underpins the various situational and personal reasons why lecturers choose whether or not to engage in academic tasks. As Suwanwala (1991) noted in her investigations regarding perceptions of research productivity of academic lecturers in Chulalongkorn University (Thailand), many lecturers did not realize the importance of conducting research. In a similar situation, but ten years later, Burapha University's research outcomes and publications still appeared to be unacceptably low (Burapha University, 2002). The reasons for this are in part explained by the results of this study, which suggest that there are several factors that affect research outcomes.

Consistent with expectancy theory, Vroom (1964) pointed out that people are motivated to work when they expect that job performance will lead to desired outcomes and when they value work activities. In the current study, results indicate that research productivity is not high because lecturers perceive a lack of a motivating environment; for instance, they face resistance from their fellow staff members. Moreover, lecturers sometimes face institutional regulations which are unacceptably complex and have insufficient equipment and materials to pursue research in a satisfactory manner. In addition, it appears that appraisal of lecturers' job performance does not enhance desired outcomes, because such reviews do not proportionally value research tasks. Consequently, lecturers prefer to teach and perform administrative duties.

Lawler and Porter (1967) have discussed the efforts that have been put into driving performance relating to abilities such as intelligence, skills, aptitudes, personality traits, and perception of the roles that would enact performance successfully. The faculty staff do what they believe they are good at and devote energy to what interests them, engaging in activities in which they think can influence outcomes (Blackburn and Lawrence, 1995).

This study has identified some important reasons regarding the factors that cause low research productivity. It is anticipated that these findings can be used as guidelines for those

who are charged with stimulating research development, and will provide sources for suggesting a change in direction for better research performance.

5.3 Conclusion

This chapter discussed the results and the outcomes of the study. The objectives of the study involved three factors, namely, motivational, personal and contextual factors and how they affect research productivity amongst academic staff in a South African context. In the chapter to follow a summary will be provided and conclusions will be drawn.

Chapter Six

Conclusions and Recommendations

6.1 Summary and conclusion

The main aim of this study is to investigate how three sets of factors, namely, motivational, personal and contextual factors, impact on research productivity among academic staff members at UKZN. Extensive research of literature was conducted to investigate these three factors theoretically as well as their effect in a South African context, laying a foundation for the current study. The literature review exposed a gap since these three factors have not been examined collectively in a South African environment and therefore this study aims to bridge the gap. The results obtained through the completion of questionnaires did not represent definitive data. No factor stood out in isolation to be a significant predictor of research productivity. Motivational factors and personal factors were partially accepted and contextual factors were not found to be significant predictors of research productivity.

It can be concluded that the results obtained in this research should not be viewed in a negative light. There is room for growth and development in the South African higher education system. This study in South Africa, containing all three factors, has shown that the factors which affect universities in the US do not have a similar effect on research productivity at UKZN. This creates a platform for further research so as to discover what specific factors do affect UKZN. This study shows that university environments are independent of each other and cannot be expected to mimic one another.

6.2 Significance

6.2.1 Theoretical

The current literature available on research productivity examines motivational, personal and contextual factors individually. Previous studies have investigated only two of the three sets of factors in question. No similar study has been conducted involving all three factors and no

such study has been done in South Africa. This study adds to the information currently in existence on research productivity and allows a different perspective for comparing future studies on research productivity.

6.2.2 Practical

Listed below are a few suggestions based on the findings of the study which could be implemented at UKZN to encourage research output by academic staff members. Lecturers are not self-motivated to conduct research. An intrinsic drive needs to be developed within academic staff members to create knowledge and a positive perspective towards research. Most lecturers tend to act in isolation when conducting research; yet it will be of greater benefit to work in teams with other lecturers. The amount of effort exerted on research is linked to the value of personal activities.

Curriculum Development

Textbooks are not the only source of knowledge. Current research papers can be incorporated into the teaching curriculum, assisting the development of knowledge. Therefore, it is vital to ensure that lecturers understand the importance of research. Once lecturers realise the importance of research, it would come naturally to want to conduct research. Ongoing investigations with support from the university will produce positive results. The university can provide support to lecturers by developing their research skills since an appropriate level of skills creates a higher level of research confidence. The university should put a policy in place whereby doctoral and masters graduates are included in the academic staff. This would increase the research knowledge and experience available at the university which can be shared with existing staff members. While the university has made many efforts to provide research seminars, there should in addition be interesting and innovative programs, such as introducing new statistical programs or innovative data collection methods.

Teaching time

Realistically it is difficult to reduce teaching time as it is the main responsibility of the university. One way to overcome the problem of the excessive teaching load is for the university to reduce teaching workloads for highly qualified and active research staff.

