



**A systems approach to the production and retention of academic staff with
PhD: A case study of a university of technology**

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degree of Doctor of Philosophy in Leadership and Complexity in
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Durban University of Technology

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ABSTRACT

Compared to most countries with similar economies, South Africa presents figures that reflect that per million there is a critical shortage of doctorate holders. Doctoral education has been linked to economic growth and global competitiveness; however, several scholars have bemoaned the country's extremely small doctoral output in relation to its economic and social development needs. The higher education (HE) system has set a throughput rate of 20% per annum but higher education institutions have, to date, only achieved 11%. This should come as no surprise as decades into democracy the South Africa HE system is still reliant upon the top 10 traditional universities for its doctoral graduate output. This anomaly can be attributed to how these higher educational institutions were established during apartheid and their approved programme qualification mix (PQM) mandates. During this period in South African history, only traditional white universities located in urban areas had the required research infrastructure and were permitted to offer doctoral degrees.

This lack of access to further postgraduate training left South Africa with a dearth in highly skilled academics (professoriate), of which an estimated 20% will retire within a decade leaving a vacuum in the higher education system. Efforts to fill this vacuum are hampered by the following factors: i) there is a global demand for the limited available academic talent, ii) the current South African doctoral output is inadequate to replace its ageing professoriate at an equivalent rate, iii) programmes aimed at developing the next generation of academics (nGAP) have not been fully implemented, further, the posts complement constitutes a mere 25% of the country's needs.

The nGAP programme had envisaged the allocation of 15 posts per institution to meet the annual demand for academics however to date it has only managed 5 posts on average since inception in 2016. This study thus seeks to explore the challenges of producing and retaining academic staff with PhDs within and from outside the nGAP programme in the UoT sector and, in particular, at one institution through a systems lens. The study focusses then on XYZ institution and adopts a systems lens approach.

From data analysis it has emerged that the profiles of PhD candidates in the country and the production and retention of academic staff with PhDs are the key determinants of the percentage

of academic staff with PhDs. A qualitative system dynamics causal loop diagram (QCLD) conceptual model that illustrates the dynamics between these variables is presented and discussed. CLDs were chosen as they are powerful tools that visually illustrate the interdependence and interrelationships between variables embedded in any system under review and assist in the identification of leverage points for effective policy intervention.

KEY WORDS

Doctoral education, supervision, academic staff workload, postgraduate funding, academic staff retention, academic staff remuneration, academic staff promotion, systems thinking, system dynamics, causal loop diagrams, system archetypes.

DECLARATION

STUDENT NUMBER: 21557650

I declare that, “A systems approach to the production and retention of academic staff with PhD: A case study of a university of technology” is my own original work except where otherwise indicated. Where work of others was used, their contribution was acknowledged through referencing the source. I further declare that this thesis has not been submitted for examination before.

..... May 2021

SIGNATURE

DATE

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LIST OF ABBREVIATIONS & ACRONYMS

ASSAf	Academy of Science of South Africa
ACUP	Association of Catalan Public Universities
CHE	Council on Higher Education
CODOC	Cooperation on Doctoral Education
COHORT	Committee of Heads of Research and Technology
CREST	Centre for Research on Science and Technology
DST	Department of Science and Technology
EACEP	Existing Academics Capacity Enhancement Programme
HEIs	Higher Education Institutions
HEQSF	Higher Education Qualification Sub-framework
HERANA	Higher Education, Research and Advocacy Network in Africa
HRDC	Human Resource Development Council
HWUs	Historically White Universities
IAU	International Association of Universities
NCHE	National Commission on Higher Education
NDP	National Development Plan
nGAP	Next Generation of Academics
NPC	National Planning Commission
NRF	National Research Foundation
PASHEPI	Production of Academics and Strengthening of Higher Education Partnerships with Industry
RIE	Research, Innovation and Engagement
SADEC	Southern African Development Community
SATN	South African Technology Network
SET	Science, Engineering and Technology
SSAUF	Staffing South Africa's Universities Framework
USAF	Universities South Africa

Chapter 1: Introduction

1.1 Introduction and problem statement

Compared to most countries with similar economies, the South African economy has a critical shortage of doctorate holders per million (ASSAf 2010; Badat 2010; HESA 2011; Kritzinger and Loock 2013; DHET 2014; Cloete, Mouton and Sheppard 2015). The main problem is the limited number of academics with PhDs and thus, by extension, the availability of supervisors who are willing and able to supervise doctoral students (Mouton, Boshoff and James 2015).

This study adopts a systems approach in exploring the dynamics involved in the production and retention of academic staff with PhDs within the higher education (HE) system. The systems approach advocates for a holism approach of sweeping in all variables influencing the system of interest and viewing the dynamics involved within a proper context (Churchman 1968). Thus, the evolution of doctoral education in this country, contemporary endogenous and exogenous factors influencing the production and retention of academics with PhDs were examined within the context of academic staff qualifications.

The next section explored the problems related to the low percentage of academic staff with PhDs in this country. It commenced with the challenges of doctoral education in South Africa and thereafter discussed the contribution of academic staff with PhDs within this context. According to the HRDC (2015:49) “unlocking SA’s human potential on all levels, including the production of qualified academics, is imperative for economic growth and development in this country”.

1.1.1 The challenges of doctoral education in South Africa

At the beginning of the decade (ASSAf 2010) claimed that existing data on doctoral output was neither sufficient nor comprehensive enough to answer the critical questions related

to the status, significance and impact of the South African doctorate on the knowledge economy. This is in spite of the fact that the developed countries have already made the direct link between the PhD and the knowledge economy in the context of national development. A significant number of countries are planning to increase their doctoral holders because they acknowledge that a PhD secures a competitive advantage for governments seeking to compete in a global economy (ASSAf 2010:22). Cloete (2015) stressed acknowledgement amongst policy makers and other stakeholders of the role of universities as drivers of economic growth through the production of new knowledge and innovation for global competitiveness. Teferra (2015) similarly asserts that doctoral education lies at the core of a university's research capacity and is also seen as the primary source of research productivity and innovation in the global knowledge economy. An earlier study by Vaughan (2008) already estimated the contribution of advances in knowledge to one-third of the gross domestic product (GDP) of any country.

The realisation of the contribution of new knowledge and innovation to the GDP and global competitiveness and its urgency has recently been acknowledged by the highest office in the country and the minister of the Department of Higher Education and Training (DHET). The establishment of a presidential commission on 4IR to identify policies, strategies and plans that position SA as a global competitive player within the digital revolution space and other initiatives such as hosting the 4IR summit in Midrand in 2019 are all such attempts. Further, Mouton (2016) acknowledges that there has been a renewed interest in doctoral education during the past decade in South Africa after decades of neglect (Molla and Cuthbert 2016). The need to produce more PhD graduates within Africa to focus on research and innovation for solving the continent's problem such as poverty reduction has recently been embraced by national governments in Africa (Teferra 2015; Molla and Cuthbert 2016).

To this end, South African President, Cyril Ramaphosa brought together public and private sector players as well as academia in its presidential commission to seek answers on how to drive the current slow economic growth. Including academia is imperative in

this regard, Vaughan (2008) earlier argued that universities play a critical role as domains of knowledge generation and innovation. Similarly, recent studies (HRDC 2015; Teferra 2015; CHE 2016; Molla and Cuthbert 2016; Mouton 2016) have acknowledged the connection of academia with the development of skills in key strategic areas of national innovation systems necessary for the knowledge economy. HRDC (2015) however cites the challenges of the education pipeline in the country which is too low to support a developing economy.

Notwithstanding the direct link of university contribution to the GDP, at the beginning of the decade, Badat (2010) bemoaned the extremely small numbers of doctoral outputs of the country in relation to its economic and social development needs. Mouton (2016:55) concurs with previous studies (ASSAf 2010; Badat 2010; HRDC 2015) that “the country’s production of PhD graduates is too low, and that South Africa is near the bottom of the list of PhD-producing countries worldwide”. In this regard, this study compared the number of doctoral holders per million of different countries in 2003 and 2007. The most recent statistics published in 2016 by Mouton (2016:56) compared doctorate holders of different countries per 100 000 of population in 2011. South Africa held 3 doctoral holders per 100 000 of population in 2011.

Table 1.1: Doctoral Holders per million of population

Country	2003	2007
South Africa	23	26
Brazil	43	52
South Korea	157	187
Australia	200	251
Portugal		569
Turkey		48

Source: Adapted from ASSAf (2010); Badat (2010); MacGregor (2013)

Countries such as Brazil were already planning to increase their PhD production by 15 000 PhDs annually by 2010, while India anticipated a fivefold increase by 2015 from their 2003 base of 65 491 (DHET (2014)). Other rapidly developing countries such as Mexico and China showed growths of 17% and 40% respectively (MacGregor 2013). In comparison, the meagre targets set by South African bodies such as the National Research Foundation's (NRF) 5 000 per annum by 2018, the Department of Science and Technology's (DST) 6 000 by 2018 and more than 100 per million of population (DHET 2014:79) by 2030 indicated in the ministerial report of 2013 and the NDP Vision 2030 do not bode well for a country aspiring to global competitiveness. Compounding South Africa's limited number of doctorate holders per million is that by 2009, 29% of its doctoral graduates were international students, of these only 42% intended staying in the country upon completion of their studies ASSAf (2010:91).

In an attempt to encourage institutions to increase postgraduate programmes, DHET approved a new funding formula in 2003 which rewarded institutions for efficiency in producing masters and doctoral graduates by research only (Vaughan 2008). According to Mouton, Boshoff and James (2015:02) this "2003 funding framework introduced a direct reward (as a research output subsidy) to universities for the number of doctoral graduates produced (a monetary value equivalent to three articles in an accredited journal)".

The strategy was intended to increase doctoral output and stimulate research activity. The efficiency rates in the HE system was low; "in 2006 four universities had a completion rate above 55% after 7 years, and seven universities had a completion rate lower than 35%" (Cloete 2015:13). In South Africa, the two most popular types of masters offerings are by coursework and mini dissertation and by research only (DHET 2014). In an attempt to stimulate research activity, the new funding framework was designed to reward institutions that produced only masters and doctoral graduates by research. This strategy was intended to induce a systematic and proactive university response considering dwindling third stream income to supplement government subsidy and tuition fees.

Clearly, the new funding framework had very little, if any impact because South Africa only increased its doctoral holders per million from 23 in 2003 to 26 in 2007 (see Table 1.1). On the contrary, Mouton, Boshoff and James (2015) argue that this funding framework had an impact on doctoral output, citing a steady increase in numbers from 977 to 1 878 from 2004 to 2012 respectively.

Further, the South African HE system is lagging behind the national benchmark of an average throughput rate of 20%, the national average graduation rate is only 11% (Badat 2010; HRDC 2015). This anomaly should come as no surprise as in the South African context 83% of all doctoral graduates in 2007 were produced by the ten traditional historically white institutions (HWIs) (ASSAf 2010; Louw and Muller 2014). The national policies from the apartheid era with respect to the type and mandates of different institutions has persisted, hence the low and skewed distribution of doctoral outputs between institutions. The problem of low doctoral output in the country brings into focus the most pertinent question asked by Mouton ‘What needs to be done to increase the pool of PhD graduates?’ when speaking at a workshop hosted by South Africa’s National Research Foundation and the Carnegie Corporation of New York in August 2013. The theme of the workshop was Expanding and sustaining Doctoral Programmes in Sub Sahara Africa (Mouton, Louw and Strydom 2013). Cloete, Mouton and Sheppard (2015:10) citing MacGregor (2013) summed up the dilemma of doctoral output as a conundrum arguing that, “in order to produce more doctoral graduates, more PhD supervisors are needed: but in order to have more supervisors, more PhDs are needed”.

1.1.2 Contribution of academic staff with PhDs towards doctoral education

Several scholars (Badat 2010; Badsha and Cloete 2011; Cloete, Mouton and Sheppard 2015) have acknowledged that academic staff with PhDs are critical for the stimulation of research activity in the production of new knowledge and innovation as well as being supervisors of doctoral students. Comparatively though, South Africa is not doing well in terms of both research and doctoral output rates. As an illustration of the country’s dire situation in terms of both doctoral output and research output rates Badsha and Cloete

(2011) and Masondo (2014) compared the entire South African HE system to one university in Brazil. Masondo (2014) argues that South Africa and Brazil are comparable economies.

Further, Badsha and Cloete (2011:06) claimed that the “University of Sao Paulo in Brazil (almost 90 000 students) in 2010 produced 8 200 ISI publications while the entire South African system (almost 900 000 students) produced just over 9000. More concerning is that Sao Paulo produced 2400 doctorates and South Africa only 1 420. Another big difference between Sao Paolo and, for example, South Africa’s top ranked University, UCT, is that at the former 98% of academics have doctorates, while at UCT only 57% have doctorates, which is the highest in South Africa”. Pandor (2014) and Mouton, Boshoff and James (2015) have since put the South African doctoral output over 1 800 per annum from 2012.

Badsha and Cloete (2011) maintain that the percentage of permanent academic staff with PhDs has steadily increased from 32% to 36% from 2000 to 2010 respectively. Overall, the HEMIS data puts the average percentage of academics with PhDs in South Africa at 35.5% in 2012. However, this falls far below the envisaged targets of the statutory bodies of DHET and NPC of at least 50% and 75% respectively. XYZ¹ is listed as the lowest in the country at 9%, according to the HEMIS audited data of 2012 and CHE (2016:214). However, the Historical Student Enrolment 2010–2017 – a XYZ document presented at a strategic planning workshop by the institutional HEMIS office indicated 14% of academic staff had PhDs in 2017. This low percentage of academic staff with PhDs in the HE system illustrates limited supervisory capacity which in turn leads to poor doctoral output and the research and innovation required to stimulate economic growth.

The problem of the low percentage of academic staff with PhDs in the South African HE system has been a pertinent issue for decades. Issues such as the challenges facing the higher education sector in producing and retaining academic staff with doctoral degrees

¹ XYZ – the institution under review will be referred to as XYZ because it wished to remain anonymous

within the HE sector have been raised across various platforms such as the Council on Higher Education (CHE), Committee of Heads of Research and Technology (COHORT), DST, National Planning Commission (NPC) and NRF (HESA 2011). COHORT (2004) in particular, found that acquiring a PhD enables academics to become extremely mobile and if retention strategies are not put in place a large proportion of these academics will be lost to the HE system. Several scholars have argued over time that academia is no longer an appealing career option due to, amongst other factors, low salaries, poor career advancement opportunities and heavy teaching loads (Netswera and Rankhumise 2005; Habib and Morrow 2006; Backhouse 2009; Tettey 2010; Hayward and Ncayiyana 2015). The HESA (2011) report for example, put the loss of skilled workers to emigration alone in just one decade (1987-1997) at 41 496, claiming that a high proportion of these were from the HE sector. However, a study by Odhiambo (2013) while acknowledging brain drain, claimed that there is no systematic record of the number of skilled professionals that many African countries have continued to lose to the developed world. A study by Geber (2013) concurs with HESA (2011) citing high emigration rates of Sub-Saharan African academics and professionals to overseas universities where salaries are more competitive and opportunities are more attractive. It can thus be concluded that the loss of academic talent has persisted unabated beyond the decade cited by HESA (2011) and (Geber 2013).

This figure (41 496) does not take into consideration the movement of qualified academics within the sector (from lower ranked to top-tier universities located in urban areas), to Research Councils, and to the private and public sector (Muller 2012; DHET 2015). This implies that the loss of academic talent from lower ranked institutions is even greater and warrants urgent attention.

The challenge of the low percentage of academic staff with PhDs prompted Higher Education South Africa (HESA) to host a national workshop in 2009 to initiate discussions on what was needed to be done to mitigate against this problem. The workshop included all stakeholders, (CHE, DHET, HESA and almost all universities) involved in doctoral

education in this country (HESA 2011). Although the primary task of the established Working Group was to develop a proposal for a national programme for building the Next Generation of academics, it took a holistic overview in its analysis of the underperformance of HEIs in the production and retention of academic staff with PhDs. A draft proposal was presented by the Working Group and discussed at a consultative workshop in August 2010. It outlined some of the key challenges that faced South African HEIs in order to increase the percentage of academics with PhDs before presenting a detailed plan for a National programme to develop the Next Generation of Academics, loosely referred to as the nGAP. Such key challenges are illustrated in the form of a table below (HESA (2011)).

Table 1.2: Key challenges influencing the percentage of academics with PhDs

Inequality of representation	
PhD production challenges	PhD retention challenges
Expansion of higher education (workloads)	Remuneration of academics
Current postgraduate pipeline Doctoral enrolments Blockages / attrition rates	Promotion
Constraints Research infrastructure Limited supervision expertise Funding	Institutional culture
Age profile of academics	Academic mobility

Source: Adapted from HESA (2011)

These variables were explored in Chapter 2 to answer questions 2 and 3 of this study. What is surprising is that HESA merely stated the key challenges affecting the current academic cohort who do not have PhDs and no clear strategy was articulated or budgets set aside to address these challenges. The nGAP on the other hand was a comprehensive strategy with timelines and with allocated budgets. It was only later in 2015 that the work

of HESA was extended by staffing South Africa's Universities Framework (SSAUF) (DHET 2015) to include the following: *Nurturing Emerging Scholars Programme* (NESP), *New Generation of Academics Programme* (nGAP) and *Existing Academics Capacity Enhancement Programme* (EACEP).

For the nGAP project to be feasible, postgraduate pipeline issues are important not only in South Africa but elsewhere in sub-Saharan Africa as well (Bunting, Cloete and van Schalkwyk 2014; Hayward and Ncayiyana 2014; Roy 2014). However, the predicament in which HEIs find themselves in is that postgraduate student enrolments in South Africa is low and attrition rates are high (Letseka and Maile 2008; ASSAf 2010; Herman 2012). Strategies for the production of the next generation of academics without purposeful and parallel strategies to redress the plight of the current cohort of academics without doctoral degrees exhibits the classic features of 'shifting the burden' and 'fixes that fail' archetypes (Kim 1992; Kim and Lannon 1997; Braun 2002). These two system archetypes suggest that those fundamental problems which are complex, long-term and require substantial initial capital should be prioritised instead of dealing with short-term symptomatic problems. In prioritising short-term problems, managers derive instant results but deal with the same problem over and over again because the systemic fundamental problem has not been addressed. The systemic and fundamental problem facing the HE system with regards to academic staff qualifications is the provision of support for the existing academic cohort and those joining academia from outside the nGAP programme as well as their retention within the sector.

It is important to note that not all academics enter the profession through the nGAP programme. In terms of age profile of academics, the bulk of those already in the system are above 35 years old, therefore not eligible for the nGAP programme. Approximately 35,5% of academics in the system hold a doctoral degree (ASSAf 2010; DHET 2015) of these, a 20% retirement swell of the professoriate is estimated within a decade (Mouton, Louw and Strydom 2013). An alarming and even more sobering statistics is illustrated by DHET (2015:07) in that the HE system requires 1 200 new academics per annum to

mitigate retirements and the annually increasing student participation rates. The nGAP only aspires to allocate 400 posts per annum across the sector, which translates to approximately 25% (15 posts per institution) of the number of new academics needed per year. The system has only managed to allocate, on average, 5 posts per institution annually from its inception in 2016. The most pertinent question therefore is, what are the challenges of producing academics with PhDs, both within and outside of the nGAP?

The statistics clearly indicates that the nGAP is not a panacea for all the ills of the academic staff qualifications in the country. This study, therefore, is aimed at exploring the challenges of producing and retaining academic staff with PhDs, particularly in the UoT sector. According to the audited HEMIS data of 2012, all the UoTs occupy the bottom end of the scale with the highest ranking, CUT at only 26% indicating a decline from 28% of the previous year (DHET 2012). ASSAf (2010:60) in fact contends that the share of academic staff with PhDs per university classification was 41%, 30% and 12% for universities, comprehensive universities and UoTs respectively in 2007. The statistics and allocation of nGAP posts does not take into consideration the skewed distribution of academic staff with PhDs in the UoT sector and yet the targets set by statutory bodies such as the NPC and DHET do not make this distinction when setting those targets.

The UoT sector is severely constrained in terms of the percentage of academic staff with PhDs for various reasons:

Firstly, UoTs were initially established as Technikons in the late 1970s to provide technical and vocational programs (Herman 2012; Mouton, Louw and Strydom 2013). In addition, those Technikons had no mandate to offer doctoral degrees; as a result, these types of institutions are still grappling with an under qualified academic workforce (Mabokela 2000; Roy 2014).

Secondly, these institutions were established as teaching, and not research intensive institutions (Boughey 2010). As a result, academics are still burdened with heavy teaching loads (Austin 1996; Muller 2012) which puts time pressures on those academics pursuing doctoral degrees.

Thirdly, Muller (2012) maintains that these institutions are unable to produce, attract and / or retain suitably qualified academics due to the heavy teaching loads and poor research infrastructure.

Fourthly, top-tier universities mask over their inability to produce and entice enough PhD graduates to fill any vacant posts by relying on international academics (Muller 2012) and movement within the sector.

Fifthly, most UoTs offer limited PhD programmes (DHET 2014) due to the low percentage of academics with PhDs as stated earlier. ASSAf (2010:57 & 61) illustrates a clear correlation between the percentage of doctoral output to permanent academics (PAS) with PhDs. UoTs again occupy the bottom of the scale in this indicator. It is difficult to ascertain whether UoTs are unable to produce and retain academics with PhDs because of limited opportunities to supervise and the poor research focus of these institutions or if those UoTs are unable to launch PhD programmes because of their limited number of academics with PhDs as argued by Hayward and Ncayiyana (2014). Most importantly, XYZ is the only institution in the country which does not have a PhD in its programme qualification mix (PQM) (ASSAf 2010).

Finally, it is a combination of these problems that poses production and retention challenges of skilled academics within the UoT sector.

Given this context, ASSAf (2010) called for more research into doctoral education in this country. In addition, in its recent volume CHE (2016) alluded to more research still required among academics and officials working in the higher education sphere. This research responds to these calls through exploring the factors impeding the production and retention of academic staff with PhDs using a systems thinking approach and system dynamics (SD) in particular. It uses the two most powerful SD tools for eliciting information, reference mode and time horizon. The reference mode is useful in characterising a problem dynamically as a pattern of behaviour unfolding over time which shows how the problem arose and how it might evolve into the future. Time horizon on

the other hand extends far back in history to show how the problem emerged and describe its symptoms (Sterman 2000).

1.2 Research questions

1.2.1 Overarching question:

What are the challenges of increasing the percentage of academic staff with PhDs in HEIs in South Africa and UoTs in particular?

1.2.2 Research questions:

- i. Why is there a low percentage of academic staff with PhDs in HEIs in South Africa and UoTs in particular?
- ii. What are the challenges of producing academic staff with PhDs in HEIs in South Africa and UoTs in particular?
- iii. What are the challenges of retaining academic staff with PhDs in HEIs in South Africa and UoTs in particular?
- iv. From a system's thinking perspective, what is the relationship between the challenges of producing and retaining academic staff with PhDs in HEIs in South Africa and UoTs in particular?

1.3 Justification of the study

The Presidency, DHET and NPC amongst others have all linked doctoral education to economic growth and development. However, in relation to its economic and social developmental needs, South Africa produces an extremely small number of doctoral graduates due to the low percentage of existing academics with PhDs. The doctoral graduation rate national benchmark is 20% but the national average is only 11% (Badat 2010). Scholars such as Wolhuter (2011) have lamented the limited research on doctoral education in the country in comparison to other parts of the world and several scholars

(Theron, Barkhuizen and Du Plessis 2014; Park 2015) assert that the challenges of producing and retaining academic staff are poorly understood.

This research sought to explore this phenomenon at an aggregate level by adopting a systems thinking philosophy of holism. Systems thinking teaches us that to know something, one needs to understand the whole in order to put the constituent parts in their proper context. This enabled the exploration of the challenges of producing and retaining academic staff with PhDs who are willing and able to supervise doctoral students, stimulate research activity and thus contribute to innovation and global competitiveness in the proper context. Previous studies have adopted a linear approach when exploring the contemporary issue of the low numbers of academic staff with PhDs in the country. Some have focused on the production in isolation, while others have looked at the retention side of the same phenomenon. While there is merit in delving further into the understanding of the dynamics involved in each variable, a holistic perspective that puts each variable into its proper context is imperative. A study by Cloete, Sheppard and Bailey (2015) is one of the few studies that took a holistic view to address this phenomenon. It suggested human resource strategies that could incentivise staff to pursue doctoral degrees and to retain those staff once they qualified. Similarly, the current study adopts a systems thinking philosophy of viewing the challenges of production and retention of academic staff with PhDs holistically within the proper context of a low percentage of academics with PhDs in the HE system. Systems thinking and system dynamics emphasise an understanding of the whole for better insights into constituent variables (Sterman 2000; Reynolds and Holwell 2010; Morecroft 2015; Singh 2015).

1.4 Delimitations

Firstly, the study is a single holistic case study of one UoT. The South African HE landscape is comprised of 26 universities divided into three categories; 14 traditional universities, 6 comprehensive universities and 6 UoTs. Yin (2003) and Patton and Appelbaum (2003) advocate for the use of a single holistic case study if the environment

is an extreme or a unique case. XYZ is both a unique and an extreme case for the following reasons amongst others: a) it has the lowest percentage of academic staff with PhDs, b) its location justifies its classification of a unique case c) it is the only institution which does not have a PhD offering in its PQM.

Secondly, this study is intended to provide a rich understanding of the underlying factors that have contributed to XYZ having the lowest percentage of academic staff with PhDs compared to other institutions in the country. However, as each institution is unique with its own set of challenges this study does not therefore purport to represent the challenges of producing and retaining academics with PhD within the HE sector or UoTs for that matter. Thus, the findings of the current study which focuses on one UoT cannot be generalised to the South African HE system. While the scope of this study is limited to XYZ's unique academic staff development and retention challenges, it should not reduce the value of the study.

Thirdly, while the challenges of the low percentage of academic staff with PhDs are broad, this study is limited to those variables identified in the HESA report (boundary of the study) that impede an increase in the percentage of academic staff with PhDs in the country. The reasons for delimiting the study to these variables only are:

- a) Although the main task of HESA's working group was to explore various initiatives for producing and retaining a new generation of academics, it extended its scope in determining a holistic overview of the challenges facing HEIs. In June 2009, it examined existing initiatives at different universities for the building of the Next Generation of academics and supporting current academics among others. The proposal that emerged from numerous engagements with various stakeholders regarding academic staff qualifications outlined the key challenges facing South African HE institutions,
- b) the identification of the key challenges plaguing the HE system with regards to academic staff qualifications involved all the relevant stakeholders in doctoral education in this country, and

- c) focusing on additional variables would not be feasible (too big) for a PhD study. Any additional factors could serve as scope for further research.

Lastly, the study adopted a systems approach and system dynamics (SD) in exploring the challenges of production and retention of academic staff with PhDs at XYZ. Furthermore, the study adopted a qualitative SD (QSD) approach as a research methodological framework to answer question four of this study. This study is intended to initiate the viewing of the contemporary challenge of academic staff qualifications in the HE system through a systems lens. It is limited to QSD modelling and a full-blown SD model is the scope for further research. Studies such as Singh (2015), Yang (2015) and to a limited extent, Mirchi (2013) have adopted similar approach in analysing dynamics involved in their respective complex systems.

1.5 Research methodology

This is an exploratory study. Kowalczyk (2014) asserts that in an exploratory study a researcher has an idea or has observed something and seeks to understand more about it. It is an attempt to lay the groundwork for future studies. Strydom (2013) on the other hand, maintains that in an exploratory study, researchers collect data in order to explore a new topic and delve into new problem areas to gain a broad understanding of a situation. This study, whilst exploring a common problem in academia adopts a new methodology to gain a broad understanding of the contemporary issue of academic staff qualifications.

The study further adopted an interpretivist paradigm. Kipkebut (2010) argues that paradigms are foundations that guide how researchers investigate problems, design their research as well as establishing methods to be used to collect, analyse and interpret data. An interpretivist paradigm is frequently associated by several scholars with qualitative research (Goldkuhl 2012; Antwi and Hamza 2015; Thanh and Thanh 2015). These authors further assert that an interpretive paradigm portrays a world in which reality is socially constructed, complex and ever changing. Thus, Hudson and Ozanne (1988:513) argue that

interpretivists presume that each researcher comes into the research environment with some knowledge or pre-understanding but assumes that this is insufficient in developing a fixed research design due to the complex, multiple and unpredictable nature of what is perceived as reality. This study uses a systems approach as a mechanism to include and consider the inter-relationship between variables at play in this research.

A single case study was used to allow the holistic study of variables within a single context, more specifically, the dynamics involved in increasing the percentage of academic staff with PhDs in the UoT sector and XYZ specifically because of its unique circumstances. The study has adopted a systems approach and QSD in particular to explore the challenges of academic staff qualifications. In this regard, a qualitative causal loop diagram (CLD) conceptual model that shows the relationship between production and retention strategies with their impact on the percentage of academic staff with PhDs at XYZ is presented. The model provides a graphic overview of the variables embedded in this system of interest. It further graphically illustrates leverage points where management can affect policy changes. Thereafter, system archetypes that exhibit in the institution were explored to assist managers with fundamental systemic solutions as opposed to those short-term symptomatic solutions which commonly characterise management decisions in many organisations.

1.6 Outline of the chapters

This dissertation / thesis is presented in seven chapters.

Chapter one provided the background to doctoral education in the country, its contribution to global competitiveness and the role of academic staff with PhDs in this regard. Furthermore, the problem statement, the justification for the study, limitations of the study and the outline of the thesis were presented.

Chapter two explored the evolution of doctoral education in this country. It explored macro level factors that outline the context of the HE system in the country with particular reference to academic staff qualifications. It provided an overview of the legislative

framework during the apartheid era and beyond which can be attributed to the challenges of academic staff qualifications. The HE landscape during the pre- and post-apartheid era provided the context into the establishment of the higher education institutions (HEIs), the type of their approved PQMs and mandates as well as the skills requirements of academic staff in such institutions. This chapter does not provide a complete history of apartheid education “but a selection of a few dimensions of apartheid” (Roy 2014:24) to demonstrate how these have contributed to the low and skewed distribution of academics with PhDs in different types of HEIs. This chapter answered the first research question of the study.

Chapter three is an in-depth analysis of literature on the low percentage of academic staff with PhDs in South Africa. It was divided into three sections that answered questions two to four of this study. The first and second sections presented micro level factors that explored the endogenous and exogenous factors that influence the production and retention of qualified academic staff at institutional level. To reiterate, these factors are limited to those identified by the stakeholders in the HESA report. The last section provides the theory of systems thinking and SD which has been adopted as a methodological framework for the current study.

Chapter four highlights the research methodology used to answer the research questions. In this regard, a single holistic case study research design, a system dynamics qualitative research methodology, trustworthiness as well as ethical considerations are presented.

Chapter five is a presentation of the qualitative results. It described the sample size and the characteristics of participants and presented the findings according to the research questions of the study.

Chapter six is a discussion chapter. It adopted a system learning and intervention strategy. It is presented in the form of a series of CLDs representing all the themes and categories that emerged from data analysis and the literature review. Thereafter, a comprehensive qualitative CLD depicting the causal relationship between the individual CLDs was presented as a conceptual model for this study. It highlighted leverage points where

management can effect change by making informed policy decisions. System archetypes that exhibit at XYZ were identified in diagnosing the problems and providing suggestions for planning purposes.

Chapter seven presented recommendations, draws conclusions and gives suggestions for future research.

Chapter 2: Evolution of doctoral education in South Africa

2.1 Introduction

In Chapter 1, the role of PhDs and their contribution to economic growth and global competitiveness was explained. However, statistics indicate that South Africa is not doing well compared to countries with similar economies in both indicators. Therefore, the overarching question this study seeks to address is – Why is there a low percentage of academic staff with PhDs in HEIs in SA? This question cannot be fully understood without a comprehensive understanding of the legislative context within which higher education operates. This chapter provided an overview of the legislative framework that has regulated the evolution of doctoral education in the country over the years.

2.2 Historical overview of the doctoral education in South Africa

The challenges of the low percentage of academic staff with PhDs in the South African higher education system cannot be understood fully without understanding the context within which HEIs operate. In this regard, literature that explores the evolution of doctoral education during apartheid was reviewed. In addition, selected literature on the changes in the HE landscape and legislative framework during the post-apartheid era was explored. Four pieces of legislation were explored to determine their impact on the low percentage of academic staff with PhDs in this country. This section commenced with how doctoral education evolved during and after apartheid which had a huge impact on all aspects of life including education in South Africa. Thereafter, the four pieces of legislative framework that have had a major impact on doctoral education and academic staff qualifications were explored.

The challenges of low percentage of academic staff with PhDs in this country were premised around the African perspective because of the continent's unique challenges in comparison to other developing as well as developed countries as alluded to in Table 1.1.

The need to produce more PhD graduates within Africa to solve the continent's problems were stated in Chapter 1 (Teferra 2015; Molla and Cuthbert 2016).

Literature reveals that doctoral education has a long history in South Africa. It has evolved since the "first doctoral degree in law was awarded at the University of the Cape of Good Hope in 1899 to William Alison Macfadyen" (Herman 2011a: i). Despite this long history however, doctoral education in the country and the rest of Africa has remained a challenge. According to MacGregor (2013) the challenges of doctoral education in Africa attracted attention from International associations such as the International Association of Universities (IAU) and the Association of Catalan Public Universities (ACUP). Following a seminar in Ethiopia in 2012, these bodies explored and summarised the challenges of developing doctoral education in Africa. Similarly, the HERANA study of nine Sub-Saharan universities painted a very bleak picture of PhD production in Africa. Of these according to MacGregor (2013), only three produced between 20 – 40 PhD graduates with the remaining five producing less than 20 in 2007.

Cloete, Mouton and Sheppard (2015) nonetheless argue that PhD production is not uniform across the world. Amongst countries with high levels of PhD production they cited Germany, Canada, the United States and the United Kingdom. Surprisingly though, doctoral output in the country is minute even when compared to most other countries with similar economies (Mouton, Louw and Strydom 2013) as illustrated in Chapter 1. This phenomenon is partly exacerbated by the fact that the burden of PhD production still rests on a few historically white universities (HWUs) in this country. As a direct consequence of the legacy of apartheid, these universities have a higher percentage of academic staff with PhDs. In 2007, 83% of all PhD awards were still produced by the nine HWUs (ASSAf 2010; Louw and Muller 2014).

The preceding section has shown that the South African HE does not fare well in terms of doctoral education compared to other countries. The reasons vary, ranging from shortage of funding for students and institutions, low institutional capacity to poor quality supervision (HRDC 2015; Mouton, Boshoff and James 2015; Teferra 2015). The most

compelling reasons were articulated by Herman (2011a) who asserts that in the past there was limited information and research on doctoral education. The author further argues that “until the late 1980s doctoral education was the privilege of the élite, white, mostly male students” (Herman 2011a:01). These two reasons have been proven by ASSAf (2010) to be the main contributing factors in the problems with which South African higher education still contends. In this regard, the two reasons were explored briefly to provide the context on how doctoral education has evolved in South Africa.

2.2.1 Limited knowledge about PhD

In the past, there has been limited empirical research conducted on doctoral education in South Africa. More recently, a large and growing body of literature on this phenomenon has begun to emerge. Prominent individuals such as the CEO of Universities South Africa, (USAF), Professor Bawa, and research institutes such as the Centre for Research on Science and Technology (CREST) in 2008 and 2009 respectively, began criticising the lack of research in doctoral education in this country. In addition, several studies (Bitzer 2008; ASSAf 2010; Herman 2010) concurred with the assertion that studies on doctoral education in South Africa were rare and the few that exist have been conducted in recent years. Consequently, authors in 2011 started to compare research output on doctoral education in the country with international trends (Badsha and Cloete 2011; Wolhuter 2011). The study by Wolhuter (2011:126) in particular, found that the amount of “published research on doctoral education abroad has significantly accumulated in recent years compared to the minuscule number of publications on doctoral education in South Africa”. Resultantly, recent studies are beginning to investigate this phenomenon from different perspectives, for example, a study by Vandenberg (2013) explores limited research conducted on factors that contribute to doctoral success in South Africa.

The limited knowledge about PhDs prompted the National Research Foundation and the Department of Science and Technology in 2009 to commission the Academy of Science of South Africa (ASSAf) to conduct a series of studies on the status and position of

doctoral education and to advise on how to expand the quality and quantity of PhDs in order for South Africa “to be a serious competitor in the global knowledge economy” (Herman 2011a:171). In the same year, the Academy of Science of South Africa in its turn commissioned a series of studies on the status of the PhD. Herman (2011a) claims that the ASSAf, 2010 report was the first comprehensive publication on doctoral education in South Africa and asserts that it initiated the first national debate on the status of PhDs with the aim of informing future policy on the programme. Finding 24 of the ASSAf (2010) report emphasises that more research is still required to develop a comprehensive understanding of the dynamics of doctoral education in South Africa. It is precisely for this reason therefore that this PhD study was exploring this phenomenon from the perspective of producing and retaining academic staff with PhDs at a fundamental level, that is, institutional level. This is based on the acknowledgement that “academics with doctoral degrees are the major producers of research output and the main supervisors of doctoral students” (DHET 2014:103).

Furthermore, the limited available literature produced in South Africa on PhDs tends to focus on doctoral education at policy level almost exclusively. Even less attention is paid to the challenges of producing and retaining academic staff with PhDs at institutional level. Only recently has it been shown that retention of academic staff with PhDs has a direct impact on doctoral output as stated in point 1.1.2. Higher Education South Africa mandated Dr Saleem Badat to develop a proposal outlining a national strategy to address the challenges facing the HE system with regards to academic staff qualifications. These challenges were identified in the HESA (2011) report. The second reason for the challenges of doctoral education as articulated by Herman (2011a) is discussed below.

2.2.2 Racial and gender divide in doctoral education until the late 1980s

Several scholars (Herman 2011c; Sehoole 2011) cited racism and patriarchy as the key features of colonialism and apartheid in South Africa. These two variables consequently bequeathed the country with a predominantly white and male academic work force in the South African context. Alarming statistics of this phenomenon as articulated by several

scholars estimate that about 40% of these highly skilled white male professors will retire within the decade leaving a vacuum in the HE sector (Badat 2010; Herman 2010; Mouton, Louw and Strydom 2013).

The racial divide in doctoral education is articulated by Herman (2011b) who found that “87% of all doctoral degrees in 1996 were awarded to white students, the profile however has changed dramatically 10 years later but it is still not representative of the total population. For example, 56% of all doctoral graduates in 2006 were still white (although whites made up only 9.2% of the total population), while the number of African graduates represented 30% of the total (although Africans made up 79.5% of the total population” (Herman 2011b:172). Compounding this phenomenon though, is that international students, mostly from Africa, make up about 30% of all graduates (ASSAf 2010) which means that racial equity is to a large extent masked by the doctoral output from other parts of Africa and are not necessarily Black South African graduates. Firstly, it should come as no surprise that South Africa has a low number of doctoral holders per million of the population compared to most countries at the same developmental level. Secondly, academic staff with PhDs are drawn from the same pool of doctoral graduates hence the prevalence of white male academics with PhDs within the sector, the majority of whom are due to retire within a decade.

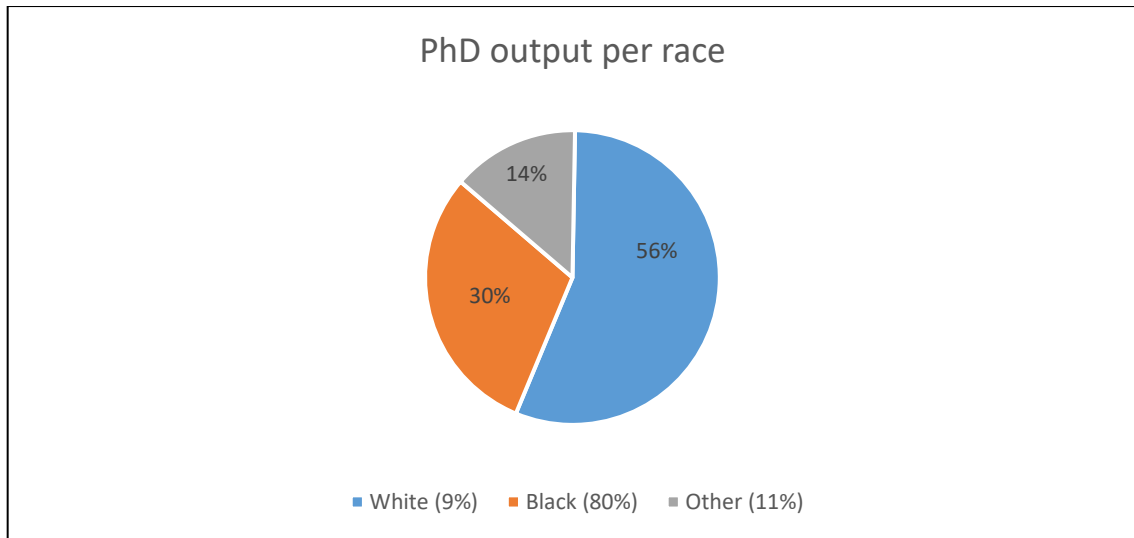


Figure 2.1: Share of Doctoral output by race in 2006

The gender divide in doctoral education on the other hand is confirmed by Finding 2 of the ASSAf (2010:16) report, which revealed that most of the doctoral graduate class of 2007 were white South African men in their thirties. Similarly, Herman (2012) acknowledged the significant changes in the profile of doctoral graduates from 1996, but argued that the skewed distribution towards white males remained. He argued that proportionally higher doctoral awards in South Africa in 2007 were white men in their 30s or older with the average age of graduation being 40 years. As alluded to by MacGregor (2013) the higher the white male academic staff with PhDs the higher the percentage of white male PhD graduates, attributed to a certain extent through role modelling amongst other factors.

In addition, MacGregor (2013) argues that doctoral output mirrors the academic staff qualifications, the higher the percentage of academic staff with doctoral qualifications the greater the doctoral output. According to the ministerial report (DHET 2014) a study conducted by Mouton in 2012 concurs with the sentiments that there is persuasive evidence of a very strong correlation between the proportion of staff with doctorates and per capita research output and doctoral graduate output. Similarly, Badsha and Cloete (2011) illustrates this correlation between academic staff with PhDs and doctoral output

by comparing the entire South African HE system with the University of Sao Paulo as alluded to in Chapter 1. The racial and gender context in which doctoral education during apartheid was offered contributed to this anomaly, and its consequences have persisted beyond this era. The ensuing section discussed a selection of pieces of legislation that have regulated the evolution of doctoral education in this country.

2.3 Doctoral education legislative framework in South Africa

This section explored the legislative framework that has regulated the evolution of the HE system and its many challenges during apartheid and beyond. According to Badsha and Cloete (2011:14)

“South Africa has had three major legislative differentiation moments in higher education, i) a political separation informed by apartheid ideology (Extension of University Education Act in 1959), ii) the creation of technikons (Technikons Act, 1993), iii) mergers to reduce the number of universities from 36 to 23 and to create two new types of universities: comprehensives and universities of technology”.

However, similar to Roy (2014:24) this study “does not purport to completely portray the history of apartheid education but a selection of a few dimensions from the apartheid era” and the changes thereafter that have had an impact on the evolution of the doctoral education with particular reference to academic staff qualifications in the country. In this regard only a few select aspects of the HE legislative framework that have led to the low percentage of academic staff with PhDs in the HEIs, particularly UoTs, were discussed.

Table 2.1: Higher Education Legal Framework pre and post 1994

No.	Apartheid legislative framework	Post-apartheid legislative framework
1	University Act of 1916	Education White Paper 3: A programme for the transformation of higher education 1997
2	Extension of the University Education Act of 1959	The White Paper on Post School Education and Training, which was approved by the Minister of Higher Education and Training in 2013
3	Staffing South Africa Universities Framework (SSAUF) 2015	

2.3.1 Doctoral legislative framework during apartheid

As articulated above, the skewed distribution of doctoral output and percentage of academics with PhDs stems, to a large extent, directly from the passing of these pieces of legislation. The first two universities established in the 19th century in this country were designed to primarily prepare White males. Subsequently, a further four universities were established in the early 20th century and these too were intended to serve the White population (Mabokela 2000).

The initial landscape of the higher education system that entrenched the system along racial lines began with the passing of the University Act of 1916 (Mabokela 2000). This Act made provision for the establishment of the first university for Black students. The university of Fort Hare was thus established that same year. Subsequently, the Extension of the University Education Act of 1959 resulted in the establishment of additional universities along racial and ethnic lines. Universities for Coloureds, Indian, Sotho, Venda, Tsonga, Zulu and Xhosa were thus established (Mabokela 2000).

As a direct consequence of these pieces of legislation, Herman (2011b) argues that the university sector was delineated between HBUs and HWUs. HBUs were meant to populate the civil service for the apartheid government's Bantustan system and had no research mandate, while HWUs were endowed with resources and produced the majority

of research output and doctoral degrees in South Africa (SehooLe 2011:57). Odhav (2009), in the same vein, argues that HEIs were established along urban and rural divide with those in rural areas being primarily disadvantaged when compared to their urban counterparts. Roy (2014) and Waghid (2015) concur that the HE system was divided by ethnicity, language or geographical location (urban vs rural), in which only universities catering for white students could award a doctoral degree. Waghid (2015:02) further maintains that “these institutions became known as historically white (advantaged) (HAIs) and historically black (disadvantaged) institutions (HDIs), differentiated according to academic programming, knowledge production, staff qualifications, student access, opportunities and quality, infrastructure, funding and geographical location that disadvantaged the HDIs”.

In addition to the traditional university system, the Nationalist Party government established white and black Technikons in a similar fashion to provide technical and vocational programs in the late 1970s (Mouton, Louw and Strydom 2013:205). Accordingly, with the addition of Technikons, South Africa’s HE landscape comprised of 36 institutions (Herman 2012; Waghid 2015), classified into 21 universities and 15 Technikons.

The democratic government that gained ascendance after the 1994 elections inherited a highly fragmented and racialised HE system riddled with inequalities (SehooLe 2011). This HE framework had the unintended consequence of low PhD production. More than two decades into democracy, the country is still grappling with low production of PhDs and a skewed distribution of qualified academic staff because doctoral education had previously been concentrated in those few traditional white universities. These HE system problems can thus be dated as far back as to the way these institutions were established. Consequently, in 1995, the National Commission on Higher Education (NCHE) was established to provide advice to the new government on the reform and restructuring of higher education (Herman 2011b). Table 2.2 below illustrates the correlation between doctoral output and permanent academic staff (PAS) with PhDs. Despite the efforts of the

new government, predominantly white universities located in urban areas remain higher up in both indicators compared to their UoT and rural university counterparts, decades after the apartheid system were repealed.