Remuneration

The university could consider increasing researchers' salaries to ensure that income derived from conducting research is matched or higher than income derived from only teaching. Research productivity can be encouraged by offering different rewards such as money, promotion or recognition for staff who are research productive compared to those who are not. The university could also consider a special kind of leave for research development.

Easy access to facilities

The database system should be easier to access so as to compile information. All academic staff members should have equal rights to use the university facilities. The number of research assistant and technicians should be increased. A research assistant plays an important role in ensuring that research is accomplished. These assistants should be Bachelor and Master's degree students as this would have the benefit that they would learn how to conduct research. Thus, the university would develop experienced personnel who will become good future researchers.

Policies and procedures

University problems related to complicated regulations which create unnecessary inconvenience for research staff should be clearly defined and restrictive rules should be reduced. Moreover, the university should provide more balanced research funding. Currently, lecturers struggle to find outside funding and have to face competition.

The research environment should be developed to encourage output and therefore role models or mentors should be provided to low research performing faculties to assist with the research process and provide continuous motivation.

6.3 Suggestions for future research

Future researchers can conduct similar studies but in addition they can make use of both a qualitative and quantitative approach as only one approach was used in this study. A different data collection method in such studies could also be used so that in-depth interviews could allow the researcher to gain more personal information than is gained from a questionnaire.

A longer time frame could allow for more universities to be involved in the study, permitting a comparison across provinces to be made and ensuring greater accuracy of results. The more universities there are involved in the study, the greater the sample size would be, allowing for greater generalisability. Incorporating different universities would result in greater willingness of the academic staff to answer the questions more freely and openly since the responses would not be able to be traced back to one university.

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Appendix A: Gatekeepers Letter



19 August 2014

Mr Jarrod Emlyn Naidoo
School of Management, IT and Governance
College of Law and Management Studies
Westville Campus
UKZN
Email: 209525010@stu.ukzn.ac.za

Dear Mr Naidoo

RE: PERMISSION TO CONDUCT RESEARCH

Gatekeeper's permission is hereby granted for you to conduct research at the University of KwaZulu-Natal (UKZN) towards your postgraduate studies, provided Ethical clearance has been obtained. We note the title of your research project is:

"Examining the impact of personal, contextual and motivation factors on research productivity: A case study among academic staff at UKZN".

It is noted that you will be constituting your sample by randomly handing out questionnaires to academic staff members on all campuses

Data collected must be treated with due confidentiality and anonymity.

Yours sincerely

MR MC BALOYI
REGISTRAR

Office of the Registrar

Postal Address: Private Bag X54001, Durban, South Africa

Telephone: +27 (0) 31 260 8005/2206 Facsimile: +27 (0) 31 260 7824/2204 Email: registrar@ukzn.ac.za

Website: www.ukzn.ac.za



Founding Campuses: ■ Edgewood ■ Howard College ■ Medical School ■ Pietermaritzburg ■ Westville

Appendix B: Ethical Clearance



23 March 2015

Mr Jarrod Emlyn Naidoo (209525010)
School of Management, IT & Governance
Westville Campus

Dear Mr Naidoo,

Protocol reference number: HSS/1077/014M
New project title: The effect of personal, contextual and motivational factors on research productivity among academic staff at the University of KwaZulu-Natal

Approval Notification – Amendment

This letter serves to notify you that your request for an amendment received on 19 March 2015 has now been approved as follows:

- Change in Title

Any alterations to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form; Title of the Project, Location of the Study must be reviewed and approved through an amendment /modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

Best wishes for the successful completion of your research protocol.

Yours faithfully

.....
Dr Shenuka Singh (Chair)

/ms

Cc Supervisor: Dr M Williamson
Cc Academic Leader Research: Professor Brian Mc Arthur
Cc School Administrator: Ms Angela Pearce

Humanities & Social Sciences Research Ethics Committee
Dr Shenuka Singh (Chair)

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1910 - 2010
100 YEARS OF ACADEMIC EXCELLENCE

FOUNDER COLLEGES: Edgewood Howard College Medical School Pietermaritzburg Westville

Appendix C: Questionnaire

Examining the impact of personal, contextual and motivational factors on research productivity : A case study amongst academic staff at UKZN.

The purpose of this questionnaire is to find out what impact several factors might have on research productivity amongst academic staff at the University of KwaZulu-Natal.

Your responses will be **strictly confidential and anonymous and will be used for academic purposes only**. The request for a minimal amount of biographical information (see below) is only for the purpose of identifying any specific group differences.

All that is required is for you to place a tick in the box that you think most accurately indicates your view towards a particular item, ranging from strongly disagree to strongly agree.

Thank you in advance for your help with this research exercise.