Table 2.2: Universities in terms of their share of doctoral graduates and PAS with PhD 2007

University	Institution type	No. of PhD graduates	% of PhD graduates	% PAS
University of Pretoria	HWU	170	13	38
University of Stellenbosch	HWU	153	12	61
University of Cape Town	HWU	142	11	58
University of the Witwatersrand	HWU	134	11	45
North West University	HWU/merged	124	10	43
University of Kwa-Zulu Natal	HWU/merged	106	8	30
University of South Africa	Distance/HWU	78	6	34
University of the Free State	HWU	77	6	49
University of Johannesburg	HWU/merged	75	6	18
Rhodes University	HWU	48	4	50
University of Western Cape	HBU	41	3	43
Nelson Mandela Metropolitan University	HWU/merged	35	3	34
University of Zululand	HBU	20	2	38
University of Limpopo	HBU	17	1	16
Tshwane University Technology	UoT	12	1	13
Central University of Technology, FS	UoT	11	1	29
Cape Peninsula University of Technology	UoT	10	1	11
University of Fort Hare	HBU	10	1	19
University of Venda	HBU	6	0	35
Durban University of Technology	UoT	5	0	7
Vaal University of Technology	UoT	0	0	12
Mangosuthu University of Technology	UoT	0	0	5
Total		1274		33%

Table 2.2 provides a clear indication of the legacy of apartheid in 2007, thirteen years into democracy. UoTs have the lowest PhD participation rate and consequently a low percentage of academics with PhDs followed by the comprehensive universities which came about because of the changes in the HE landscape. XYZ reflects a zero in Table 1 because it did not have and still does not have a PhD qualification in its approved institutional PQM.

When looking back at the landscape of HE system during the apartheid era, it can be inferred that the acute shortage of academic staff with doctoral degrees and the backlog in doctoral output in South Africa can be attributed directly to the evolution of the HE system from this era. Doctoral participation and output thirteen years into democracy is still concentrated in the HWUs as illustrated in Table 2.2 above and the highest percentage of permanent academic staff (PAS) with PhDs are concentrated in the same institutions.

Several issues stand out from the preceding discussion:

Firstly, doctoral education was gender based; racialised; a preserve of whites, although they only made up approximately 10% of the total population; and offered at traditional HWUs. It cannot therefore come as a surprise that there is a vacuum in the HE academic workforce created by the groundswell of retirements of the highly skilled white male academics.

Secondly, traditional HBUs and Technikons had no mandate to offer doctoral degrees; as a result, these types of institutions are still grappling with an under qualified academic workforce. Two important diagrams from ASSAf illustrate this anomaly. For example, Figure 12 of the ASSAf (2010:60) report shows that in 2000, UoTs, which were Technikons in the past, had 6% of academic staff with doctoral degrees compared to the 43% at traditional universities. Figure 14 of ASSAf (2010:61) illustrates a slight increase of academic staff with PhDs from 6% to 12% and a slight decrease from 43% to 41% at UoTs and traditional universities respectively in 2007. As mentioned earlier, statistics prior to this date are not readily available. It is important to note that there is a direct

correlation between the percentage of permanent academic staff with PhDs and doctoral output as illustrated in Table 2.2 as stated earlier.

2.3.2 Doctoral education legislative framework in South Africa post-apartheid

Several scholars have reported that the advent of democracy in 1994 necessitated a complete overhaul of all social, political, economic and cultural institutions of South Africa (Fiske and Ladd 2004; Herman 2011b; Mouton, Louw and Strydom 2013; Cloete, Mouton and Sheppard 2015). This study however, focuses on the transformation of the HE system with particular reference to academic staff qualifications. In this regard, relevant pieces of legislation that have influenced the staffing of HEIs in this era are compared in the following discussion.

The White Paper 3 is arguably the most important piece of legislation that began the transformation of the HE system in South Africa. It outlined a comprehensive set of initiatives for the transformation of higher education through the development of a single coordinated system (DHET 1997). The White Paper on Post School Education of 2013 on the other hand regulated the staffing of HEIs amongst other policy imperatives. Yet another important government report which specifically attempted to address academic staff qualifications is the SSAUF of 2015. This framework builds up on the HESA (2011) report and should be read in the context of key policy documents, such as the White Paper for Post-School Education & Training as per guidance given by the Minister of Education Blade Nzimande in 2013 (DHET 2013). The three pieces of legislation indicated in 2.3 have had a major influence on regulating academic staff qualifications in this country. The impact of these three pieces of legislative framework on academic staff qualifications was compared further.

White Paper 3: A programme for the transformation of higher education 1997

The White Paper 3 is the culmination of extensive investigations that commenced with the establishment of the NCHE in 1995. The White paper laid out a set of goals regarding the size, structure, governance, funding, and other aspects of post-apartheid higher education in South Africa (Mouton, Louw and Strydom 2013). As a result, the restructuring of institutions commenced in 2002 with the mergers of some HEIs (DHET 2002; Mfusi 2004; SehooLe 2011; DHET 2014; Cloete, Mouton and Sheppard 2015).

According to Waghid (2015) the HE system in 2001 consisted of 36 HEIs made up of 21 universities and 15 Technikons. Through restructuring this number was reduced, with some either merged or unbundled finally resulting in 23 universities (Herman 2011a). These institutions were then placed into three categories with different mandates. They were restructured into 11 traditional universities with a strong focus on masters and doctoral programmes, six comprehensive universities offering a mix of UoT and traditional university programmes at undergraduate level with some masters and doctoral programmes as well as six universities of technology which had a primary focus on vocational training (Cloete, Mouton and Sheppard 2015: 206-07). More importantly, according to Herman (2011a), the new HE landscape consisted of 23 institutions, all of which could offer doctoral degrees in contrast to the mandates of institutions during the apartheid era.

The original 23 institutions have since increased to 26 with the addition of Sefako Makgatho Health Sciences University, Sol Plaatje University and the University of Mpumalanga, resulting in 14 traditional universities. The status of the Technikons as alluded to by Herman (2011b) was changed after much pressure from the sector to UoTs in 2004. All these institutions however, still play different roles in doctoral education, based on their approved programme and qualification mix as well as their existing capacity and expertise. Although all the institutions could offer doctoral degrees, the approval of postgraduate programmes is dependent to a large extent on academic staff

qualifications when taking the council for higher education (CHE) programme accreditation approval template into consideration. This skewed participation rate has persisted over time and is clearly evident in the doctoral enrolment figures of 2012. Cloete, Mouton and Sheppard (2015:43) put doctoral student numbers at 10 621 or 76%, 2 638 and 706 at traditional universities, comprehensive universities and UoTs respectively.

As a result, doctoral enrolments have remained skewed in favour of the traditional universities due to the legacy of apartheid. These institutions were endowed with resources and had the highest percentage of academic staff with PhDs necessary to launch and sustain doctoral programmes (Hayward and Ncayiyana 2014). The importance of academics with PhDs in launching graduate programmes was emphasised by Hayward and Ncayiyana (2015). These authors argued that graduate education in sub-Saharan Africa is in crisis attributing the problem to the limited number of academic staff with doctoral degrees. Table 2.3 illustrates the skewed distribution of doctoral enrolments per university classification type that has persisted over time.

Table 2.3: Headcount of Doctoral first - enrolments by university classification 2002 - 2007

Classification	2002	2003	2004	2005	2006	2007
First-enrolments	2481	2519	2693	2692	2916	2684
Universities	1820	1902	2040	2072	2283	2106
Comprehensive universities	553	514	530	503	507	460
University of Technology	92	70	123	112	126	118

Source: Doctoral students in South Africa: A statistical profile adapted from ASSAf (2010)

An interesting observation from Table 2.2 and Table 2.3 is that the approved PQMs of some of the UoTs in particular did not or still do not offer higher qualifications, such as masters and doctoral degrees, hence the low participation rate. Compounding this problem in the UoT sector is that the mandate of teaching institutions did not change, as a result, academics are still burdened with heavy teaching loads (Muller 2012). In addition, the

sector is confronted with poor research infrastructure and an underqualified academic workforce who cannot supervise doctoral degrees (Herman 2011a). The special block grants proposed by the national plan for higher education (NPHE) to bridge the gap in terms of research infrastructure to compensate for the decades of neglect for institutions with weak research cultures has not made significant inroads (Herman 2011b). These disparities between the HEIs pose a challenge in terms of academic staff mobility within the system. In the same vein, doctoral output per university type remains skewed for the same reasons articulated above.

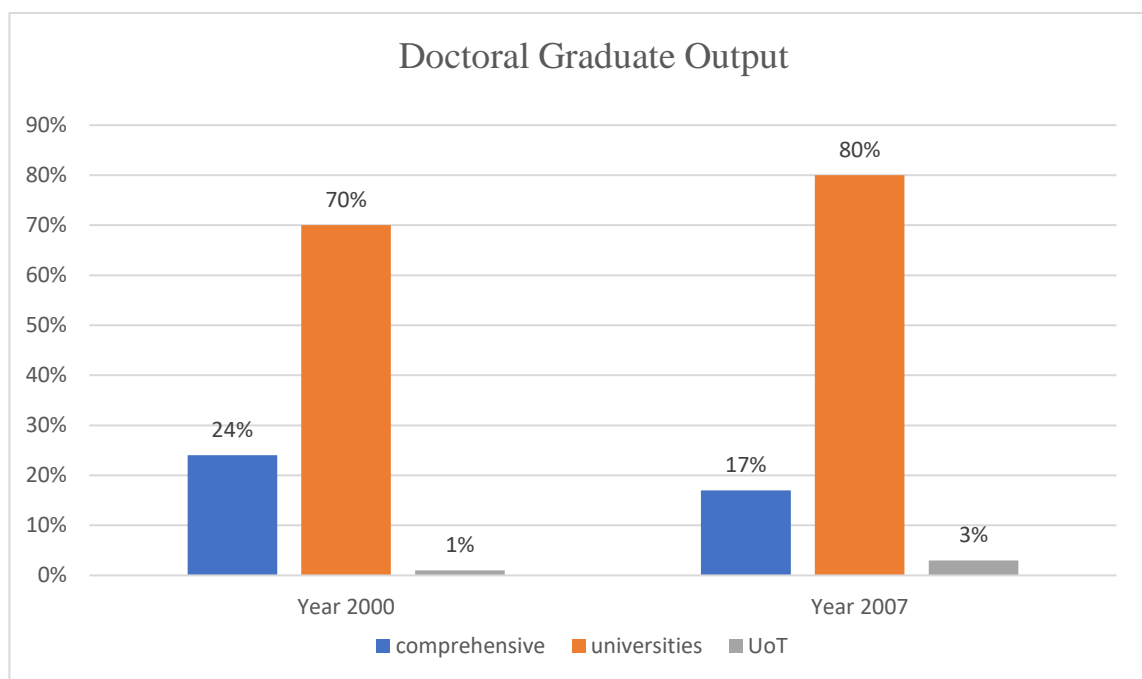


Figure 2.2 Share of doctoral graduates at public HEIs in South Africa by institutional type

Source: Doctoral students in South Africa: A statistical profile; ASSAf (2010: 55)

Figure 2.2 concurs with assertions that in 2007, approximately 83% of all PhD awards were still produced by the universities, particularly HWUs (ASSAf 2010; Herman 2012). Similarly, SehooLe (2011:57) argues that “despite the restructuring process aimed at redressing some of the imbalances of the past, HWUs continued to be the major producers

of doctoral graduates and research” and the envy of academic staff with PhDs in lower ranked universities (Muller 2012). Interestingly, only the University of Western Cape (UWC) is among the top 10 performing universities regarding doctoral output (see Table 2.2). Although UWC is an HBU, the reasons for its comparable performance in terms of doctoral output could be attributed to the percentage of academic staff with PhDs. UWC is located in the urban area and thus able to attract suitably qualified academics.

Statistics have shown that the burden of producing doctoral graduates in this country lies with a small number of institutions (see Table 2.2). The most pertinent question to ask is whether the targets set by the DST, medium term strategic framework (MTSF) and NDP will be met. Herman argues that it is unlikely that universities will have the capacity to meet the expanded doctoral production targets on their own. Herman (2011c) brings the question of current debates on the differentiation of HEIs into focus, taking into consideration the limited financial resources and the international trends in this regard. However, in the South African context, differentiation could lead to perpetuating the privilege of the HWUs. CHE (2016) claims that debates around differentiation have been contentious due to the systems’ divided past based on race. It argues that this legacy created the notion that traditional universities were “better” than others.

The most notable implications of the White Paper 3 on the percentage of academic staff with PhDs in the UoTs include:

- Despite the restructuring and mergers of HEIs, the percentage of academic staff with PhDs remains skewed in favour of HWUs.
- UoTs are still burdened with heavy teaching loads, poor research infrastructure and underqualified staff because the first tranche of the HDI grant was only allocated in 2017/18.
- Interestingly, DST, NRF, DHET and the NPC amongst other statutory bodies do not make the distinction between different types of institutions when setting targets for academic staff with PhDs in the HE system.

- UoTs are set up to fail in terms of academic staff qualification targets because the nGAP project which was discussed in the following sections does not consider the persistent imbalances.

White Paper on Post School Education and Training, 2013 and SSAUF 2015

The impact of the White Paper on Post School Education should be read together with SSAUF in terms of academic staff qualifications as guided by Blade Nzimande the minister of Higher Education in 2013 (DHET 2013). Reading into the policy on Post-School education which emphasises the significant low percentage of academic staff with PhDs in the HE sector, SSAUF argues that it should come as no surprise that the HE system is facing a crisis. This crisis is in relation to the size, composition and capacity of the academic staff in HEIs (DHET 2015).

Both the White Paper on Post School Education and the Framework are building on and take forward work that was carried out by the HESA task team from 2009, which culminated in a report, “Proposal for a National Programme to Develop the Next Generation of Academics for South African Higher Education” which is colloquially referred to as the nGAP (HESA 2011). The HESA task team however merely noted the challenges facing the existing academic cohort without necessarily designing a comprehensive strategy to support this cohort. These two documents take the HESA work forward by outlining the following:

DHET (2013) focused on four policy imperatives: i) expansion of the HE sector, ii) differentiation, iii) research and innovation for development and iv) staffing the universities. DHET (2015) on the other hand specifically focused on: i) the ageing academic workforce, ii) the relatively under qualified academic staff workforce and iii) the low numbers of postgraduate students creating an inadequate pipeline for the recruitment of future academics.

The White Paper on Post School Education provides much broader policy imperatives for the HE system whereas SSAUF focuses specifically on the last policy perspective of the

White Paper. This study explores the “staffing the university” policy imperative of the White Paper and all the challenges outlined by SSAUF. SSAUF has gone further than HESA and the White Paper in an attempt to address the development of the existing cohort of academics without PhDs. In addition, SSAUF succinctly captures the crisis in the HE system with respect to academic staff qualifications and designing specific programmes for dealing with the crisis.

This section firstly, outlined the nature of the crisis as captured by DHET (2015). Secondly it compared guidelines provided by the White Paper and SSAUF on how to deal with the crisis. According to SSAUF the HE system requires approximately 6 163 new academics annually to cater for the growth in the system as envisaged by the NPC (DHET 2013; National Planning Commission 2013). It further argues that this is a conservative estimate, one which does not consider any attrition caused by retirement, resignations and by death. The retirement groundswell of the highly skilled academics is well documented. Given the scale of need therefore, the nGAP programme aspires to provide 400 positions annually arguing that this translates to only 25% of the need. The full 400 posts in turn translates to 15 nGAP allocations per institution (DHET 2015).

Surprisingly, despite the envisaged targets none of the institutions were allocated more than 5 posts since the programme’s inception in 2016 according to the university capacity development programme (UCDP) advertisement for phases 1 - 4. Even the full 15 posts capacity per institution are said to constitute a mere 25% of the need (DHET 2015). XYZ’s allocation has been fluctuating since the programme’s inception in 2016. The institution was allocated 5 posts for 2016 and 2018 and 2 posts for 2017 and 2019 phases. This therefore implies that more young people, precisely 75%, will still need to join academia outside of the nGAP programme to satisfy the requirements even if the full nGAP capacity of 15 posts per institution is achieved.

Secondly, the White Paper on Post-School Education provides broader policy proposals on how to deal with the crisis in the HE system. While, SSAUF specifically targets young potential academics (nGAP), the White paper addresses the plight of the existing academic

cohort without PhDs. In this regard, the White paper proposes a) providing financial assistance for current and potential academics to undertake postgraduate studies in South Africa and abroad, b) provision of mentors for younger academics, c) addressing workload and over-large class sizes where possible and d) better rewards for teaching (DHET 2013: 36).

While the first three policy proposals directly address academic staff qualifications, only A and C address the plight of current and potential academics that will join academia from outside nGAP. As indicated earlier the first tranche of HDI grant aimed at addressing academic staff qualifications amongst other needs was only released in the 2018/2019 financial year. In addition, the policy proposal of sending students abroad has been strongly criticised by Mlambo (2010: 01) who suggested that “as policy advice it is absurd and unacceptable”, while Herman (2011c) queries the wisdom of such a policy proposal. He questions whether sending students abroad will lead to an increase in PhD holders or an increase in the brain drain. In addition, the policy, similar to that in the HESA report merely makes mention of workload and large class sizes without suggesting any well thought out strategy to deal with the problem particularly in the UoT sector where staff-student ratios are generally higher (DHET 2015:08).

Alternatively, SSAUF has specifically designed three programmes for dealing with the crisis in the HE system:

Nurturing Emerging Scholars Programme (NESP)

New Generation of Academics Programme (nGAP)

Existing Academics Capacity Enhancement Programme (EACEP)

Amongst these three programmes, the well-developed and widely communicated programme to the higher education community is the nGAP. This programme was rolled out in 2016. It would be interesting to conduct further investigation on the numbers of young people who would willingly join academia under the terms and conditions of the nGAP programme. Without a doubt, there are benefits because of the reduction of the workload to 20% in the initial stages of the PhD and mentoring amongst others. However,

do these benefits outweigh the lack of flexibility in terms of mobility for eight years? The nGAP cohort falls under the Y generation described by Du Plessis (2010) as excessively ambitious and fiercely competitive. The author argues that this group is not loyal to employers and they will gladly switch positions when promised more experience or better compensation. Similarly, Robyn (2012) argues that Generation Ys envision their careers in a series of two-to-three-year chapters, as a result companies are faced with the reality of threateningly high attrition rates.

2.4 Conclusion

The evolution of doctoral education with its associated legislative framework during and after the apartheid era has had a major impact on all aspects of HEIs in this country. Doctoral education from the apartheid era bequeathed the country with limited highly qualified academic staff close to retirement. The poor prospects for replacement considering student pipeline challenges and limited academics with ability to supervise further exacerbate this problem.

Chapter 2 provided the reference mode of how the problem of the low number of doctoral holders per million of the population in this country arose and likely to unfold in the future. This was presented in the form of the legislative framework that created different types of institutions and their mandates with respect to doctoral education. The following chapter explored the contemporary problems of producing and retaining academic staff with PhDs considering the evolution of doctoral education in this country.

Chapter 3: Production and retention of academic staff with PhDs

3.1 Introduction

The low percentage of academic staff with PhDs is a problem not only in South Africa but in the rest of Africa, albeit for different reasons (MacGregor 2013; Hayward and Ncayiyana 2014). Efforts to mitigate against this problem are hampered by the limited pool of new PhDs not only in South Africa but throughout Africa. These authors cited amongst others, low participation and graduation rates, absence of enabling organisational conditions and a limited research agenda as factors that hamper PhD production in Africa.

The latter, to a large extent, is affecting the UoT sector in South Africa in particular. Compounding this phenomenon according to MacGregor (2013) is that the Cooperation on Doctoral Education (CODOC) study found that academic institutions in the SADC countries have difficulty retaining academics with PhDs as an increasing number of doctoral graduates take up positions outside academia. As a result, the Higher Education, Research and Advocacy Network in Africa (HERANA) study found that the main factor influencing low PhD production is that very few African universities have the required numbers of academic staff with PhDs necessary to expand their postgraduate programs (Bunting, Cloete and van Schalkwyk 2014; Cloete, Sheppard and Bailey 2015; Hayward and Ncayiyana 2015). Mouton, speaking at a workshop convened by South Africa's NRF and the Carnegie Corporation of New York, in 2013 on "Expanding and Sustaining Excellence in Doctoral Programmes in Sub-Saharan Africa" concurred with these sentiments (Mouton, Louw and Strydom 2013). Mouton's most powerful news article in News24, on 29 August 2015, argued that there are only about 5 500 academics at South African universities with PhDs who can supervise. He further argued that although the assumption is that they will produce 5 000 PhDs a year the current average is one every four years. He argued that only 10% of the most productive supervisors produce one PhD per annum.

The key assumption from his presentation is that most South African supervisors are not productive or that there are other factors inhibiting productivity. According to Cloete, Mouton and Sheppard (2015:08) the NRF and Carnegie convention was aptly summed up by MacGregor as follows: “There’s a conundrum. To produce more doctoral graduates, more PhD supervisors are needed, but in order to have more supervisors, more PhDs are needed”. The most pertinent question to ask in this regard therefore is the one posed at this convention of “What needs to be done” to increase the pool of PhD graduates and as a direct consequence a pool of PhD supervisors. It can be clearly deduced from these observations that the challenges of increasing the production of PhD graduates stems directly from the challenges of production and retention of academic staff with PhDs. This conclusion is supported by Mouton’s input to the ministerial report (DHET 2014) who claimed that there is a strong correlation between academics with PhDs and doctoral output. He thus, strongly argued for the need to improve qualification profile of institutions’ permanent academic staff to higher percentages of academic staff with doctorates.

It is for this reason amongst others, that this study focused not only on the production of academic staff with PhDs but on how to retain them within academia in order to increase the pool of PhD holders. As alluded to in Chapter one, there are other benefits that accrue from an increase in doctoral output/production such as the contribution to the knowledge economy necessary for the 4IR, enhancing global competitiveness and increasing the pool of supervisors.

This study adopts the holism and forest thinking philosophies of dealing with complex business problems. According to Jackson (2006: xv) “Holism puts the study of wholes before that of the parts”. It advocates for concentrating attention on individual parts within the context of the whole. Systems thinking and SD practitioners suggest a paradigm shift from fragmentation or reductionist thinking in science to holism. Systems thinking is a way of understanding reality that emphasises the relationships among a system’s parts, rather than the parts themselves. It dispels the notion of reductionist thinking that insight

comes from breaking wholes down into their fundamental elements (Jackson 2001; Hjorth and Bagheri 2006; Jackson 2006; Davidz and Nightingale 2008). Similarly, Forest thinking philosophy, implies that to fully understand something one must understand the context of relationships between all the variables embedded in the whole. Conversely, Tree-by-tree traditional thinking believes that to know something one must focus on the details of individual variables. Forest thinking thus, emphasises grouping individual component parts to give a big picture of the system (Richmond 1997).

In this regard, the systems thinking philosophy adopted by this study encourages viewing the problematic situation holistically (forest thinking), instead of a linear approach to viewing variables individually (Richmond 1997). Therefore, for one to understand the challenges of the low percentage of academics with PhDs, one needs to explore the relationship between the production and retention of academics within this proper context.

The chapter commenced with a comprehensive discussion of the challenges of producing academic staff with PhDs. This was followed by a discussion of the challenges of retaining academic staff with PhDs. The last section focused on the systems thinking and system dynamics methodological framework to portray the interrelationship and interdependence between the production and retention variables in increasing the percentage of academics with PhDs.

3.2 Challenges of producing academic staff with PhDs in HEIs in South Africa

While challenges of producing academic staff with PhDs are broad and varied, the current study was confined to those that were identified by the stakeholders in doctoral education in this country in the HESA report. According to Ulrich (2003) drawing a boundary that determines what to include and exclude in sense making is a key component of systems thinking. Any additional factors could serve as scope for further research.

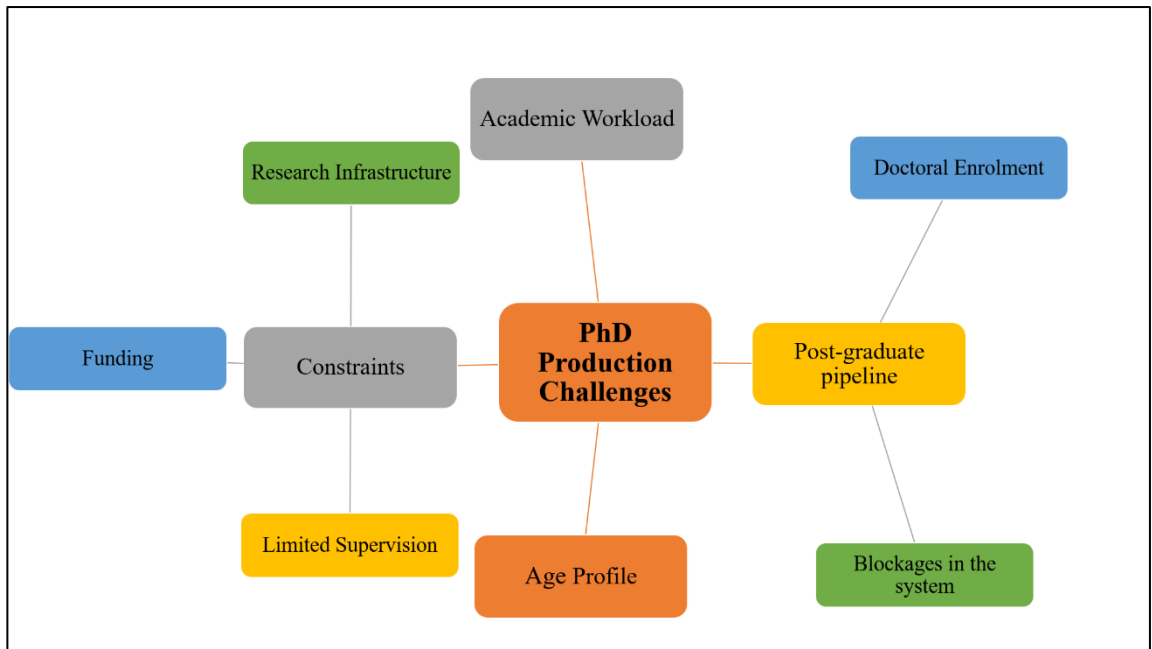


Figure 3.1: Factors that facilitate or inhibit the production of academics with PhDs

Two reports that have succinctly captured the main challenges of producing academic staff with PhDs in South Africa are the HESA report and the report of the technical task team (TTT). TTT was appointed to review the supply of Academics in Higher Education in South Africa by the Human Resource Development Council (HRDC 2015). The latter report is titled “Production of Academics and Strengthening of Higher Education Partnerships with Industry (PASHEPI)”. An analysis of these two reports and available literature on the challenges of producing academic staff with PhDs revealed that academic workload, current postgraduate pipeline (doctoral enrolments and blockages in the system), constraints in doctoral education (research infrastructure, funding and limited supervision) and age profile of academics are the main delimiting factors in producing academic staff with doctoral qualifications (HESA 2011; DHET 2014, 2015; HRDC 2015).

Other factors alluded to by several scholars (Mouton 2007; Herman 2011d) that negatively influence the rate at which HEIs produce academic staff with PhDs are that the PhD candidate in South Africa is on average 40 years old at entry, is part-time with implications

for preparedness, has had a long hiatus period of more than ten years since completion of masters and registration at doctoral level, and have no research skills having previously undertaken their masters by coursework and mini dissertation. Herman (2011c) adds that a lack of recognition of the value of the doctorate is another dimension that hinders the expansion of doctoral education. Similarly, recognition of a PhD and academia as an attractive career option have been strongly argued by the ministerial report in 2013 (DHET 2014; HRDC 2015). The most pertinent question posed by Herman (2011c) is whether South Africa can achieve the desired outcome by following international trends or whether the expansion target is merely a pipe-dream.

Differentiation of the higher education system whereby productive institutions are strengthened is an international trend currently debated in the HE system (DHET 2013; Cloete 2015). Although this phenomenon falls outside of the scope of this study, this researcher concurs with the views of those who argue that it will perpetuate the privilege of the HWUs if adopted in terms of the current PhD productivity of HEIs. It has already been pointed out in Table 2.2 and Figure 2.1 that more than 80% of doctoral graduates in this country are produced by traditional universities. More important to note is that there is a direct correlation between the percentage of academics with PhDs and the effectiveness and efficiency of doctoral programmes. Thus, the higher the percentage the more productive the programmes will be. To reiterate, UoTs occupy the bottom end of the scale in terms of both indicators as shown in Table 2.2. Therefore, at a glance, adopting this policy imperative will perpetuate the apartheid legacy for which UoTs were established. However, delving deeper into debates may reveal all the dynamics involved in the differentiation of the HE system.

Challenges facing the higher education sector in South Africa in the development of academic staff with doctoral degrees have been raised by many statutory bodies involved in doctoral education such as CHE, COHORT, DST and HRDC. Furthermore, several studies (ASSAf 2010; Herman 2011d) have raised fundamental questions about the capacity of the HE system to achieve the articulated targets of academic staff with PhDs

by DHET, NDP and MTSF. ASSAf (2010) further argues that such targets cannot be achieved by relying on the HE education system facing the challenges alluded to above. The ensuing discussion elaborated on each of the variables depicted in Figure 2.3.

3.2.1 Academic workload

According to Kenny and Fluck (2017:504) there is “no credible mechanism to identify and quantify the range of tasks that typically constitute academic work”. Thus, this lack of understanding calls for the need to manage academic workloads in order to protect academics from overwork. It is universally acknowledged that the academic workload comprise of three tenets, teaching, research and community engagement, however, these are not the only tasks that constitute academic workload as argued by (DHET 2015; Kenny and Fluck 2017). These studies argue that the apparent lack of understanding what constitutes academic workload has led to the deterioration in academic working conditions within universities. The influences on academic workload are widely documented and must be properly understood when planning for changes to university staffing in South Africa (DHET 2015).

For the purpose of this study, challenges of workload on academic staff pursuing doctoral degrees were explored under the following headings: time pressures due to heavy teaching load, class sizes and part-time teaching.

Teaching load

It is universally acknowledged that the academic staff portfolio is comprised of three tenets: teaching, research and community engagement. A study by Roy (2014) found that in South Africa, career advancement in academia has been linked to the three tenets of the academic portfolio. As a result, academics have been under significant pressure nationally and institutionally to increase their throughput rates, research output and community engagement.

However, in more recent years, it is noted that these are not the only pressures competing for academic staff members' time. Academics have been burdened more recently with publication pressures in order to generate third stream income, the need to bring in external funding, greater administrative responsibilities and pressures to increase throughput rates (DHET 2015; Kenny and Fluck 2017). Hornibrook (2012) argues that these administration and service tasks increasingly encroach on the traditional domains of research and teaching. The author further argues that academics are under increasing pressure to publish high quality research, apply for grants, demonstrate research impact and build external links with industry.

Increasing throughput rates entails putting in extra work with underprepared students when one takes into consideration the calibre of students coming out of the schooling system (DHET 2014, 2015). Mlambo (2010) concurs with these sentiments, arguing that given the ever-increasing bureaucratic and administrative duties, academics are left with little time to pursue their PhD studies. Similarly, Cloete, Mouton and Sheppard (2015) point out that the additional challenges brought about by the mergers between institutions which resulted in higher teaching loads has left the current cohort of academics minimal time in which to improve their qualifications particularly in the UoT sector. In addition, the publication of the higher education qualification sub-framework (HEQSF) in 2013 which regulated the alignment of qualifications, resulted in some qualifications being phased out and the introduction of new qualifications (DHET 2014; Cloete, Mouton and Sheppard 2015). Due to these changes, the phasing out and phasing in of some modules created an additional burden particularly on those academics registered for higher qualifications for the duration of phasing out some modules.

The legacy of heavy teaching loads at UoTs has not changed. Boughey (2010) and Austin (1996) argue that in contrast to academics from the research-intensive universities which in essence are traditional universities, UoTs are still encumbered with heavy teaching loads as a result of the vocational education mandate of the Technikon legacy. In order for Technikons to make the transition to become universities of technology the need to

upgrade the qualifications of their staff is essential. This shift in focus at these institutions puts additional pressure on the existing cohort of academics (Boughey 2010:20). Tettey (2010:50) suggests that one way to facilitate the development of new faculty members is to “reduce their teaching load, by at least one course, in the first year while they are trying to settle into their new positions”. This principle is already implemented for academic staff appointed on the nGAP project at XYZ. If this principle could be extended to existing academic staff who are registered for doctoral degrees through EACEP as suggested by DHET (2015) especially at UoTs, this would ease time pressures and facilitate higher completion rates.

The impact of heavy teaching loads can best be explained by the experiences of two academic staff, as highlighted by Backhouse (2009). In her study, Backhouse found that one English lecturer was overwhelmed by teaching because students had a greater need for basic English skills which put additional pressure on her time. Heavy teaching loads are not only characterised by the size of classes and number of groups per academic but also by the additional level of extra effort required. DHET (2015) has already identified challenges of operating in a context of low throughput rates because of student under-preparedness.

The second example is best illustrated by the experience of a postgraduate student who was encouraged to be a tutor and later offered a short lecturing position comprised of one subject. But when the student was persuaded to become more involved, the workload impacted on her postgraduate studies. As a consequence, the student took 12 years to complete her PhD as the workload increased (Backhouse 2009). The student’s experience clearly illustrates the consequences of the disparity between the workload of current academic staff in the HEIs and those recruited into the system through the nGAP project, who are assigned 20% of a ‘normal lecturer’s workload (DHET 2015).

The challenges of a heavy teaching load are not peculiar to the South African context however. Hayward and Ncayiyana (2015) in their study of Sub-Saharan Universities found that there is a need to recruit additional well-trained staff in order to reduce teaching

loads to a reasonable size, which may require a cap on enrolment. In South Africa particularly, the DHET (2012) envisaged an increase in the participation rate in tertiary education from 16% in 2011 to 23% by 2030. Interestingly though, it is silent on any corresponding increase in the number of academics. Similarly, a study of Australian universities by Kenny and Fluck (2014) found that government funding was tied to student numbers resulting in rapid growth without a commensurate increase in ongoing academic staff.

HRDC (2015) puts the annual demand for academics at 1 450 per annum in the country to meet rising demand. Thus, rapidly escalating enrolments unaccompanied by a parallel increase in academics will always have unintended consequences particularly in the UoT sector. The dire consequences of heavy teaching loads amongst other challenges are best illustrated by the Ethiopian example where only 100 PhDs were produced over the last 50 years according to Hayward and Ncayiyana (2015).

Class size

South African higher education has recently been characterised by the demand for higher enrolment since 1994 as a direct consequence of the apartheid legacy in the HE system. The National Plan for Higher Education of 2001 envisaged an expansion of the university system from the gross participation rate of 16% to that of 20% from 2011 to 2016 (HESA 2011). With the number of programmes remaining the same at XYZ, the increased participation rates resulted in larger student population per programme. Tettey (2010) found that in Africa the demand for higher education has increased tremendously, with implications for staff satisfaction. In addition, several scholars (Tettey 2010; Hayward and Ncayiyana 2015) have observed that the increase in student numbers has not been accompanied by a parallel growth in academic staff numbers in both South Africa and in the Sub-Saharan universities. In the South African context specifically, the rapid enrolment envisaged by the National Plan for Higher Education has also not been accompanied by an equivalent expansion in the number of academics (Roy 2014). This dichotomy has also been acknowledged by DHET (2015).

Large class sizes with the associated administrative duties such as marking and consultation generally impacts negatively on the progress of academics registered for PhDs and leads to a decline in the quality of teaching. This is one of the major discrepancies between the working conditions of nGAP lecturers and other academic staff who are also pursuing doctoral degrees, particularly at Universities of Technology where according to Muller (2012) academics are encumbered with heavy teaching loads.

Part-time teaching

Globally, academia is characterised by heavy workload with poor remuneration. Consequently, academics have a need to supplement their income. Kipkebut (2010) reported that in Kenyan universities, there is a growing need for academics to take up consultancy jobs or secondary teaching in their own institutions or private institutions. The financial strain of income on academics is not peculiar to the Kenyan academics; the phenomenon of low academic salaries is global as academics in other parts of the world also experience the need to supplement their incomes. In this regard, Hayward and Ncayiyana (2015) pointed out that in most African universities, low salaries compel academics with families to seek second jobs to support them. This view is supported by Cloete and Maassen (2015) who found that in the HERANA study, academics were involved in part-time teaching to supplement their incomes. Universities in South Africa, particularly HDIs faced with budget constraints explore various ways of raising third stream income, of which part-time programmes are such a source. Academic staff are enticed through the offer of additional income to participate in part-time teaching. This, as alluded to by several scholars (Cloete and Maassen 2015; Cloete, Sheppard and Bailey 2015), has resulted in academic staff taking on heavier teaching loads to supplement their income. This in turn has had a detrimental effect on academics who are involved in PhD research.

3.2.2 Current postgraduate pipeline

An adequate academic labour force is dependent on an increase in the production of doctorates to address the supply arm of HE (HRDC 2015:01). In this regard, the pool from which academics are drawn needs to be urgently increased. However, this cannot be achieved without a full understanding of the dynamics involved in the doctoral pipeline. Most importantly, only 12% of the pool of doctoral candidates is comprised of those academics who are already in the HE system (ASSAf 2010). The PhD cohort pool serves as a source of recruitment for the nGAP programme. On the other hand, an increase in suitably qualified academics leads to an increase in the postgraduate pipeline. This section therefore explored the doctoral pipeline challenges and its impact on the production of academics with PhDs.

The current postgraduate pipeline is characterised by two factors, i) enrolment at doctoral level, ii) conversion rate from masters to doctoral degrees or blockages in the system (HESA 2011). These factors were explored at some length in this section, focusing particularly on those aspects that affect current and potential academics in the HE system.

3.2.2.1 Doctoral enrolment

Several scholars have argued that growth in doctoral enrolments and graduates in Africa have not expanded (Hayward 2010; Herman 2011d; MacGregor 2013; Hayward and Ncayiyana 2015). It is estimated that only 1% of students in higher education within the Southern African Development Community (SADEC) region are enrolled for doctoral programmes (MacGregor 2013). In South Africa, HESA (2011) puts the total of postgraduate enrolments in 2009 at 9.1% which is inadequate for South Africa's economic and social development needs (Badat 2010). This figure has since increased to 13% in 2012 as reported by the (HRDC 2015). Mouton, Boshoff and James (2015) credits the 2003 funding framework for this gradual increase in student enrolments. It should however be noted that in this country, postgraduate means both masters and doctoral degrees, thus, the views of Badat (2010) and HESA (2011) have a direct correlation with

MacGregor's 1% for the SADEC region. A successful implementation of the nGAP project is dependent on the same pool of potential postgraduate enrolments.

Several scholars have postulated on the reasons for the slow growth in doctoral enrolments and one of the reasons advanced for this phenomenon is how a PhD is viewed by policy-makers and society in general. Herman (2011b) in particular argued that doctoral education was initially overlooked by both policy-makers and the research fraternity. Backhouse (2009) and Herman (2011b) have argued that national policies begun to view the doctorate as distinct from other postgraduate degrees since 2006/2007. Cloete and Maassen (2015) and Cloete, Mouton and Sheppard (2015) argue that while the PhD is recognised by society, its value and contribution to society has not yet been appreciated. A case in point is illustrated by the findings of a study by Herman (2011c) where students tell their supervisors that although they have a PhD they are still poor. Similarly, Rybicki (2011) found that another reason for the low enrolments is that students do not see the need to pursue doctoral studies. He claimed that students said "why work for a pittance for several years to possibly qualify for a not-very-well-paid job afterwards when you could have the same or better job now?" (Rybicki 2011:01). They further argue that in South Africa a PhD is perceived as a luxury rather than as a necessity among some policymakers and society at large. This highlights a need for advocacy if there is any hope of increasing the postgraduate pipeline. ASSAf (2010) maintains that in order to escalate the number of PhDs, there is a strong need for advocacy at all levels – individual, institutional and national levels. It is however refreshing to note that the Presidency as articulated in Chapter 1, is taking the lead in linking the value of a PhD to the GDP and global competitiveness. Further research is required to determine how a PhD is viewed by society in South Africa, and a need for advocacy in this regard.

Other barriers to increasing enrolments are the small pool of potential doctoral students (DHET 2014) and the capping of enrolments at undergraduate level (ASSAf 2010). The limited physical resources were cited by institutions in their enrolment planning responses to DHET as major obstacles to any attempt to increase enrolment participation rates at all

levels (ASSAf (2010). This however is contrary to the envisaged increase in the participation rate from 16% to 23% stated earlier. According to the HRDC (2015) report of 2012, of 938 200 students in HE, 60 000 were at Honours study level, 49 000 at master's level and only 12 800 at Doctorate level. Further compounding the small pool of potential PhD candidates is that many students take a master of business administration (MBA) which does not lead to a doctoral degree (Mouton 2007). Herman (2011c) argues that doctoral enrolments are complex; while some PhD programmes must turn away students due to lack of physical research infrastructure such as laboratory space or the lack of supervisory capacity; others are struggling to find suitable students. In the sub-Saharan Africa, Hayward and Ncayiyana (2014) concur with Herman attributing another possible cause of declining enrolments at doctoral level to a limited pool of suitably qualified academics in certain disciplines to launch postgraduate programmes. These authors further reveal that few of the 1 500 public and private institutions offer graduate programmes at masters and doctoral levels.

In South Africa specifically, doctoral enrolments are concentrated in the top 9 PhD producing universities out of a total of 26 universities (HRDC 2015). With the burden of producing doctoral graduates resting on such a small number of institutions, as illustrated in Tables 2.2 and 2.3, it is unlikely that those universities will have the capacity to meet the expanded postgraduate enrolment target of 25% by 2030 as envisaged by the NPC (Mouton 2011; Herman 2012; Masondo 2014). The reasons for this anomaly were explained in the evolution of the HE system in this country. Consequently, doctoral education in the country is still skewed towards traditional universities which invariably would be HWUs.

Compounding the challenge of a limited pool of potential academics is that from a total of 2 692 first enrolments for doctoral study in 2005, 26% were international students (HESA 2011). ASSAf (2010) has since put that figure at 28% and 29% in 2006 and 2007 respectively, illustrating that this situation is gradually worsening. Firstly, in planning for

a Next Generation of academics, which has been cited as a solution to the low percentage of academic staff with PhDs, the doctoral pipeline issues thus become imperative. Second and most importantly, removing barriers on the system and investing in the support programmes for existing academics to increase the enrolments from the current 12% is critical.

Thus, the way a PhD is viewed, limited physical infrastructure leading to enrolment capping, the availability of academics with PhDs who can supervise, the skewed distribution of enrolment between HEIs and the composition of doctoral candidates will ultimately determine success or failure of HEIs in contributing to the global competitiveness of the country. These variables have a direct impact on the production of doctoral holders.

3.2.2.2 Blockages in the postgraduate pipeline

Several scholars have argued that the conversion rates from masters to PhD are low in the country. ASSAf (2010) has put this rate at 6.9 translating to a conversion rate of one doctoral graduate for every seven masters graduates. Mouton (2007) shares similar sentiments putting the rate at 6 to 1 over the past 15 years. According to the HRDC (2015) the average conversion rate from masters to doctoral degrees was estimated to have been 37% from 2000 to 2006. However, contrary to claims of low conversion rates in the country, Mouton (2007) explains that about a third of masters graduates in this country are MBA, the majority of whom do not proceed to doctoral studies. He further argues that if this fact is taken into consideration, the conversion rates are one for every three or four masters which compares favourably with international trends.

Two studies have quantified the pile up in the system (ASSAf 2010; HESA 2011) as follows:

of the total number of PhD enrolments, 27% (2 684) were first enrolments, 12% (1 163) graduated, while 61% (6 125) constituted on-going enrolments.

The cohort study of 2005 illustrated the high dropout rate of 41% and a throughput rate of 35% at doctorate level (DHET 2015).

Table 3.1 2005 Cohort study excluding UNISA

		Year 1	Year 3	Year 5	Total
UG degree	Graduated	-	27%	21%	48%
	Dropped out	30%	12%	4%	46%
Masters	Graduated	6%	25%	12%	43%
	Dropped out	28%	15%	13%	57%
Doctorate	Graduated	1%	14%	20%	35%
	Dropped out	22%	15%	4%	41%

Source: Adapted from SSAUF (2015: 09)

The above table shows a worrying trend of high dropout rates at the initial stages of doctoral studies. Possible causes include the type of master's degrees obtained by doctoral candidates that have contributed to this scenario. MBA and masters by coursework and mini dissertation have been criticised for not adequately preparing students for the rigors of PhD research. The age of a PhD candidate in this country is on average 40 years old, and thus is inevitably studying part-time and juggling work, family and their studies. Those that persist under such circumstances might then take longer to complete their studies. Funding and supervision have been the main factors cited by several scholars in doctoral education as the two main obstacles to completion.

Table 3.1 concurs with Letseka and Maile (2008) assertion of high attrition rates at doctoral level. Vandenberg (2013) concurs, stating that these results, which correlate with those from studies abroad, revealed that 29% of doctoral candidates drop out during the first two years of enrolment. An attrition calculation conducted in 2001 on the doctoral cohort in the country showed a 46% dropout rate across all disciplines (Herman 2011a; Mouton 2011:18). Several scholars have argued that there is no comprehensive international data on the possible causes and consequences of graduate candidates abandoning their doctoral studies. Meanwhile, Mouton (2007:1088) contends that there is

no systematic and credible data on doctoral attrition rates for South Africa. The Department of Basic Education (2010:34) concurs that there are no accurate statistics in South Africa on attrition, but it is estimated at an average of 13% across institutions. Letseka and Maile (2008) claimed that National Treasury publicly lamented the consequences of the dropout rate which is costing R4.5 billion in grants and subsidies to higher education institutions without a commensurate return on investment. In order to reduce doctoral attrition in South Africa, a better understanding of the actual causes of that attrition is necessary (Letseka and Maile 2008; Herman 2011d).

To mitigate against these challenges, postgraduate students from elsewhere in Africa are seen as attractive to many South African universities – they contribute to racial transformation, efficiency (completing studies more quickly than local students) and quality (reputedly good writing skills) (Muller 2012; Cloete, Mouton and Sheppard 2015). These authors argue that this doctoral statistic masks the inability or lack of enthusiasm in attracting local, particularly black candidates, into doctoral programmes. Race is one of the most important dimensions of doctoral education in this country; however, as stated in Chapter 1, it falls outside the boundary of the current study.

DHET (2015) argues that more needs to be done to improve completion rates, considering that less than 50% of those who register complete their degrees even after an extension of two years. Table 3.1 illustrates a shocking graduation rate of 14% in three years and a further 20% in five years. The HRDC (2015) report bemoaned the high attrition rate for doctoral students in South Africa suggesting that only 11% of doctoral students complete their degrees per annum. It can thus be inferred that a greater proportion of the 61% ongoing enrolments eventually drop out. On the contrary, several scholars argue time-to-degree on average is comparable to international trends standing at five or 4.8 years (ASSAf 2010; HESA 2011; Mouton 2011; MacGregor 2013).

Several studies (Backhouse 2009; Herman 2011d; HRDC 2015) appropriately captured the reasons why obstacles in the doctoral pipeline occur. These studies found that supervision and finance are arguably the two main contributing factors to the blockages

in the pipe-line system. In this regard Herman (2011d:41) identified the specific dynamics involved: i) limited availability and capacity of supervisory at departmental level, ii) poor working relationships or personality conflicts with supervisors, iii) supervisors who are too busy to take on doctoral students or are uninterested in student topics or problems, iv) insufficient training on how to conduct research or write a dissertation and v) lack of financial support for doctoral students which has always been cited as a major barrier to completion.