J. E. Naidoo Mcom (Management)

209525010

073 614 4442

209525010@stu.ukzn.ac.za

QUESTIONNAIRE

Gender

Discipline

School

Number of years of research experience

Title

Strongly Disagree **Disagree** **Neutral** **Agree** **Strongly Agree**

A **B** **C** **D** **E**

	A	B	C	D	E
• Monetary incentives personally encourage me to be research productive.					
• Research grants influence the number of research papers conducted within my school as a unit.					
• A lack of monetary incentives would decrease the number of research papers I publish.					
• The tenure and promotion process causes me an unreasonable amount of stress to produce research papers.					
• Non-monetary incentives offered by my school motivate me to conduct research.					
• As part of my position, I am expected to seek external funds to fund my research.					
• I am satisfied with the recognition I receive from my colleagues in my discipline.					
• I feel morally obligated to maintain the University-wide norm for research.					
• I am self-motivated to produce research papers of a high quality.					
• If the publication of research was not a requirement of my job, I would not conduct any research.					
• A graduate assistant would facilitate faster production of research publications by me.					
• Family commitments hamper my research obligations.					
• UKZN offers adequate resources to my college to perform research.					
• The high cost of publishing research papers is demotivating to conduct research.					
• I am satisfied with my opportunities for networking with my colleagues in my discipline.					
• The publication process demotivates me.					
• Access to data information hinders the standard of research produced.					
• Easy access to required information encourages you to continuously conduct research.					

Strongly Disagree **Disagree** **Neutral** **Agree** **Strongly Agree**

A **B** **C** **D** **E**

• I find conducting research interesting and informative.					
• My research has attracted interest from my fellow researchers in the field.					
• I consider research to be valuable.					
• I think it is necessary to continuously conduct research.					
• Conducting research is more rewarding than lecturing.					
• I feel a sense of personal achievement on the completion of a study.					
• I consider the opinions of others valuable to my current research.					
• I am satisfied with the way I conduct research.					
• Published research is an asset to the University.					
• My home environment is conducive to research activities after hours.					
• Time away from the office greatly increases my research productivity.					
• Supervising postgraduate students helps to improve the quality of my research.					
• Conducting research motivates me to make a difference to the current information available in my respective field.					
• The unavailability of resources negatively affects the ability to publish research papers.					
• I publish high quality research within my discipline.					
• My rank impacts the standard of research papers I produce.					
• Experience positively influences my capability to conduct research.					
• I am in constant competition to produce research of a high standard.					
• My research positively contributes towards curriculum development.					
• Personal convictions influence the topics I research.					

Strongly Disagree **Disagree** **Neutral** **Agree** **Strongly Agree**

A **B** **C** **D** **E**

• My research is valued by my school.					
• My working environment significantly affects my research productivity.					
• Mentoring is important to me.					
• My religious beliefs affect the type of research I conduct.					
• I have a personal/emotional attachment to my research activities.					
• Hobbies such as jogging or gyming stimulate my research ideas.					
• My school encourages me to collaborate with my colleagues.					
• My school provides me with choices in the research questions and issues that I investigate.					
• I follow the correct ethical procedures when conducting research.					
• External influences such as working environment and incentives outweigh my personal drive to publish research papers.					
• The lack of support from colleagues demotivates me from conducting future research.					
• Training seminars assist me in conducting my research.					
• I have recently published in a recognized journal.					
• I have presented at or attended at least two international conferences over the last three years.					
• I have published several chapters or an entire book in my respective field.					
• I am a productive researcher.					
• How many papers have you published in the last 5 years? A 1-3 B 4-6 C 7-9 D 10-14 E 15+					

Appendix D: Statistician Letter

Gill Hendry B.Sc. (Hons), M.Sc. (Wits)
Mathematical and Statistical Services

Cell: 083 300 9896
email : hendryfam@telkomsa.net

19 November 2014

To whom it may concern

Please be advised that I have assisted Jarrod Naidoo (student number 209525010), who is presently studying for a Master of Commerce, with the statistical analysis for his study.

Yours sincerely

Gill Hendry (Mrs)

Appendix E: Editors Letter

College of Law and Management Studies
University of KwaZulu-Natal

Tel: 031 260 2491
Cell: 083 566 8036
e-mail: goodierc@ukzn.ac.za

27 January 2015

To Whom It May Concern

DECLARATION OF PROFESSIONAL EDITING: Masters dissertation by Jarrod Naidoo

I declare that I have edited this dissertation.

My involvement was restricted to language usage and spelling, completeness and consistency, referencing style and formatting of tables and figures. I did no re-writing of the content.

Yours sincerely



DR CAROLINE GOODIER