The work of the task team (HRDC 2015:22), while expressing similar sentiments, included other dimensions to this problem, such as “i) the age of the student at the time of enrolment, coupled with ii) professional and family commitments, iii) inadequate socialisation experiences, iv) poor student-supervisor relationships; and (iv) insufficient funding”. In the same vein, a study by Backhouse (2009) found that a large proportion of doctoral students lacked the necessary research skills. In this regard, Mouton (2016:70) indicated that PhD candidates in this country “require extensive guidance with the development of their research proposals (51%), the organisation of their thesis (49%), scientific writing (45%) and choosing their thesis topic (44%)”.

Herman (2011d) argues that in an ideal world, the doctoral candidate should be reasonably well prepared for most of these tasks. However, Backhouse (2009) revealed that this is evidently not the case, even from the top 10 universities that produce as many as 83% of the doctoral students in the country. Several scholars attribute this apparent lack of research expertise by PhD students to, i) a hiatus of 10 years or more which posed a challenge for most doctoral students due to research skills erosion and ii) the role of a coursework master’s degree in preparing students for the rigors of PhD research which was seen as less than ideal (Herman 2011d; MacGregor 2013).

Another contributing factor to the blockages in the system is the fact that in this country the majority of PhD candidates undertake their studies on part-time basis. Herman (2011d) stated that 50% of PhD candidates undertook their studies part-time while a further 20% were full-time students with part-time jobs. Mouton (2016) put this figure between 60%

and 70%, arguing that the average age of this cohort is 40 years old with major implications for preparedness. The author cited three top reasons for blockages in the system as, i) finding sufficient time for studies, ii) balancing work with studies and iii) age of students particularly those older than 30 years. Roy (2014) surveyed 950 PhD students enrolled in the top 12 PhD producing universities. There is no consistency with regards to top PhD producing institutions, some articles refer to top 9, while others refer to top 10 (83%) or even 12 (95%) institutions in this regard (ASSAf 2010; Herman 2011d; Jansen 2011; Herman 2012; Mouton, Louw and Strydom 2013; Cloete, Mouton and Sheppard 2015; HRDC 2015). Similarly, the study by Roy (2014) attributed constraints in academics' time as a leading factor for attrition, since most individuals pursue their PhD while employed.

Academics pursuing PhDs are not immune to these statistics and can be even more affected. Herman (2011d) goes further to suggest that research must be conducted at departmental as well as institutional level in order to gain a better understanding of the possible causes. Consistently high levels of attrition may signal underlying problems in a department, university, or discipline (ASSAf 2010) hence the need to conduct research at both institutional and departmental level as suggested by Herman (2011d).

In summation, factors that inhibit the progression rate of PhD studies leading to blockages in the doctoral pipeline cited by the various studies are; the age of candidates, family responsibilities, finding time, ability to balance work, family and studies, hiatus of more than 10 years, the type of master's degree obtained, insufficient funding and relationships with supervisors. Most of these factors were identified by stakeholders in doctoral education in the HESA (2011) report and these have been discussed under separate headings. Thus, Backhouse (2009) and Herman (2011d) argued that when academics are struggling to balance their workload, it is their PhD studies that are sacrificed.

3.2.3 Constraints facing South African Higher Education

Several studies (ASSAf 2010; HESA 2011; DHET 2015) have revealed that constraints in producing academic staff with PhDs are research infrastructure, limited supervision and funding. These variables were explored briefly in this section to illustrate their impact on the production of academic staff with PhDs.

3.2.3.1 Research infrastructure

In recent years, there has been an increasing interest in research infrastructure and its impact on doctoral education. Research reveals that the availability and quality of research infrastructure, facilities, and equipment at many South African universities including the top 12 institutions which produce 95% of doctoral graduates is not adequate (Habib and Morrow 2006; Badat 2010; Hayward and Ncayiyana 2014; Cloete 2015; Cloete, Sheppard and Bailey 2015). These constraints have a negative impact on the enrolment and production of doctoral graduates.

Research infrastructure is described by several scholars (Badsha and Cloete 2011; HESA 2011; Cloete, Mouton and Sheppard 2015) as information and communication technology services, equipment, computers and computer software and internet. Other scholars such as Cloete, Mouton and Sheppard (2015) have extended research infrastructure to include libraries, laboratories, databases, key journal subscriptions and financial incentives that facilitate research such as sabbatical leave, paid study leave, fellowships and scholarships, travel assistance to conferences, monetary allowances for publications and successful supervision of postgraduate students.

As a result of the constraints in research infrastructure and the consequences of research infrastructure on doctoral education and research Cloete, Mouton and Sheppard (2015) call for stronger participation by the state in resourcing basic research infrastructure in HEIs. Similarly, Badsha and Cloete (2011:51) call for the Government to partner with the private sector to raise the level of R&D, with resources targeted towards building the research infrastructure required by a modern economy.

Several studies have revealed that due to the legacy of apartheid, research infrastructure in the country is still skewed in favour of the HWUs (Badat 2010; Cloete 2015; Cloete, Mouton and Sheppard 2015; Cloete, Sheppard and Bailey 2015). Even the HESA (2011) report reveals that the allocation for nGAP appointments take this constraint into consideration by allocating R50 000 per candidate to at least alleviate some of the research infrastructural challenges such as equipment. Several scholars have been engaged in debates on whether to adopt international trends by capacitating the top ten PhD producing institutions in terms of research infrastructure (Badat 2010; Cloete 2015; Cloete, Sheppard and Bailey 2015). These new debates are couched around differentiation in the HE system (Badat 2010; DHET 2013).

Although differentiation makes academic sense, arguments against this approach maintain that it will perpetuate the apartheid legacy in the South African context (ASSAf 2010). Cloete, Mouton and Sheppard (2015:246) indicate that globally the bulk of doctoral education is provided by relatively few institutions and research capacity is still highly concentrated in a few regions: the EU, Japan and US. They argue that in the South African context, there is a need for decentralising research infrastructure to culturally diverse communities without being absorbed in the few hubs where capacity is concentrated. In the South African context that constitutes HWUs, with HBUs and the UoTs severely constrained because of the HE legacy. The DHET (2014) report differentiates the skewed distribution of research infrastructure between institutions into three clusters. The majority of the 11 institutions in Cluster 3 are HDIs and UoTs except UFH and UWC which are in Cluster 1. The research related needs of Cluster 2 and 3 institutions are almost similar. In Cluster 3 few academics have either a masters or a doctoral qualification and thus most research development initiatives and grants goes towards staff development. In both 2 and 3's institutions, there is a need to establish or strengthen the research office and provide infrastructure that supports research such as libraries and laboratories amongst others (DHET 2014: 354-355). XYZ is severely constrained in terms of infrastructure due to its historical disadvantage (HDI) and location (urban vs rural) and type of institution (UoT). As illustrated in Table 2.2, this institution has the lowest percentage of academic staff with

PhDs, and as argued above the bulk of research initiatives should be dedicated to staff development. However, here there exists a dichotomy; PhD research is dependent on the availability of research infrastructure.

Louw and Muller (2014) argue that many of the undesirable legacies of apartheid are entrenched inequalities in almost all the aspects of the higher education system in this country, and research infrastructure is no exception. They argue that the country's higher education system is still characterised by two sets of institutions: historically advantaged institutions (HAIs) and historically disadvantaged institutions (HDIs) almost two decades into democracy. Thus, it is for this reason that all the HAIs fall under Cluster 1 in terms of research infrastructure. The availability of research infrastructure has a direct impact on the production of academic staff with PhDs.

3.2.3.2 Funding

Several reports have thus far cited insufficient funding as the single biggest obstacle to the production of PhDs in this country (ASSAf 2010; HESA 2011; DHET 2014). In addition to insufficient funding, Badat (2010) blames the poor planning and coordination at policy level between the DST and the previous Department of Education for the challenges of postgraduate funding. At policy level, Kehm (2009) in Herman (2011c) argues that the issue of funding requires policies in two areas, the funding of the institutions to establish and run doctoral programmes and the funding of doctoral students so they are able to devote appropriate time to their studies. Herman (2011c) argues that high levels of funding are required for increasing the PhD output. Rybicki (2011) puts the PhD costs at R100 000 per student per annum for just lab costs in the Science disciplines and between R70 000 - R90 000 for personal costs. According to Herman (2011c) some PhD programmes, especially in the natural sciences, rely almost entirely on NRF and DST funding. He argues that the programmes that survive are those run by research chairs who can secure other sources of funding.

However, both NRF and DST funding have had their own challenges. According to HESA (2011) DST cut its support to the NRF in 2009. Despite this challenge, the NRF still aims to increase the number of PhDs they support to 6 000 per annum by 2025. Surprisingly, a country in the top 3 in terms of size of the economy invests much less than its African counterparts in higher education.

Firstly, MacGregor (2013) puts the African investment in higher education, on average, at 0,78% of GDP, arguing that this has, however, not proportionally increased alongside the increase in postgraduate student enrolments. In South Africa specifically, HESA (2011) indicated that during the period 2008 – 2009 the government spent 0,92% of GDP on higher education, falling short of the target of 1% promised by the Mbeki government at the time. This contribution has been gradually decreasing, in 2010 HESA estimated at the time, that the state intended to allocate 0.74% of GDP to universities. It is however important to note that since 2004 there has been a steady increase in the funds available for higher education, both in absolute terms and when inflation is taken into account. Nevertheless, the proportion of the national budget going to higher education has declined (HESA 2011).

Arguably, South Africa in comparative terms spends less than other sub-Saharan African countries on higher education. CHE (2009) put the contribution of countries such as Botswana, Burundi, Ethiopia, Kenya, Rwanda, Senegal and Swaziland, which allocate up to 2.1% of GDP to higher education, much higher than South Africa. All this in a country where the CHE (2009:09) claims that universities are largely state funded through DHET. On the contrary, Molla and Cuthbert (2016) in a study of South Africa, Ghana and Ethiopia found that South African expenditure in research and development (R&D) as a percentage of the GDP was higher than both countries. The authors further link expenditure on R&D directly to building human intellectual capacity. It is generally acknowledged that academics with PhDs are creators of research and innovation,

There are though, different views on how to fund HEIs taking into consideration the evolution of the HE system in this country which has led to a divide in terms of privilege

between institutions. The ministerial report alleges that the current “funding models are biased towards universities that are already strong” (DHET 2014:81). The report further, argues that in South Africa, “all higher education institutions should offer higher degrees. It recommends that in some, the mix should be predominantly undergraduate, while in others there should be upwards of 30% of masters and doctorate students” (DHET 2014:91). Institutions such as XYZ have opted, according to the strategy 2025, for the former suggestion as alluded to earlier. The institutional strategy 2025 envisages 3 masters and 3 doctoral degrees in areas of strength in the institution.

The ministerial report of 2014 argues for dedicated funding outside of the standard formula for masters and doctoral studies. It has been stated earlier that in this country only 10 universities produce 83% of doctoral graduates. The suggestion, by implication, advocates for a greater slice of the budget going to the already strong universities. However, it argues that “we can get there if there is political will, and it should be clear that this is not at the expense of HDIs – they need to have their funding secured and historical backlogs remedied” (DHET 2014:91). The reality of the situation is that the HDI grant promised to HDIs is yet to be fully realised. It remains to be seen whether the recommendations from this report can achieve the desired outcome without necessarily perpetuating the status quo in higher education. The report further argues that,

“funding, for example, two universities at the level required to become world-class will not, however compromise the others, and will in time benefit the whole system, including through the production of the next generation of the highest quality academics for the country” (DHET 2014:91).

With the history of higher education in this country, this might lead to the creation of yet another layer of élite institutions. This suggestion touches on the topical issue of differentiation in higher education which falls outside the scope of this study.

The current rate of state expenditure on HE is evident in many areas, particularly for institutions in Cluster 3, the majority of which are HDIs. According to DHET (2014), deteriorating research infrastructure, insufficient laboratory spaces, large and growing

student-lecturer ratios which are not been accompanied by concomitant increases in academic staff are such areas. This report acknowledges that too few academics in institutions in this cluster have either a masters or doctoral qualifications and thus the majority of research development funding must go towards staff development. This is based on the acknowledgement that academics with doctoral degrees are the major producers of research outputs and the main supervisors of doctoral students. The suggested dedicated funding formula will therefore perpetuate the skewed distribution of funding with established traditional universities receiving a greater proportion of funding by virtue of their higher postgraduate enrolments.

Another challenge attributed to insufficient funding is the lack of knowledge about sources of funding. The HRDC (2015) task team identified lack of information on scholarships and bursaries as one of the gaps in the HE system. This task team stated that the NRF is the main individual provider of postgraduate bursaries. It further argued that postgraduate bursaries are rare and very few HEIs receive funding from endowments. Similarly, Cloete, Mouton and Sheppard (2015) found that many students, departments and supervisors were not familiar with bursaries and scholarships readily available for postgraduate studies, instead they relied on the postgraduate funding office to assist students with information on funding options. However, this strategy only works if the postgraduate funding office functions efficiently and communicates well with students. It therefore concluded that the limited funding opportunities or sources are not effectively communicated to students in those institutions where the research office is not functioning well. As alluded to earlier that there are only 10% reputable and productive supervisors who produce 1 PhD per annum, it can be assumed that these supervisors would be knowledgeable about readily available bursaries and scholarships.

3.2.3.3 Limited supervision

The concerns about limited supervision were cited by DHET (1997) as one of the major factors that inhibited participation rates at doctoral level. In addition, there is a consensus among authors that limited supervisory capacity in South African HEIs has been a major

factor that inhibits doctoral enrolments and output (ASSAf 2010; Badat 2010; Herman 2011c; Herman 2011d; Cloete and Maassen 2015; Cloete, Mouton and Sheppard 2015). These scholars argue that in South Africa, in an effort to meet the targets set by NPC, DST and MTSF, not enough attention is being given to the role of supervision. Mouton, Louw and Strydom (2013) argue that it is very nice to set these targets from the top, their view is that it is going to be nearly impossible to more than triple PhD output in the next 15 years, a targets set by the NPC. Cloete, Mouton and Sheppard (2015) cautions that these targets can only be achieved under stringent conditions, including an unlikely local injection of supervisory capacity. The limited percentage of academics with PhDs, the impending retirement swell of the professoriate within a decade and the current doctoral pipeline challenges makes the supervisory injection unlikely (Mouton, Louw and Strydom 2013). Many researchers in the field of doctoral education have raised three main concerns i) capacity of supervision in terms of numbers ii) capacity in terms of skills of supervisors and iii) the relationship between the supervisor and the student.

Supervisory capacity – the study by ASSAf (2010) credited as the source of scientific knowledge on doctoral education in the country has questioned the motivation to escalate the number of well-trained PhDs in South Africa. It argues that such goals cannot be achieved by relying on the limited capacity of universities nor will such goals be achieved by simply increasing enrolment. PhD enrolment is dependent on the availability of supervision, and in the future any attempt to increase enrolment without paying attention to the critical shortage of supervisory capacity is futile. This critical shortage of supervisory capacity was raise at the Carnegie Corporation of New York and NRF conference as alluded to earlier. ASSAf (2010) further reiterates that the shortage of suitably qualified academic staff and the continuing ageing of the same cohort poses a serious constraint on any substantive growth in doctoral enrolments in the near future. Badat (2016) estimated a 27% retirement swell of academics with PhDs, more than 50% of whom are the highly skilled professors leaving the HE system with a deficit in terms of both research output and doctoral supervision. Altbach, Reisberg and Rumbley (2009:89) raised a concern that “more than half the professoriate in much of the world is getting

close to retirement, too few new PhDs are being produced and there are too few incentives to induce new doctorate holders to enter the profession”. In the South African context, CHE (2016) claims that there are insufficient numbers in the existing academic and postgraduate pipelines to replace the retiring cohorts. ASSAf (2010) cite supervision as the single largest threat to any major initiative to increase doctoral output in the next decade.

Mouton, Louw and Strydom (2013) also raised several concerns about supervisory capacity in South Africa. These authors put the number of academics at South African universities with PhDs who can supervise at 5 500 arguing that the assumption is that they will produce 5 000 PhDs a year. Compounding the supervisory capacity challenges is the concern raised by Herman (2011d) that firstly, some supervisors are ageing professors close to retirement. Secondly, the recommendation by Badsha and Cloete (2011) to extend the retirement age for certain academics or the re-hiring of retirees with a track record of successful supervision was not endorsed by the NPC in the NDP. Thirdly, research reveals that universities and universities of technology absorb senior academics from traditional universities into management and academic positions (Herman 2011c). Fourthly, an exploratory study of science councils and industries in South Africa on the other hand, reveals that there are many employees with PhDs and research experience whose capacity is not being maximised (ASSAf 2010; Herman 2011d). The sum of these scenarios has a corrosive effect on the capacity of supervision in the HE system.

The argument is that harnessing these untapped supervisory capacities creatively could support the expansion target. The supervisory capacity in South African HE is limited and skewed hence the over reliance on the top 10 traditional universities for supervision, production of academic staff with PhDs and production of PhD graduates who could serve as a potential source for the next generation of academics. Several articles (ASSAf 2010; HESA 2011; DHET 2014) have clearly shown that doctoral supervisory capacity has always been highest in the University sector, 41% in 2007, and lowest among Universities

of Technology, 12% in 2007, although this is a significant improvement compared to the 6% in 2000.

Several studies (Mouton 2007; ASSAf 2010; Herman 2012) have revealed that the consequences of limited capacity in the HE system are dire. The CREST report which assessed supervisory capacity as a ratio between the number of permanent academic staff with PhDs and the number of doctoral students revealed that the norm at universities was two doctoral students to one supervisor (Herman 2011c) and the ratio was even less at UoTs. Herman (2011c) further argues that the greater burden of supervision relies on a few reputable and experienced supervisors with a good completion record who may have 5-10 doctoral students, while others may have 1-2 students or even none. A study conducted by Cloete, Mouton and Sheppard (2015) involving UCT Law, NWU Social Work, UFS Theology, NWU Education, UJ Education, Wits Political Studies and UP revealed a correlation with Herman (2012) regarding PhD supervision load. It found that the number of PhDs supervised ranged from 2 to 12 per supervisor in the sample interviewed. ASSAf (2010) and Herman (2012) argued that these ratios do not capture the full supervisory load. Herman (2011c) further contends that in addition to the doctoral student load, supervisors also carry a supervisory load of master's students with a ratio of 5.2 students per supervisor. Furthermore, since higher education in South Africa has become teaching intensive, the burden of undergraduate teaching is high, particularly in the UoTs by virtue of their establishment as illustrated earlier (Herman 2011d).

Supervisory skills - The burden of supervision is dependent on a few reputable supervisors as alluded to above because of the supervisory skills of some academic staff with PhDs. Cloete, Mouton and Sheppard (2015) emphasise that experience and training in supervisory skills plays an important role in the effectiveness of supervision. Mouton, Louw and Strydom (2013) raised a concern that there is a lack of supervision training in HEIs in South Africa. Cloete, Mouton and Sheppard (2015:112) found that in all South African universities, supervisors of doctoral candidates are required to have a doctoral degree. Ideally, these authors would prefer a situation where the supervisor has not only a

doctoral degree but is also an established scholar and a supervisor with some experience. The author however concurs with Mouton, Louw and Strydom (2013) arguing that, given the huge growth in numbers of doctoral enrolments and the increasing burden of supervision on the few, it is now commonplace for academic staff to find themselves in the situation where they have to supervise their first doctoral candidate very soon after completing their own doctoral degree.

Similarly, Herman (2011d) raises a disturbing trend in some universities of assigning doctoral students to unsuitably qualified supervisors. Herman insist that there is a perception that not enough is being done to ensure that inexperienced supervisors, such as recent PhD graduates, or unsuitable supervisors, such as those without PhDs, are not supervising doctoral students. Herman (2011d) and Fourie and Campus (2015) argue that in many developing countries like South Africa, supervisors find that most postgraduate students are less prepared for higher degree studies. This results in increasing and unprecedented pressure, particularly on young and inexperienced supervisors who may have only recently obtained their doctoral degrees themselves. The programme of co-supervision is important in the building of supervisory skills. Many studies have found that a sizeable percentage, which Mouton (2016) puts at 45%, of all participants indicated that they sometimes have to supervise students outside their main area of expertise which is an additional cause for concern. Fourie and Campus (2015:05) found that “good supervision is the key to successful postgraduate research training; yet they found that this teaching-learning process is poorly understood by its stakeholders”.

Supervisor student relationship - according to MacGregor (2013), the two seminars in Ethiopia in 2012, the International Association of Universities (IAU) and the Association of Catalan Public Universities (ACUP) summarised the challenges of developing doctoral education in Africa. Among others, the issue of poor supervision came out strongly. Several studies have identified organisational factors such as poor working relationships between the supervisor and the student, personality conflicts, supervisors who are too busy, supervisors who are uninterested in student topics or problems, and lack of

flexibility in the doctoral programme as barriers to completion as stated earlier (Herman 2011d). He raises several concerns about the relationship between students and supervisors, arguing that some students drop out because of an irreversible breakdown of the relationship with a supervisor. The author however apportions the blame on both the supervisor and the student.

Cloete (2015) suggests that many doctoral students work while they study which impacts on their levels of preparedness for doctoral studies. Similarly, Herman (2011d) found that some students drop out because the project is poorly designed or proves to be unworkable and basically they give up. According to this study, students mainly cited lack of guidance in the selection of the topic. Herman (2011d) blames the apprenticeship supervisory model, which is based on an individualised and personal relationship between the supervisor and the PhD student as the contributing factor to the challenges faced by doctoral students in this country. Herman, found that some students attributed their obstacles to completion to the inflexibility of this model. ASSAf (2010) Finding 12 concurs that it is evident that the traditional apprenticeship model may not be an efficient approach for the purpose of rapidly increasing the production of doctoral graduates in South Africa.

Several studies have shown that even those PhD candidates that persist have complained about supervisors who seemed to be overloaded with teaching or with the number of students they are supervising. Quite a number of studies have attributed the delayed progress of students to the frequency of meetings or intervals in feedback received from the supervisor. Cornér, Löfström and Pyhältö (2017) claims that evidence has shown that a functional supervisory relationship, constructive feedback, and social support contribute to the timely completion of studies. The author further maintains that frequent supervision leads to satisfaction with the programme thus reducing the attrition risks regarded as very high in the South African HE system by Letseka and Maile (2008). On the other hand, Cornér, Löfström and Pyhältö (2017) emphasised the importance of good quality

supervision and its contribution to reduced risk of burnout and attrition during the doctoral journey.

Due to high supervisory load, Mouton, Louw and Strydom (2013) revealed that the bulk of current doctoral supervision happens at a distance, with the average student only getting two hours of supervision a month. Similarly, ASSAf (2010) illustrated the range of supervision commitment, with 73% of students receiving less than two hours of supervision per month while only 2% receive more than 15 hours.

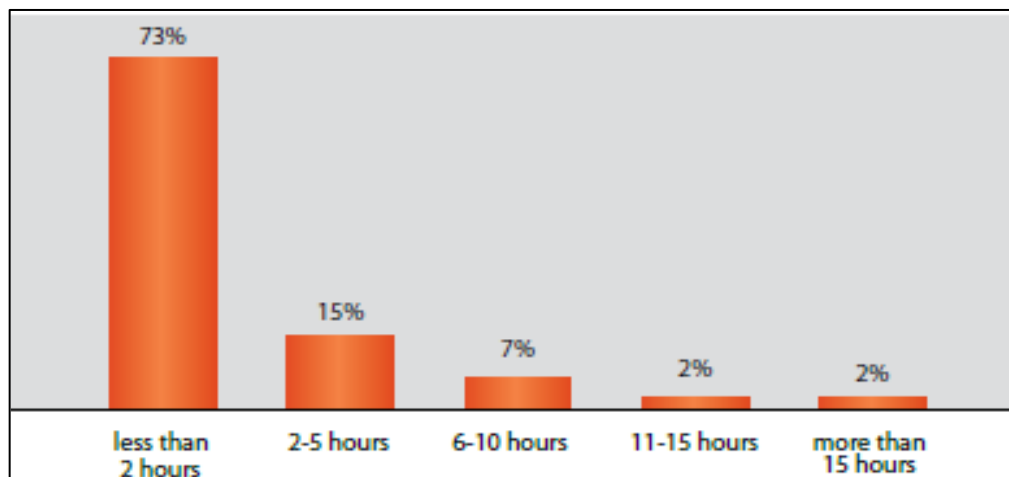


Figure 3.1 Hours of supervision received per month by doctoral students

Source: ASSAf (2010:64)

In addition, it was perceived that the unavailability of the supervisors exacerbated the students' feelings of loneliness. These feelings of loneliness are further exacerbated by the lack of close proximity to supervisors for academic staff from UoTs, the majority of whom are supervised by academics from traditional universities where there is sufficient capacity. In this regard, the poor working relationship between students and supervisors poses a serious threat on any substantive growth in doctoral output in South Africa.

3.2.4 Age profile of academics

A study by Roy (2014:97) claimed that the age of instruction and research staff at the institutions of higher learning in this country is worrying, in 2009, almost 50% of staff were 45 years old or above. Table 3.2 below outlines the age profile of permanent academic staff in HEIs in South Africa.

Table 3.2 Headcount of instruction/research professionals with permanent appointments at South African Universities, according to age (HEMIS audited data, 2012)

	Professor Associate professor	Director Associate director	Senior lecturer	Lecturer	Junior lecturer	Below Junior lecturer	Undesig nated	Total
Under 25 years	0	0	2	43	64	5	7	121
25-34	72	0	656	1 998	432	56	92	3 306
35-44	766	31	1 504	2 598	246	44	99	5 288
45-54	1 542	67	1 419	1 906	107	22	72	5 135
55-59	960	43	592	580	23	10	34	2 242
60-62	427	25	230	151	12	1	19	865
63-65	242	12	112	67	4	1	8	446
66-69	19	0	4	9	1	0	0	33
70 years and over	6	1	2	6	0	0	0	15

Source: SSAUF (2015: 14)

In South African universities, most junior lecturers and lecturers do not have doctoral degrees, with senior lecturers particularly at UoTs falling in the same category. This assumption is extrapolated from Table 12 of ASSAf (2010:60) which illustrates that the distribution of academic staff with PhDs per university classification in 2007 was 41%, 30% and 12% for universities, comprehensive universities and UoTs respectively. As the CEO of USAF, Professor Bawa and others indicate, there is limited research and statistics on doctoral education in South Africa, hence no statistics were found on the number or percentage of academic staff according to age, who do not have doctoral degrees.

However, several scholars have argued that PhD candidates on average are 40 years old at graduation in this country. Table 3.2 therefore clearly illustrates a large number of academic staff above the age category 35-44 years who might not hold doctoral degrees.

To best explain the consequences of age on academic staff with PhDs, statistics was extrapolated from the audited HEMIS data of 2012, ASSAf Table 12, and SSAUF Table 7. The audited HEMIS data of 2012, according to SSAUF, put the percentage of academics with PhDs at 35.5%. Of these, according to Badat (2010), HESA (2011) and Mouton, Louw and Strydom (2013), 20% will retire within a decade, leaving a vacuum in the HE system. This is clearly illustrated by the large number of academics in the age category 45 – 54 from Table 3.2.

Currently, universities have different policies in place regarding retirement age. Age 60 is the retirement age at some universities, whilst others have put retirement ceiling at 65 (HESA 2011). Some scholars stated that after 1994, the retirement age was shifted downward from 65 to 60 to create space for a more representative demographic profile (Habib and Morrow 2006; Dube and Ngulube 2013; National Planning Commission 2013). Clearly, this was a political decision that has had dire consequences taking into consideration the age profile of professors, directors and senior lecturers in Table 3.2. However, this strategy has been lamented by Dube and Ngulube (2013) who argued that it is disheartening to note that on the basis of the current retirement age, most senior academics are due to retire in the next five to ten years. Similarly, Tettey (2006; 2009; 2010) has lamented the impact of retirement age on academic staff qualifications in African universities. Citing the university of Ghana, Tettey (2006:45) stated that it increased “the retirement age from 60 to 70 for associate professors and above 60-65 for senior lecturers subject to good health” to mitigate against the retirement groundswell of highly skilled academics. In this regard, Tettey (2006:03) recommended that the retirement age for academics should at least be reconsidered as a short-term measure to ensure that the institutions are staffed by qualified personnel until long term solutions are found. In the South African context, Bazana, McLaren and Kabungaidze (2018) argued

that the highly skilled older generation academics are seen to be of no real value in the transformation of higher education because of their race, age and cultural identity. These authors further lamented the fact that the skills of these academics are not utilised in the mentorship of nGAP cohorts in some universities.

The long-term solution according to the stakeholders in the HESA (2011) report and DHET (2015) is the nGAP project amongst others. SSAUF builds on the solutions provided by HESA by designing additional programmes particularly, EACEP. Current academics who do not hold a PhD and more than 75% of potential academics who will join academia outside of nGAP to meet the demand will require support as identified by EACEP.

Until then, the retirement mandate of 60 – 65, the high retirement of highly skilled academics, the low throughput rate of 11%, the low impact of the nGAP programme and EACEP existing on paper only, the challenges of the low percentage of academic staff with PhDs in South Africa and the rest of the African continent, according to Tettey (2010), will persist.

Having stated earlier the nGAP programme was rolled out in 2016 and annually thereafter and is seen as a panacea for the shortage of academic staff with PhDs; it would be interesting to measure how many of these Generation Y candidates will be retained by the HE system after their contracts end. More interesting, however is the determination of what percentage will remain in the “less prestigious” universities classified as lower ranked universities by Muller (2012). The next section explored the challenges of retaining academic staff with PhDs in the HE sector identified by HESA (2011).

3.3 Challenges of retaining academic staff with PhDs

There is a unanimous feeling that talent is a critical resource that organisations should prioritise (Selesho and Naile 2014). Literature has revealed that there is a high turnover of this critical resource in the HE system. Several studies have attempted to elucidate the reasons for these high turnover rates, which includes amongst others, uncompetitive

remuneration packages and incentives, unfair promotion policies because of rigid organisational structures, institutional cultural issues and the mobility of academic staff particularly those with doctoral degrees (HESA 2011; Robyn 2012; Dube and Ngulube 2013; Theron, Barkhuizen and Du Plessis 2014; Cloete and Maassen 2015). Thus, to mitigate against this loss, Netswera and Rankhumise (2005) suggested that companies must adopt targeted retention strategies. In the HE system, retention efforts, time and investment must be focused on staff with core competencies in core business units. The departments and faculties should regard their academic staff with PhDs as critical resources that should be prioritised in the HE system. The following variables that facilitate or inhibit the retention of academic staff with PhDs were discussed under separate headings. To reiterate, these are confined to those variables that were identified by the HESA (2011) report.

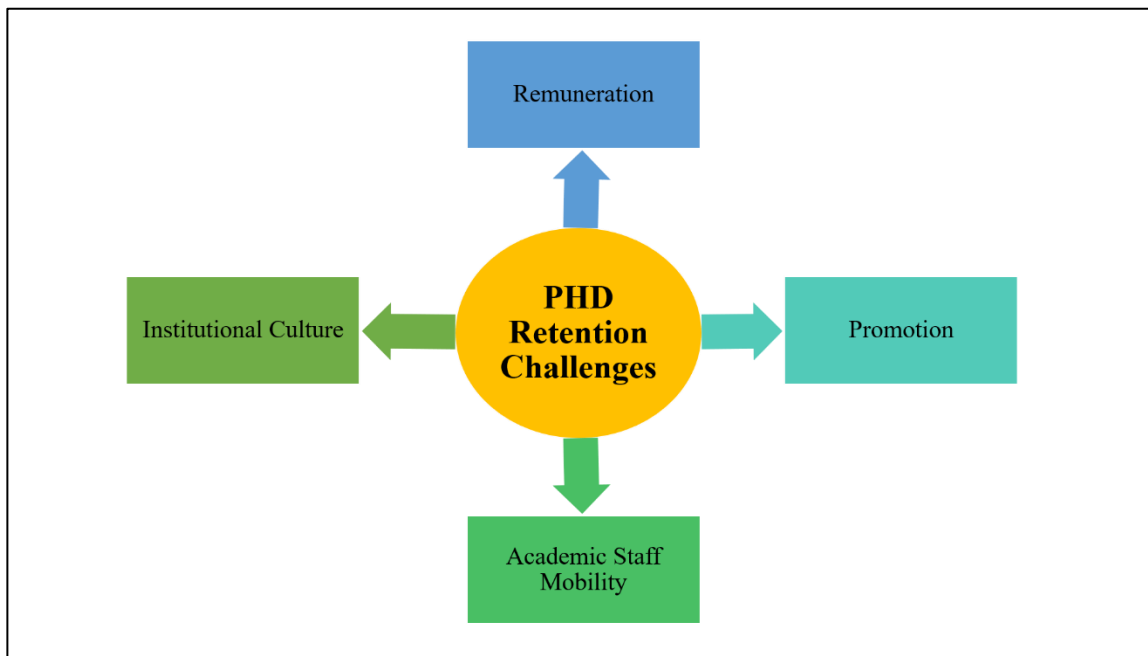


Figure 3.2 Factors that facilitate or inhibit the retention of academics with PhDs

Selesho and Naile (2014) argue that the shortage of academic staff with PhDs and the failure of universities to retain quality academic talent have negatively impeded the production of doctoral graduates necessary for the knowledge economy. Similar studies

(Kipkebut 2010; HESA 2011; Theron, Barkhuizen and Du Plessis 2014) maintain that HEIs are currently facing significant challenges in the retention of key and talented academic staff. Challenges of academic staff retention phenomenon have persisted over time and earlier studies such as Habib and Morrow (2006) have already raised these concerns.

It has been argued that unfavourable working conditions such as unattractive remuneration in the higher education sector may lead to the migration of academics with doctoral degrees to the private and public sector or even between countries. The phenomenon of low academic remuneration, however, is not peculiar to the South African HE system. A study by Cornuel and Verhaegen (2005) showed similar trends of poor academic staff retention rates in Netherlands. The study maintained that academic staff are lost from their institutions or country regularly for various reasons which includes remuneration.

Similarly, Netswera and Rankhumise (2005) observed that job hopping and skills migration have consequently become a global phenomenon and one that impacts negatively on South Africa's post-apartheid job market, particularly the higher education sector. The study further argues that it is now "common knowledge that the skills flight from the Southern African Development Community (SADC) is mainly to Europe, the United States of America (USA) and Australia" (Netswera and Rankhumise 2005:36). In this regard, HESA (2011) found that South Africa lost 41 496 skilled workers to emigration, a proportion of whom were from the higher education sector. Furthermore, academics constitute a highly sought after and mobile sector of society. According to COHORT (2004) the shortage of academic staff with PhDs in HEIs is compounded by the fact that the qualification and expertise of these academics make them relatively mobile and a greater proportion will inevitably be lost to the public and private sector and to a certain extent, emigration as illustrated by the HESA report.

The results of the study conducted by Theron, Barkhuizen and Du Plessis (2014) clearly confirms a high turnover in academia revealing that approximately 74.5% of the academics in the survey were looking for opportunities to advance their careers, within

and outside of academia, or even through emigration. HESA (2011) and Theron, Barkhuizen and Du Plessis (2014) are of the view that, globally, the demand for academic staff in higher education institutions is increasing and is expected to continue to increase. Concurrently, retention problems and intentions to leave are exacerbating the problem, and a so-called academic 'retirement swell' is also evident, leaving HEIs with no option but to seriously investigate retention of academic staff (HESA 2011). Theron, Barkhuizen and Du Plessis (2014) argue that when top-performing employees exit, they leave a void that is often costly to fill and challenging to manage. In addition, it takes time, investment and effort to replace highly skilled professionals in the HE system. A study by Somaya, Williamson and Lorinkova (2008) estimated replacement costs at 100% to 150% of the annual salary of such an employee. Retaining skilled workers is thus regarded as a critical strategic human resources issue.

Several studies have raised concerns that despite the acknowledgement of these talent management challenges, there still remains limited empirical research in developing countries to explain this phenomenon (Ng'ethe 2014; Theron, Barkhuizen and Du Plessis 2014). Furthermore, they assert that there is no diagnostic tool that can be used to measure the turnover of academic staff. Selesho and Naile (2014) further argue that due to limited empirical research on employee retention, turnover continues to inform the current understanding of employee retention. The fact that there are no definitive answers available academically implies that turnover and retention research continue to be important research topics to pursue (Ng'ethe, Namusonge and Iravo 2012).

Two studies that seem to underscore the phenomenon of academic staff retention were conducted by Theron, Barkhuizen and Du Plessis (2014) and Selesho and Naile (2014). The two studies paint a gloomy picture of the higher education system with respect to academic staff retention. The survey conducted by Theron, Barkhuizen and Du Plessis (2014) from 13 HEIs involved a purposive convenience sample of 330 academics, and analysed factors that might encourage academics to leave HEIs. The study found that only 25.5% of the participants had not applied for a position. The 74.5% of those that applied,

31.4% applied for a job at another academic institution, followed by 28.1% who applied for a promotion in the same institution and 24.2% who looked for a job in sectors other than academia. An inference could be drawn that several of the 31.4% who applied for a job in another institution could be from the UoTs and HBUs to the HWUs taking into consideration the history of higher education in this country.

The statistics support the contention that HEIs are facing significant challenges in retaining key and talented academic staff (Kipkebut 2010; HESA 2011; Theron, Barkhuizen and Du Plessis 2014). On the reasons for the loss, the results of the survey illustrate that academics in the sample were most likely to leave the institution for the following reasons: dissatisfaction with financial compensation (54.2%), offer of a promotion (46.4%), unhappy about career development opportunities (41.2%), retirement (41.2%) and offer of higher pay in another company (38.6%). An interesting observation from this study illustrates that compensation emerged as a potential turnover factor and less so as a potential retention factor for the current sample (Theron, Barkhuizen and Du Plessis 2014).

The study by Selesho and Naile (2014) on the other hand examined factors that influence the poor retention rate of academic staff at selected universities in South Africa. The survey involved 80 academic staff lecturing at selected institutions. The sample was chosen in such a way that more than 35% of the selected academic staff have worked at higher education institutions for more than 10 years. This study sought to determine why academic staff were leaving the profession or changing universities. It found that job satisfaction was the main factor keeping academic staff in their profession, linking it to career growth and academic development. In this respect there is a correlation with Theron, Barkhuizen and Du Plessis (2014) which found that compensation was a turnover factor rather than a retention factor in academia. Compensation is therefore a hygiene factor rather than a motivator according to the Herzberg two factor theory as alluded to by (Ng'ethe 2014).

Important to note, is that a conducive work environment that offers career growth and academic development was not identified by Badat (2010) and all the stakeholders in doctoral education in the country in the HESA (2011) report. Therefore, no centralised and coordinated strategy and funding is set aside for career growth and academic development particularly for the existing academic cohort. Recently, initiatives such as the EACEP have been mooted by policy makers, but no strategy or funding has been set aside in this regard or at the very least communicated to academics. DHET (2015) acknowledges that there is a need to support existing academics to complete formal qualifications such as master's and PhDs. It goes further to outline the costs associated with such a strategy, chief amongst them teaching replacement costs which have been a bane of every academic pursuing a PhD particularly in the UoT sector.

The findings of both studies have a correlation with the HESA proposals which form the basis of this study. Numerous factors inhibit the retention of academic staff / knowledge workers in HEIs; however, this study was confined to those that were identified by the stakeholders in doctoral education in South Africa. The factors identified by the stakeholders in doctoral education are, remuneration, promotion, institutional culture as well as academic mobility.

3.3.1 Remuneration

Several studies reveal that the objective of a reward system must be to attract and retain key talent at all levels of the organisation (Selesho and Naile 2014; Theron, Barkhuizen and Du Plessis 2014). Bearing in mind that remuneration is not a retention factor, dissatisfaction thereof however is a turnover factor. To facilitate high retention rates, management should reconsider remuneration packages for key knowledge workers. HESA (2011) acknowledge that compensation is a key reason why academics are leaving HEIs, and that compensation structures should be customised to retain academics. Netswera and Rankhumise (2005) recommended that HE leadership should focus on acquiring a holistic understanding of compensation systems and develop sustainable academic talent management systems.

Theron, Barkhuizen and Du Plessis (2014) and (HESA 2011) claim that the salary differentials between the private sector and HEIs are sizable and growing. Badat (2010:26) concurs with the assertion that “South African academics are inadequately remunerated relative to occupations in the public sector (state, public enterprises and science councils) and private sector that require similar levels of qualifications and expertise”. In this regard, Dube and Ngulube (2013) insist that these remuneration differences discourage postgraduate students from joining academia to replace at an equivalent pace, the void left by the retirement swell alluded to by Mouton (2011).

Due to the widening gap in remuneration, the public and private sectors exert a powerful pull on current academics and on masters and doctoral graduates (Theron, Barkhuizen and Du Plessis 2014). In this regard, Dube and Ngulube (2013) argue that a number of honours or masters graduates who can be attracted to academia by narrowing remuneration differentials are not considering academia as a viable career option. On the other hand, these authors found that academics are continuously drawn to administrative portfolios and management positions within universities; some focus on commissioned research, some divert to consultancy work and some move to the public and private sectors. Selesho and Naile (2014) claim that stagnant academic salaries, coupled with more frequent vacancies of senior positions in public and private sectors, have enticed many academic staff to abandon the academic profession. Habib and Morrow (2006) contend that it is common to hear of masters graduates with no substantial working experience being employed as deputy directors in the public service, and receiving remuneration packages equivalent to those of professors with twenty years of experience. Roy (2014) concurs, claiming that academics can expect to earn more in the private sector and at research councils and foundations than across public higher education. Although it had been established that remuneration is not a retention factor, attractive salaries offered elsewhere will lead to dissatisfaction with the pay among academics and facilitate high turnover rates. Thus, retention of academics will be impacted negatively in the long run.

In addition, Selesho and Naile (2014) argue that there are discrepancies in remuneration even within HEIs. They claim that academic salaries are not consistent across the HE sector. Roy (2014) found that the limited national data that exists on academic remuneration shows that there is considerable variation between pay levels in academia. This study found that evaluation systems to determine remuneration are not universal and there is no collective bargaining for academic salaries. Therefore, salaries and benefits vary on an institution-to-institution basis. Roy (2014) further states that although factors such as cost of living vary across provinces in South Africa, higher salaries of academic staff are typically associated with prestige and rank of the institution.

Factors such as research output play a role in the ranking and prestige of a university in South Africa. The examples from two universities quoted by Roy (2014) clearly illustrate this phenomenon. Roy (2014:40), quoting an unknown author revealed that at the University of Cape Town, a prestigious institution, academic salaries range from R403 124 for lecturers to R701 440 for professors. The University of KwaZulu-Natal, yet another prestigious university in a different province, offers salaries ranging from R286 934 to R569 416 for lecturers and professors respectively. A comparison of remuneration between these institutions and their less prestigious counterparts in rural areas could provide useful insights into the high mobility of academics within the HE system amongst other reasons. HBUs are predominantly located in small towns and rural areas while UoTs are less prestigious with some located in rural areas with both HBUs and UoTs having less research output. It therefore comes as no surprise why the percentage of academic staff with PhDs is higher at HWUs compared to their HBU and UoT counterparts (see Table 2.2).

This phenomenon goes back to Mouton's question of what needs to be done to increase the percentage of academic staff with PhDs, but in this case in UoTs, which is the focus of this study. Roy's view is supported by the HESA (2011) report which found that institutions in small towns or rural institutions experience challenges to attract and retain academics, and there is evidence of migration from these institutions, which pay relatively

lower salaries to higher-paying urban institutions. HWUs which are relatively prestigious and urban with higher research output and higher masters and doctoral students are thus able to recruit academic staff with PhDs from their rural HBUs and UoTs with less prestige and lower salaries. Muller (2012) highlighted this anomaly, claiming that top-tier universities paper over their inability to produce and retain doctoral candidates in themselves by recruiting from their lower ranked counterparts and elsewhere in Africa.

Several studies consider academia as a meagre paying profession with little opportunities for growth (Habib and Morrow 2006; Dube and Ngulube 2013; Selesho and Naile 2014). Selesho and Naile (2014) further argue that even though salary is a concern, academic staff consider the academic profession as having a superior reputation in society. However, recently there is some feeling that academics are underpaid and over-burdened professionals and that the things which once made the profession attractive, no longer exist (Selesho and Naile 2014:01). As a result, Habib and Morrow (2006) argue that the effect of such situations is that academia has become an unattractive career option. They criticise University management for ensuring that their salaries are market-related, without paying concomitant attention to the salaries of established scientists which might not be comparable to the public or private sector.

The phenomenon of low academic salaries is however not confined to the South African HE system. Kipkebut (2010) found that 51% of academics in Kenyan public universities did not believe that they were compensated fairly, relative to private comparable institutions. As a result, 50% of the participants felt the need to work outside their institutions to earn extra income. Cloete (2015) concurs with Kipkebut, noting that in the HERANA study it was found that academics were taking on heavier teaching loads to supplement their incomes. On the other hand, the proliferation of private higher education institutions, some literally within walking distance of public institutions in Kenya, meant that large numbers of senior academics were triple-teaching to supplement their incomes (Hayward and Ncayiyana 2015).

A survey by Altbach et al. (2012) compared the salaries of the professoriate in 28 countries, and data suggested that the academic profession did not pay salaries that provided a locally standard middle-class life, as measured by purchasing power parity. Habib and Morrow (2006) listed South Africa as third, after Canada and Italy, for the highest average academic salaries in purchasing power parity. When the real purchasing power of academic salaries was compared to the six Commonwealth countries, South African academic salaries came out slightly ahead of those in Malaysia, and behind those of the United Kingdom, Canada, Australia and New Zealand Kubler and Roberts (2005) in Habib and Morrow (2006). Although South African higher education salaries are comparable to other parts of the world, they still lag behind those of the public and private sector in the country as alluded to earlier. Academics in South Africa have comfortable lifestyles and remuneration packages that place most of them in the middle class. However Roy (2014) insists that compared to professionals in other sectors in this country, academics do not hold an impressive advantage.

Habib and Morrow (2006) illustrated the importance of remuneration with the two more notable cases in recent years of the Human Sciences Research Council (HSRC) and the University of KwaZulu-Natal. The authors stated that when a new HSRC management attracted social scientists of quality by offering higher salaries than those of the universities, their research output increased significantly. The university responded by implementing a different reward system that tied academics to their research output. As a result, the university was able to retain its talented academics. This system can be extended to the supervision of doctoral candidates, where academics find consultancy and triple teaching (Hayward and Ncayiyana 2014) more financially rewarding than supervision. Habib and Morrow (2006) compared the South African system with the American academy where senior professors can negotiate their salaries on an individual basis, which leads to a system that is more unequal but more productive. Such a system is not without its own challenges in the South African context because of the legacy of the apartheid system as discussed earlier. Thus, in the South African context, Altbach et al. (2012)

emphasised that equitable remuneration and compensation are important in ensuring academic retention which leads to academic success and productivity.

3.3.2 Promotion

Several scholars have bemoaned the nature of promotion processes, procedures, criteria and policies at institutional level. Some of the drawbacks cited amongst others are that the promotion is a long and tedious process, very cumbersome, stressful, unfair, inconsistent, feedback to candidates takes too long and policies and the criteria upon which these are based are not clear (Netswera and Rankhumise 2005; Tettey 2006; Dube and Ngulube 2013; Ng'ethe 2014; Roy 2014; Selesho and Naile 2014; Price, Coffey and Nethery 2015).

The issues of lack of career advancement opportunities and unclear promotion practices in academia are however a global phenomenon. Promotion anomalies have a long history; early studies in 2005 and 2006 were already focusing on its impact on academic staff retention. In the South African context, a study conducted by Netswera and Rankhumise (2005) found that opportunities for promotion, training and development were among the most important reasons why employees stayed, especially young and enthusiastic ones. However, they argue that these academics left upon completion of their developmental objectives if there were no career advancement prospects for them. The nGAP cohort falls into the category of young academics who are in UoTs for personal development. Further research should be conducted on how many of these will remain in the UoT sector where promotion is heavily weighted on research but where they are burdened with heavy teaching loads.

In a study commissioned by the World Bank, Tettey (2006), found that the promotional procedures in African Universities are long, stressful and cumbersome while the requirements are unreasonable. The study indicates that academics are frustrated by the inconsistencies and rigidity in the application of the promotion criteria. Similarly, participants in the Houston, Meyer and Paewai (2006) study complained about the academic promotion criteria. These participants argued that academic promotion criteria

is heavily weighted on research, it does not equally recognise the diversity of academic work, which includes teaching. It is universally acknowledged that an academic portfolio is comprised of three tenets, research, teaching and community engagement. This anomaly could explain the reasons for the high prevalence of academics with PhDs at traditional universities when compared to the UoT sector if one considers the Austin (1996) arguments alluded to earlier. In the same vein, a study by Kerr-Phillips and le Thomas (2009) argued that a heavy academic workload makes it difficult to meet promotion requirements. These early studies indicate that academic staff promotion problems have persisted over time and yet institutions are still grappling with similar challenges.

Promotion anomalies have persisted over the years, and recent studies on the same phenomenon have reported the same frustrations with promotion practices. A study conducted by Roy (2014) found that academic staff mobility and career progression were the main factors that influenced academics to leave the profession. Theron (2015) concurs with Roy regarding the lack of promotional opportunities citing Bitzer (2008) who found that the inconsistent application of promotion policies in higher education institutions can lead to the deterioration of the professoriate. Similarly, Selesho and Naile (2014) found that despite academic promotion being a very long and tedious process, the promotion criterion was seen as another element that discourages academics to consider applying for promotion. It can be inferred that those academics that might want to change universities would be from a UoT to traditional universities that are research led with a better research culture, infrastructure and reduced teaching loads.

In the Nigerian higher education context, a study by Ng'ethe (2014) found that the second most influential factor on voluntary turnover was the opportunity for promotion. In the same study, although lack of promotions itself was seen as a problem by academics, of main concern was the criteria on which it was based (Selesho and Naile 2014). In the South African context, of main concern for promotion criteria is that it is heavily weighted on research output regardless of the type of university. In South Africa, the different types of universities as stated earlier are traditional universities which are research led

institutions, comprehensive universities, a hybrid model and the UoTs which are teaching led. In this regard, Austin (1996) argues that academics who are employed at research universities are typically encouraged to spend comparatively more time on research activities than academics at other types of institutions in South Africa. Comparatively, Austin (1994) argues that in UoTs and to a certain extent, comprehensive universities, academics are challenged to balance research with minimal or no research support all the while burdened with heavy teaching duties. Issues of heavy teaching loads which deter academics from taking up positions in lower ranked universities have been elaborated on before (Muller 2012).

The unfair promotion criterion that does not take into consideration the nature of academic workload is a global phenomenon as stated earlier. The experiences of academics employed in UoTs in South Africa are similar to that of early career academics (ECA) in Australian universities. Price, Coffey and Nethery (2015) argue that ECAs are employed on a teaching contract however, they feel the pressure to publish in order to gain permanent appointment for the position. They argue that while the ECAs are employed primarily to teach; grants, appointments and promotions are determined primarily on publication record. Similarly, in the UoT sector, there is a mismatch between the nature of the job and the criteria upon which promotion is based for the same job. The work environment is not conducive to research in the UoTs for reasons already elucidated on, primarily heavy teaching loads, poor research infrastructure and PQMs that do not provide opportunities for supervision.

Furthermore, an IRS Report, (2000) cited by Netswera and Rankhumise (2005:39) found that amongst 13 British universities over a quarter of academics were at the top of their academic scale, which meant no promotion or progression beyond annual “cost of living” would occur. The report argued that employees who reach the ceiling in terms of their salary scale and feel that no amount of further training will enhance their career advancement opportunities will leave the institution. In the South African context, due to lack of career advancement opportunities in academia and the cumbersome nature of

promotion criteria, finding academics who have held the same position for more than 20 years is not uncommon.

3.3.3 Institutional culture

Organisational culture is often overlooked as a key factor in staff retention and yet it plays a key role in the determination of whether one decides to stay or leave a particular organisation. Cloete and Maassen (2015) argue that in order to understand universities, it is important to not only focus on the organisational structure, but to also include the organisational culture which they define as the non-rational or symbolic side of universities, as an important factor. Kerr-Phillips and le Thomas (2009) argue that organisational culture is an important factor in attracting and retaining top achievers as well as in their attrition in an organisation. Similarly, Goic (2013) contends that organisational culture and people dynamics play a major role in the retention of staff in any organisation. Goic further suggests a link between culture and various elements of the organisation including motivation and behaviour of employees. Tools such as climate surveys and exit interviews amongst others can be used to gauge whether the organisational culture is enabling career progression and retention of staff in the organisation.

In the South African HE context, organisational culture is viewed differently by different groups. A study by Kerr-Phillips and le Thomas (2009:88) found that “a major driver of top talent turnover was noted to be a bureaucratic structure, a workplace culture that tolerates poor performers, the existence of an old boys’ club, an exclusionary workplace culture and the impact of affirmative action on career prospects (the latter being raised as a problem primarily by white male interviewees)”. In the same vein, Badat (2010) found that institutional cultures, especially at historically white institutions, could, in differing ways and to varying degrees compromise equity of representation. The HESA (2011:08) report concurs that the struggle of historically white institutions to attract and retain black academics can also, in part, be attributed to alienating institutional cultures. Black academics tend to find themselves marginalised by the ‘whiteness’ of institutional

environments and cultures. More importantly, they find themselves excluded from the centres of power such as administrative and academic power (committees, disciplines, departments and faculties) by white academics and administrators. Several scholars have argued that without the provision of an enabling culture as well as the alignment of institutional systems and policies, institutions will find it difficult to negate the effects of knowledge attrition (Dube and Ngulube 2013; Goic 2013). Badat (2010:31) in this regard, suggests that the task of HWUs is to uproot historical cultural traditions and practices that impede the development of more open, vibrant, democratic and inclusive intellectual and institutional cultures, to respect, affirm and embrace the rich diversity of the people that today constitute and must increasingly constitute historically white universities.

It can be deduced from the preceding discussions that one of the biggest contributing factors to the migration of academic staff with doctoral degrees to the public and private sector therefore could be the institutional culture of the HWUs. The migration of academic staff with PhDs from the less prestigious and rural institutions to the urban and prestigious HWUs will not contribute towards increasing the percentage of academics with PhDs within the HE system if the culture in these institutions fails to facilitate career progression and retention of all academics. It has been argued earlier that due to the evolution of the HE system in the country, the system is still heavily reliant on these HWUs for the production of doctoral output. If HWUs fail to retain recruits from the UoT sector and their less prestigious HBUs, the low doctoral output rates and percentage of academic staff will persist. The question, “What needs to be done”, posed at the NRF and the Carnegie Corporation of New York convention is a critical one that needs attention if South Africa hopes to meaningfully participate in the fourth industrial revolution.

Compounding the challenges of attraction and retention of academic staff in the HEIs is the cultural orientation of the Generation Y cohort. HESA (2011) revealed that in recent research into the recruitment of Generation Ys, it was noted that this generation is interested in flat and flexible organisational structures and they do not seem to commit to one workplace. A study by Bazana, McLaren and Kabungaidze (2018) found that young

academics find the university culture to be quite uninviting compared to their older generation academic counterparts. Important to note, is that the structure of the nGAP offers appointees a 6 year contract and a further 2 years after completion (DHET 2015), thus tying them to one organisation for 8 years. Cloete and Maassen (2015) amongst others talk about rigid organisational structures of universities, hence pointing to a lack of fit for this cohort with the cultures of universities. In such studies it has been found that this cohort sees their careers as having dual or multiple career tracks.

Consideration may need to be given to ways in which academic careers are made attractive to Generation Ys as the potential pool of the Next Generation of academics fall in this category. CHE (2016) suggests that the nature of academic work must be better researched to allow for policy interventions that improve its appeal and make it attractive to new generations of academics. In other words, the culture of the HE system does not seem to be appealing to this cohort. It has already been argued earlier that this cohort is shying away from a career in academia. Even more so, the retention of those that join academia on the nGAP programme because it is viewed as an attractive opportunity to pursue a PhD almost on full-time basis whilst employed full time needs urgent attention if the return on this investment is to be realised.

3.3.4 Academic staff mobility

Over the last few years there has been a ‘global hunt for talent’, academics have become extremely mobile (COHORT 2004; ASSAf 2010; HESA 2011). Exacerbating this phenomenon is the increasing intense recruitment and global demands that make retaining scarce skills in particular more difficult (Kerr-Phillips and le Thomas 2009). Du Preez, (2002) cited in Kerr-Phillips and Thomas argue that in South Africa, the brain drain has led to the loss of top intellectual talent that could severely impact the country’s global competitiveness.

Consequently, lower-ranked universities are expected to compete for talent in this competitive environment. Early studies, (Netswera and Rankhumise 2005) already raised

concerns of job hopping and skills migration which had become a global phenomenon and impacted negatively on South Africa's post-apartheid job market, particularly the higher education sector. Similarly, HESA (2011) claimed that South Africa, lost between 1987 and 1997, 41 496 skilled emigrants, a proportion of whom were from the higher education sector. This phenomenon is exacerbated by the fact that universities operate globally and therefore compete for academic staff with PhDs from the same global market for academic talent. This assertion is supported by Geber (2013) who cited a high brain drain due to emigration of Sub Saharan African academics to overseas universities. A study by Cloete, Mouton and Sheppard (2015) revealed that Africa, Netherlands, China, and Russia amongst others, have reported challenges of retaining academic staff with PhDs in the HE system. Countries like Portugal are some of the success stories because they have made a concerted effort to reverse the decades of the brain drain, with Europe using the Blue Card to lure the highly qualified high-skilled non-EU citizens to work and live within the European Union. ASSAf (2010) reported that resource-poor nations with few world-class universities suffered a brain drain in the past. The study quoted countries such as South Korea, Australia, Ireland, Germany, China, and now India as devising strategies to bring back expatriates that have become eminent scholars in areas of national and institutional need.

President Ramaphosa, while speaking at the 4IR summit in Midrand in 2019, acknowledged that academic talent was required for the positioning of South Africa as a globally competitive player in this era. In this regard, the President put together a presidential commission on 4IR to identify and recommend policies, strategies and plans that will position SA as a global competitive player within the digital revolution space. Similarly, Professor Adam Habib, vice-chancellor and principal of Witwatersrand University, speaking at the same summit, concurred, saying the country needs new skills. "We need to anticipate them. We need to train them". However, Professor Habib wonders whether training the required talent would be realised considering the challenges of academic staff qualifications in this country.

Academic staff mobility is not only confined to global competition for talent, but several scholars have also raised concerns of academic mobility within academia (Habib and Morrow 2006; Dube and Ngulube 2013; Roy 2014; Selesho and Naile 2014). These studies have reported high migration rates of academic staff within the sector, with top-tier universities, located in urban areas being the recipients of this trend.

3.4 Systems approach to the production and retention of academics with PhDs

This section explores the challenges of production and retention of academic staff with PhDs through a systems lens.

“Systems thinking has been gaining popularity in recent years but its fundamental principles of promoting holism can be traced back to the origins of ancient spiritual traditions of Hinduism, Taoism, Buddhism, Sufi Islam, ancient Greek philosophy as well as being prevalent through the oral traditions of many indigenous tribal spiritual traditions which have existed for tens of thousands of years” (Reynolds and Holwell 2010:09).

According to these authors, the term “systems” which is widely used in contemporary works in fields such as economics and management to name a few, was explicitly used first in the eighteenth century.

In spite of its long history, there is still no universal definition of the concept. Hunt et al. (2012) postulates that systems can be considered as collections of discrete entities within real or conceptual boundaries that are linked by interrelationships and function as a whole. This view is closely linked to those of several scholars (Ackoff 1971; Reynolds and Holwell 2010) who suggest that if one considers a situation as a whole, rather than focusing on its component parts, then there are properties which can be observed which cannot be found simply from the properties of the component parts. To further illustrate this view Ackoff (1994:180) claims that “a system is a whole that cannot be divided into independent parts, that it is not the sum of its parts but a product of their interaction”.

However, Davidz and Nightingale (2008) allege that although systems thinking definitions are divergent, there should be consensus on primary mechanisms that enables systems thinking development. They further suggest that the divergent definitions of systems thinking should be reconciled into a common framework.

Regardless of how different scholars view systems thinking, they converge in capturing its core principle of holism. All scholars in systems thinking advocate for a move away from a reductionist linear approach of focusing on the component parts in isolation in an attempt to understand the whole. Singh (2015) argues that the reductionist approach, while presenting a simplified approach to problem solving, is becoming less and less suited to dealing with the complexity inherent in social systems.

3.4.1 What is systems thinking?

Sweeney and Sterman (2000) argue for the development of systems thinking to improve our ability to take holistic effective actions. It is precisely for this reason that this study adopts a holistic overview of the reasons why this institution has the lowest percentage of academic staff with PhDs in the country. Adopting this philosophical approach will give insights into the challenges of producing academic staff with PhDs as well as their retention within this context. Reynolds and Holwell (2010) argue that it is the whole that gives meaning to parts and their interactions. Thus, investing in the production of academics to obtain PhDs without necessarily taking a holistic view of interdependence between production and retention will eventually be futile.

Although systems thinking is gaining popularity amongst managers in solving complex business problems, Reynolds and Holwell (2010) argue that they still lack the understanding of its basic principles. They assert that it has become common in business to hear managers use system terms such as holism. Similarly, Ackoff (2006) acknowledges that very few managers have any knowledge or understanding of systems thinking. In his view, very little published literature on the topic is addressed to potential users, implying non-experts. He argues that in most published material and conferences,

experts are talking to each other in the language only they understand. He sums up that by saying “until we communicate to our potential users in a language they can understand, they and we will not understand what we are talking about” (Ackoff 2006:06). Thus, the intention of this study is to initiate a discussion that views the phenomenon of the low percentage of academic staff with PhDs through a systems lens in a language that management in the institution can understand.

Systems thinking as viewed by several scholars (Jackson 2003; Senge 2006) is a discipline that allows managers to see structures underlying complex situations and help them to discern points at which they can leverage change. Singh (2015) argues that systems thinking requires a commitment to uncovering the deeper issues feeding a problem situation. Thus, delving deeper into policies that regulated the evolution of the education system, the challenges of producing and retaining academics with PhDs and the challenges of the nGAP, purported to be the panacea in academic staff development, will identify leverage points where managers can design effective policy changes. In designing effective policies, Churchman (1968) recommends sweeping in as many factors as possible to the area of concern in order to look at things from different viewpoints.

Ulrich (2003) however cautions that it should be noted that while sweeping in different perspectives is important, building boundaries is a key component of systems thinking. Boundaries determine that which should be included and excluded in sense making. Coyle (2000) further suggests that the problem must be well understood and a suitable boundary drawn to turn the client’s imprecise mental models into a rigorous diagram. More importantly, SD practitioners emphasise that the boundary of the model indicating what is included and excluded is a significant determinant of the model’s validity. However, different people have very different boundaries which determine what they include and exclude in their sense making (Ulrich 2003).

According to Singh (2015) there are a number of systems thinking “tools” that can be utilised to gain a holistic understanding of any phenomena or system being investigated which aim to overcome the reductionist and linear-thinking tendencies that have prevailed

thus far. The five most popular system thinking tools that have emerged over 25 years of proven track record of experiential use are System Dynamics (SD), Viable System Methodology (VSM), Soft Systems Methodology (SSM), Critical Systems Heuristics (CSH) & Strategic Options Development and Analysis (SODA) (Reynolds and Holwell 2010:01). These authors maintain that each tool is a radical way of thinking that has been used in various social contexts over the years. Each tool can be used by managers in making effective strategic decisions in the twenty-first century.

The five approaches have their strengths and weaknesses when dealing with complex situations. SD and VSM are considered as having a primary strength and focus on making sense of interrelatedness and interdependencies between entities in a situation whereas, the primary strength of SSM and SODA lies in their ability to help us engage with different perspectives. However, Reynolds and Holwell (2010) argue that all five approaches have their strengths and weaknesses when applying a systems approach in understanding interrelationships, addressing different perspectives and dealing with power relations in the system of interest.

This study has adopted SD because of its strength in dealing with interrelationships and interdependencies when viewing problematic situations of a strategic nature within organisations. SD allows the researcher to simulate the problem and visualise how the variables fit together, interact and change over time. However, Sterman (2000) cautions against modellers who model the entire business or social system rather than a problem. It is precisely for this reason that the current study's, while sweeping in different variables, ultimate goal is to model a problem of the low percentage of academic staff with PhDs.

3.4.2 Why System Dynamics

This PhD study adopts SD because Morecroft (2015) emphasises that systems thinking, aided by system dynamics, can improve our understanding of the world around us, from making everyday decisions to leading key strategic and policy initiatives. In addition, Wolstenholme (1985) argues that SD is a powerful tool for providing insights into the

behaviour and evolution of complex systems. Increasing the percentage of academic staff with PhDs is a key strategic decision in any institution of higher learning that requires a holistic approach in the development of policies. SD has been adopted because of its strengths in the following areas amongst others:

Firstly, key strengths of SD are dealing with the interrelationships and interdependencies between variables. Aided by systems thinking, it takes a holistic view of the concern of interest and seek to understand the whole by delving deeper in understanding component parts within their proper context. The legislative framework which led to the low percentage of academic staff with PhDs, particularly in the UoTs, the present-day challenges of producing PhDs due to lack of supervisors, the challenges of retaining academics in lower ranked institutions with poor prospects for career advancement and ultimately, the nGAP programme which seem to perpetuate the skewed distribution of qualified academics amongst others are all embedded problems in this system of interest.

Secondly, SD offers a graphic presentation of the interrelationships and interdependence of multiple variables embedded in any complex situation. It illustrates the causal relationships and feedback loops using powerful tools such as CLDs and stock and flow maps (SFMs) to illustrate the causal relationships between the variables. These tools are powerful in identifying leverage points for policy change (Sterman 2000:137 & 830).

Thirdly, SD uses two of the most powerful methods of eliciting information in order to define a problem dynamically. In this regard, SD uses the reference mode and time horizon. Sterman (2000:90) defines the reference mode as “a pattern of behavior unfolding over time, which shows how the problem arose and how it might evolve in the future”. It is a powerful tool that helps us break away from the short-term linear approach to solving complex business problems. This study outlines the reference mode stretching as far back to when the first PhD was awarded and systematically progresses to how different institutions were established to the changes in legislation as a result of the political changes of 1994 in the country and beyond.

According to Sterman (2000) the time horizon must extend far enough back in history to show how the problem emerged and describe its symptoms. It must extend far enough into the future to capture the delays and indirect effects of potential policies. A future time horizon in this regard is the NDP Vision 2030. The NDP has set a target of 75% of academic staff with PhDs by 2030 (Badsha and Cloete 2011). Time delays allow policy interventions such as the nGAP and EACEP amongst others as discussed in 2.2.2 to address the low percentage of academic staff with PhDs in the HE system and its skewed distribution between different types of institutions.

Fourthly, SD has been selected for its strengths in helping managers to view both everyday problems and strategic long-term business complex problems more systematically. Luna-Reyes and Andersen (2003) credit SD as a tool that offers greater prospects of dealing with complexity than other approaches. Several scholars (Sweeney and Sterman 2000; Jackson 2003; Luna-Reyes and Andersen 2003) argue that SD is a powerful tool that equips managers with skills to penetrate complexity and get to the root causes of the problematic situation within an organisation. In addition, SD models help managers to pinpoint key decision points to improve the problematic situation. Similarly, Forrester (1995a) asserts that SD encourages managers to question their existing way of thinking by recognising the interdependence of the issues they deal with and to replace superficial explanations of problems with a more systemic understanding.

3.4.3 What is System Dynamics

Several system dynamicists (Senge 1991; Forrester 1995b; Jackson 2003; Reynolds and Holwell 2010; Morecroft 2015) maintain that system dynamics has a long history. It was founded in the late 1950s by Jay W. Forrester of the MIT Sloan School of Management with the establishment of the MIT System Dynamics Group. It was initially referred to as “Industrial dynamics: A major breakthrough for decision makers” (Jackson 2003:74). Over the years however, the concept has evolved, it is today applied in a myriad of social contexts such as economics, public policy and management amongst others. As a result of its transition from the engineering field of building radar and aircraft simulators to its

successful application in dealing with complex long-term strategic business problems “the name industrial dynamics no longer does justice to the breadth of the field” (Forrester 1995a). The concept has thus been renamed system dynamics. Importantly, Forrester always emphasised the value of learning as a crucial element in system dynamics.

Reynolds and Holwell (2010) argue that what makes using system dynamics different from other approaches to studying complex situations is the use of feedback loops and stocks and flows in displaying nonlinearity. Richmond (1997) uses the terms straight-line thinking and closed-loop thinking to illustrate the distinction between linear thinking and the closed-loop of causality in SD modelling. Richmond (1997:04) postulates that the assumption behind straight line thinking is that “causality runs only one way and that each cause is independent of all other causes”. Producing academic staff with PhDs will increase the numbers in the institution. However, in the long run, if no concerted effort is paid to designing effective policies of retaining academics in the UoT sector, the low percentage of academic staff with PhDs will persist. Closed loop thinking teaches us that the ‘effect’ usually feeds back to influence one or more of the ‘causes’ and themselves affect each other”. Thus, Jackson (2003) postulates that the multitude of variables embedded in any complex systems are causally related and feedback to influence each other.

As Senge (1990) aptly puts it, the cure sometimes can be worse than the disease. The analogy he uses is that when one drinks to relieve stress, in the long run one develops all the ills associated with drinking. By this he means that solving easy problems without necessarily understanding the embedded causes and their interrelationships can make the situation worse in the long run. Braun (2002:14) classifies this phenomenon as a Fixes that Fail system archetype. Similarly, Sterman (2001:12) argues that “in complex systems, cause and effect are distant in time and space while we tend to look for causes near the events we seek to explain. Our attention is drawn to the symptoms of difficulty rather than the underlying cause”. In the same vein Jackson (2006:78) suggests that it seems that “problems arise: when we treat symptoms rather than fundamental causes; when we

become addicted to easy solutions; when we forget that it takes time for interventions to show significant outcomes”. In Braun (2002: 2&14) by shifting burden and fixes that fail archetypes, managers get addicted to symptomatic short-term solutions that provide instant gratification. These problems are likely to recur and managers ask themselves why do they keep dealing with the same problem?

The nGAP is a case in point, funding has been thrown into this programme to increase the numbers, however, the skewed distribution between universities for a country that purports to pay attention to areas of redress in the HE system persist. The pertinent question to ask in this regard is, should debates on differentiation in the HE not be intensified and concrete findings come up with instead of it happening by default.

Proponents of SD such as Senge et al. (1999) are of the view that high leverage policies are often not obvious when we treat the symptoms instead of the underlying causes. In this regard, these authors emphasise that with systems thinking skills, managers can generally start seeing and dealing with interdependencies and deeper causes of problems. The following section discussed the SD tools used to model a system of interest. SD models have been lauded by advocates of SD as graphic presentations of systems of interest that can assist managers to delve deeper in identifying underlying causes and discern leverage points for policy changes.

3.4.3.1 System Dynamics modelling process

The SD modelling process is viewed differently by different authors. The main activities in the modelling process are grouped into categories ranging from three to seven by different experts; however, important to note is that no matter how they are grouped, they all capture the same essence of the process. Wolstenholme (2003) groups the main activities of the modelling process into three activities while at the extreme other end is Richardson and Pugh (1989) with seven stages as illustrated by Luna-Reyes and Andersen (2003:275). As stated earlier however, the aim of this study is not to develop a full-blown SD modelling process that leads to quantification of variables and computer simulation,

but rather to initiate a discussion to view complex HE problems through a systems lens using QSD modelling tools. QSD can be applied to represent system dynamics without specific quantification of variables and computer simulation analysis (Wolstenholme 1985:1050). Thus, similar to Yang (2015) the current study adapted Wolstenholme (1985) Stepwise Method for Qualitative System Dynamics. This two-step approach proposes “Problem Exploration and Model Analysis” (Yang 2015:88). The current study adopted QSD as a stand-alone methodology, commencing the process with the exploration of the problem followed by the creation of the model using SD tools such as CLDs.

3.4.3.2 Problem exploration

There are well developed SD tools for modelling a problematic situation such as CLDs and SFD amongst others. The starting point in model building is a clearly articulated problem. System dynamicists (Sterman 2000; Jackson 2003; Reynolds and Holwell 2010) regard this stage as the most important step in the modelling process that shapes the entire project. These authors further emphasise that a clear purpose is the single most important ingredient of successful modelling. Although different authors similarly capture the essence of the modelling process, they differ in terms of the number of steps as well as in the identification of areas to explore when articulating a problematic situation. Table 3.3 compares areas to explore during this phase from different authors, however, this study adopts Sterman (2000) approach to problem exploration.

Table 3.3 Problem exploration variables

Sterman (2000)	Reynolds (2010)
Theme selection	Issue of concern
Key variables	Time frame
Time horizon	Level of analysis (business unit, firm, industry, etc
Reference mode	Boundary of the study
	Likely scope of factors involved

Theme selection – Kim and Andersen (2012) emphasise that it is pointless to start drawing models without first selecting the problem you wish to understand better. Jackson (2003:68) suggests that the problem worrying the decision-makers must be clarified and variables that impact on the problem identified. However, they caution that modellers must clearly define the problem and not its symptoms because various authors (Braun 2002, 2006) argue that solving the symptom of a problem only brings about a temporary relief that in the long run comes back to hurt the structure of the system.

Key variables - At this stage of the modelling process it is important to draw the boundary of the model. Sweeney and Sterman (2000) assert that in SD, tools and processes that expand the boundaries of our mental and formal models have been developed. In doing so, we build model boundary charts, listing the variables that are endogenous, exogenous, and, as best we can, excluded. Kim and Andersen (2012) caution modellers that they should always bear in mind that they are not trying to model the whole system but what is critical is the theme being addressed. The level of detail should therefore be determined by the issue itself. Churchman (1968) and Jackson (2003) concur, asserting that when drawing the boundary of the problem, sweeping in many variables is crucial, however, Jackson suggests that no distinction between exogenous and endogenous factors should be made.

Time horizon - According to Sterman (2002b:90) the time horizon must extend far enough back in history to show how the problem emerged and describe its symptoms. It should also extend far enough into the future to capture the delayed and indirect effects of potential policies. Extending the time horizon allows us to see the patterns of behaviour created by the underlying feedback structure of the system, not only the most recent events. Similarly, Vennix (1996) acknowledges that SD is well suited to those problems whose behaviour is governed by feedback relationships that have a long-term time horizon. Kim and Andersen (2012) emphasise that it is important to determine an appropriate time horizon that is long enough to see the dynamics of the system of interest play out. They further contend that in corporate strategy, time horizon may span over

several years for change to manifest. For example, the efficacy of the nGAP strategy might take several years to show a marked increase in the overall percentage of academic staff with PhDs in the HE system and particularly in lower ranked universities if at all.

Reference mode - According to Sterman (2000) a reference mode characterises the problem dynamically as a pattern of behaviour unfolding over time which demonstrates how the problem arose and how it might evolve in the future. All the key variables that have persisted over time should be identified and linked to form the structure of the system. The key variables that have persisted over time were depicted in the boundary chart that summarises the scope of the model and which key variables are included endogenously, exogenously and excluded from the CLD model. As a standard practice in SD, CLDs have been used to illustrate the interrelationships and causal relations between identified variables when building the structure of the system (Jackson 2003). Speaking at a conference, Binder et al. (2004) argued that when creating a model, identified variables must be linked and the behaviour generated by the system structure must be simulated. Sterman (2001) maintains that simulations are not tools to predict the future; rather, they are virtual worlds or micro worlds in which managers can develop decision-making skills, conduct experiments, and play. He further asserts that modern system dynamics modelling software makes it possible for anyone to participate in the modelling process. Important as simulation is, it falls beyond the scope of this study, but will serve as scope for further research.

3.4.3.3 Model creation

To reiterate, the purpose of this study is to initiate a discussion on viewing contemporary educational problems through a systems lens that is holistic. Similar to Singh (2015) study on sustainability in the non-profit organisations, the intention is not to develop a fully developed SD model but a qualitative CLD conceptual model that can be used as a basis for initiating discussion. The model can be expanded further into a full SFD that can be quantified, simulated and tested. Several scholars (Wolstenholme 1985; Binder et al. 2004; Zaini et al. 2013) have advanced benefits for the use of qualitative CLD models

alone in articulating deeper insights about complex issues of a strategic nature. Although there are criticisms for the use of CLDs alone in modelling complex problems, its proponents argue that these can be used as stand-alone models.

Zaini et al. (2013) argue that proponents of CLDs laude their accessibility to non-experts and claim that SFDs are useful only for people who understand how they work. They further insist that one can avoid using SFDs altogether, since the structured CLD and the SFD are equivalent. This is imperative in a country where Reynolds and Holwell (2010) claim that managers still lack the basic understanding of system thinking philosophy and language. The authors further caution that it is important to bear in mind that the success of a model is not measured by the ability to build a high-fidelity model that remains as a foreign object whose intended audience does not understand. In addition, Binder et al. (2004) strongly advocate for the use of CLDs alone in capturing the essence of a complex problem. These authors maintain that a structured CLD contains enough information to convert it into an SFD.

Amongst others, the benefits of using SD according to Sterman (2001), is that we need tools capable of capturing the feedback processes, time delays, and other sources of dynamic complexity. CLDs are best at illustrating feedback, time delays, interrelationships and interdependencies between variables that can assist managers in policy review and development. Furthermore, Wolstenholme (1999) contends that CLDs were beginning to be used for purposes unrelated to model building, but for detailed system description and for stand-alone policy analysis. The intention of constructing a CLD model for this study is precisely for this reason. Zaini et al. (2013) concurs, claiming that nowadays CLDs are mostly used prior to simulation analysis, to depict the basic causal mechanisms hypothesised to underlie the reference mode of behaviour over time, that is, for articulation of a dynamic hypothesis of the system of interest. Similarly, Kim and Andersen (2012) assert that creating CLDs is a process of gaining insights into complex issues. They concur with several system dynamicists that CLDs provide a language for articulating our understanding of the dynamic, interconnected nature of our

world. The authors emphasise that by stringing together several loops, we can create a coherent story about a particular problem or issue.

However, the use of CLDs as stand-alone models is not without its critiques. Several scholars (Reynolds and Holwell 2010) insist that CLDs are not good as a basis for a full-blown model and simulator that computes dynamics and performance through time. Whilst Binder et al. (2004) claim that proponents of SFDs criticise the ambiguity and lack of detail in CLDs which prevents simulation of the modelled systems. Binder et al. (2004) also criticise the lack of exactness of CLDs arguing that this hinders the direct interpretation as a quantitative model.

As stated earlier, the modelling process for the purpose of this study began with depicting the boundary chart followed by a qualitative CLD model. In this regard, Luna-Reyes and Andersen (2003) suggest drawing a boundary that includes all interrelated variables and excluding all those that do not impact on system behaviour. Sterman (2002b) emphasises that good models must have a broad model boundary in order to explore the problem from different viewpoints. However, he suggests that there should be few exogenous factors in a good model. The endogenous, exogenous and excluded factors influencing the phenomenon of low percentage of academic staff with PhDs is depicted by the boundary chart below.

Boundary chart

Table 3.4 Model boundary chart for academic staff with PhD

Endogenous	Exogenous	Excluded
Academic workload	Limited supervision	Gender
Research infrastructure	Doctoral pipeline	Race
Funding		Differentiation
Age profile of academics		
Remuneration		
Promotion		
Academic mobility		
Institutional culture		

Source: Adapted from Sterman (2000: 97)

It is however important to note that the variables in Table 3.4, are confined to those that were identified by the stakeholders (HESA 2011) in doctoral education in the HE system. As stated earlier, supervision for this institution is an exogenous factor because the institution does not have doctoral degrees in its PQM, therefore, academic staff pursuing PhDs are obliged to be registered at other institutions. Although the doctoral pipeline (enrolments, attrition rates and doctoral output) relates to academic staff in the institution who are pursuing PhDs, these elements are influenced by the external factors. The doctoral pipeline is determined by the effectiveness of the programmes in institutions where candidates are registered, hence classified exogenously. Gender, race and differentiation are key variables in debates around doctoral education in this country; however, these variables have been excluded for the purposes of this study. Race and gender have been researched extensively particularly in the advent of democracy in this country, while differentiation debates are ongoing as stated earlier.

Causal Loop Diagram

A causal loop diagram is a concise visual presentation of a problem which reveals interconnections that are both obvious and hidden between variables. According to

Morecroft (2015) the future time path of any organisation is partly and significantly pre-determined by its structure, the network of balancing and reinforcing feedback loops that drive performance through time. Causal loop diagrams embody this important philosophical view by making plain the important feedback loops believed to be responsible for observed performance.

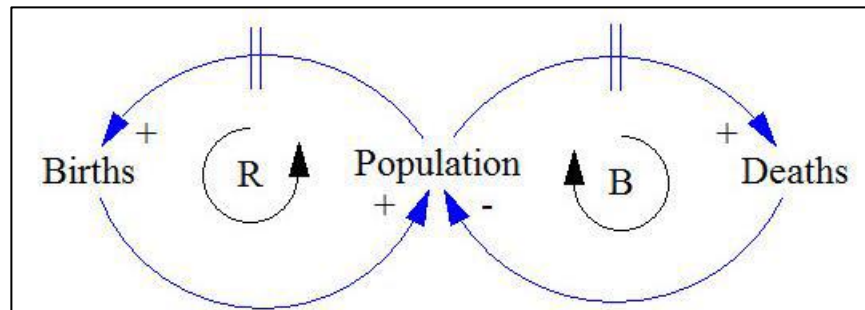


Figure 3.3 Population Causal Loop Diagram: Yang (2015)

The simple CLD reveals the interconnections and causality between two variables, births, deaths and their impact on the population. As stated earlier, this thesis is intended for non-systems experts, hence the need to provide an explanation of the basic elements of causal loop diagramming. It illustrates a simple two-way dependency that shows closed feedback loops and introduces the concept of time delays.

Toole (2005:01) maintains that much of the system structure and underlying relationships can be depicted graphically using causal loop diagrams. When creating a CLD, it is important to identify all the variables associated with the system. Thereafter, to determine which variables are causally related to other variables within the system and decide whether the effect of one variable on another is positive or negative. In addition, Morecroft (2015:40) points out that all CLDs are constructed from the same basic elements: words, phrases, links and loops – with special conventions for naming variables and for depicting the polarity of links and loops. Thus, a plus sign indicates that when the variable next to the tail of an arrow increases, the variable next to the head of the arrow also increases. A minus sign indicates that when one variable increases, the other variable decreases. Also,

important to note is that, when reading causal loops, one must always assume an increase in the first variable and its positive or negative impact on the other.

In the above CLD, the connection between births and population and deaths and population are shown by two causal links. The top link depicts the impact of population on the birth rate while the bottom link indicates the impact of births on the population. Links are assigned a positive or negative polarity. The top link has a positive polarity because an increase in population leads to an increase in the number of births. However, there is a delay between an increase in population and births. On the other hand, there is an immediate increase in the population because of increase in the number of births. An increase in population also influences the death rate. An increase in population has a positive polarity on deaths, whereas deaths have a converse impact on population. There is a delay between an increase in population and deaths; however, deaths have an immediate decrease in population. So, a positive '+' link means that if the cause increases then the effect also increases, while a negative '-' link means that if the cause increases then the effect decreases (Morecroft 2015:40)

In CLDs, causality around the loop typically occurs over time, that is, a change in one element takes several iterations to cause changes in the other variables within the feedback loop. The symbol in the top links indicates a time delay between the cause and effect. There is a lag and this means that an increase in population over time leads to more births and deaths. Such time delays add dynamic complexity because cause and effect is less obvious.

Another important element in the CLD language is reinforcing and balancing loops. A reinforcing loop is one where an increase in a variable, when traced around the loop, leads to a further increase in itself. Such an outcome requires an even number or zero of negative links (Morecroft 2015:41). A balancing loop on the other hand is one where an increase in a variable, when traced around the loop, leads to a counterbalancing decrease in itself. Such an outcome requires an odd number of negative links (Reynolds and Holwell 2010: 36). Figure 3.4 depicts reinforcing and balancing loops.

The variables depicted in Table 3.5 formed the basis for building the structure of the CLD in this section. However, the conceptual framework for this study developed in the discussion chapter took into account that which has been gleaned from mental and written databases and which has emerged as themes and categories from data analysis.

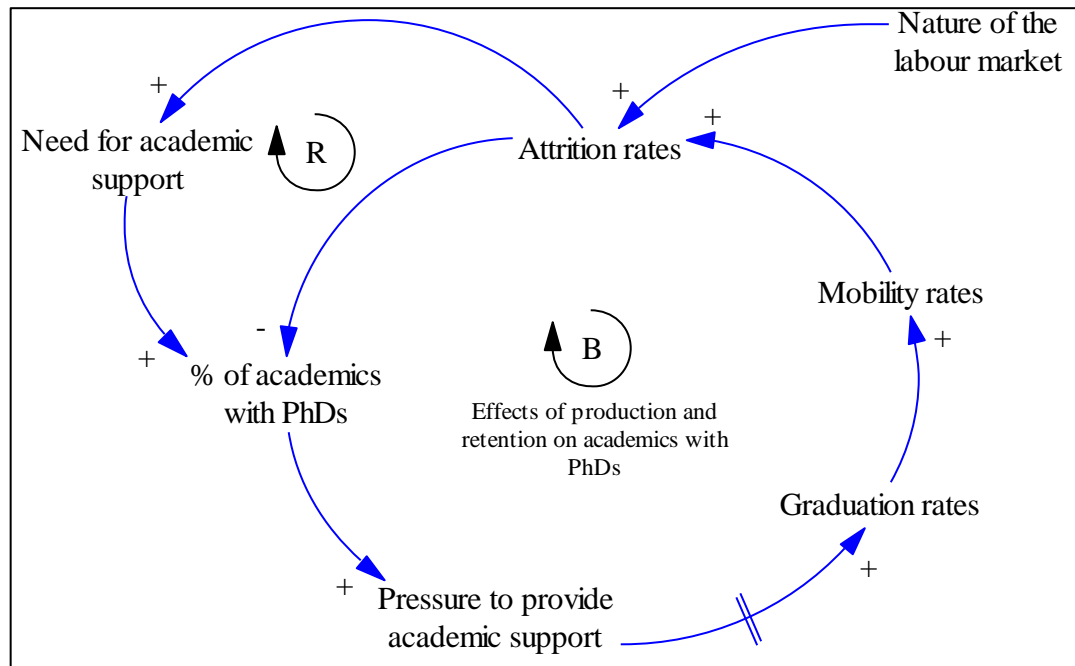


Figure 3.4 Effects of production and retention on academics with PhDs

Figure 3.5 illustrates the dynamics involved in the production and retention of academic staff with PhDs in the institution. It is important to note that this is a simple illustration of a CLD, not all variables embedded in this system are included. The attractiveness of the labour market (traditional universities, research councils, private and public sector, state owned enterprises) leads to an increase in the attrition rates. High attrition rates will have a negative effect on the percentage of academics with PhDs in the institution. On the other hand, high attrition rates increase the need to provide academic support to academics in order to fast-track the improvement of qualifications. Academics with PhDs are put under pressure to provide academic support to colleagues who are registered for a PhD. There is a time lag between the academic support and an increase in the graduation rates. As stated earlier by COHORT (2004), academic staff with PhDs are extremely mobile. Thus,

graduation rates increase mobility which in turn leads to an increase in attrition rates of academic staff with PhDs. Sometimes, complex systems with accumulating variables and more than one feedback loop may not be predictable but rather highly counterintuitive (Toole 2005).

Generally, an increase in the academic support for academic staff pursuing a PhD should lead to an increase in the percentage of academic staff with PhDs in the institution. However, reading around the loop, this effect will ultimately lead to a decrease in the overall percentage necessitating pressure to invest even more in the production. As stated earlier, CLDs are a concise visual presentation of a problem which can reveal interconnections that are both obvious and hidden between variables. The loop reveals both hidden and obvious leverage points where managers should effect change. Investment in academic support will not necessarily lead to an increase in the percentage of academic staff with PhDs if no effort is expended in reducing attrition rates.

Academic support is intended to mitigate against the negative effects of heavy workload, poor research infrastructure, insufficient funding amongst others. Whereas, paying attention to HR processes such as remuneration and promotion, image and culture of the institution might have an impact on the attrition rates. Another interesting but not so obvious connection is graduation rates and mobility. XYZ is the only institution of higher learning that does not have postgraduate qualifications in its PQM which, according to ASSAf (2010), might exacerbate mobility between institutions even for those academics who wish to pursue a career in academia. While these dynamics might not be read into this CLD, a comprehensive QSD conceptual model in Chapter 6 illustrated all the dynamics involved in this phenomenon.

Reynolds and Holwell (2010:30) suggest that systems thinking requires a “shift of mind”. They further emphasise that systems thinking advocates a move away from a narrow and silo mentality in viewing complex social problems. This emphasises the holism approach associated with systems thinking aided by SD.

In building SD models Senge and Forrester (1980) caution practitioners to bear in mind that models are built for a purpose and any validity is fundamentally determined by the extent to which it fulfils that purpose. Sterman (2000) emphasises the understanding that clients are concerned with solving problems taking place in the real world. Most importantly is that the purpose of modelling is to help the client solve the problem. Thus, Reynolds and Holwell (2010) caution that modellers should not be preoccupied with creating perfect models. They emphasise that a model cannot replicate the real-world situation in every detail.

To sum up, Sterman (2002b:501) in his article entitled “All models are wrong, maintains that the most important and difficult lesson to learn is that systems thinking requires understanding that all models are wrong and humility about the limitations of our knowledge is important”. The above therefore illustrates that the aim of modelling should never be to design a perfect model but rather to design a tool that takes into consideration that which is learned, which is the core of SD modelling. The founding father of SD modelling (Forrester 1995a) always emphasised the importance of learning in SD modelling. Thus, the notion of the learning organisation, popularised by Peter Senge becomes a vital ingredient of organisational improvement.

3.5 Conclusion

The evolution of doctoral education with its associated legislative framework prior and post the apartheid era has had a major impact on all aspects of HEIs in this country. Doctoral education from the apartheid era bequeathed the country with limited highly qualified academic staff close to retirement. The poor prospects for replacement considering student pipeline challenges and limited academics with ability to supervise further exacerbates this problem.

The HE system was, and still is, reliant on the traditional white universities for the production of PhD graduates. As a result, the country has low numbers of PhD holders in comparison to other countries with similar economies. Several studies have directly linked

doctoral education to economic growth and global competitiveness and yet South Africa relies on a few institutions for these important economic indicators. What needs to be done to increase the percentage of academic staff with PhDs and consequently doctoral output in this country? This question cannot be answered without understanding the factors that influence this phenomenon.

Firstly, the country despite setting a doctoral throughput target rate of 20% only manages 11% annually. Numerous production challenges prompted HESA to mandate Dr Badat to identify such challenges. While these were identified by all stakeholders in doctoral education, it remains to be seen whether the proposed solution will produce the intended outcomes. Postgraduate pipeline challenges make recruitment for the nGAP difficult; there is a limited pool of master's graduates and the teaching load, research funding, research infrastructure and supervision remain particularly challenging in the UoT sector.

Secondly, the academic profession is no longer regarded as a viable career option. There is a global hunt for talented academics. With academia no longer considered viable and a global hunt trawling the limited talent pool, both policy makers and executive management at institutional level need to explore the above question in earnest.

Chapter 4: Research Methodology

4.1 Introduction

The main purpose of this study is to determine the reasons why this institution has the lowest percentage of academic staff with PhDs in the country. In this regard, it explores the causal relationship between two variables: production and retention of academic staff with PhDs within the context of the evolution of the HE system discussed in Chapter 2. It explores the causal relationship between these variables through a systems lens. A systems thinking approach and SD in particular have been adopted to explore the questions outlined in this chapter. There are four questions that are designed to explore this phenomenon. It adopts different research methods in addressing these questions:

Table 4.1 Research questions and methodology used to gather data

Research questions	Methodology
Question 1 – Why is there a low percentage of academic staff with PhDs in HEIs in South Africa and UoTs in particular?	To answer this question, a comprehensive literature review was conducted in order to gain an in-depth understanding of the shortage of academic staff with PhDs.
Question 2 – What are the challenges of producing academic staff with PhDs in South African HEIs in general and UoTs in particular?	To answer questions 2 and 3, the study adopted qualitative research methodology to gather data from participants' mental databases as well as written databases.
Question 3 – What are the challenges of retaining academic staff with PhDs in South African HEIs in general and UoTs in particular?	These databases are in the form of interviews and perusal of documents relating to the challenges of producing and retaining academic staff with PhDs.
Question 4 – From a systems thinking perspective, what is the relationship between the challenges of producing and retaining academic staff with PhDs in HEIs in general and UoTs in particular?	To answer question 4, a systems approach that integrates secondary and empirical data was adopted in the construction of CLDs, QSD model and system archetypes for this study in the discussion chapter.

4.2 Research design

This section describes the interpretivism research paradigm and case study methodology adopted for the current study.

4.2.1 Research paradigm

This study has adopted an interpretivist paradigm which assumes that “methods used to understand knowledge related to human and social sciences cannot be the same as its usage in physical sciences because human interprets their world and then acts based on such interpretation while the world does not” (Hammersley, 2013, p. 26). Furthermore, (Pham 2018) suggests that interpretivists must adapt a relativist ontology in which a single phenomenon may have multiple interpretations rather than a truth that can be determined by a process of measurement. Similarly, (Creswell 2013) maintains that interpretivists gain a deeper understanding of the phenomenon and its complexity in its unique context instead of trying to generalise the base of understanding for the whole population. (Pham 2018) concurs with these sentiments, rather viewing them as limitations of the interpretivism paradigm. The author claims that interpretivists aim to gain the deeper understanding and knowledge of phenomena within its complexity of the context rather than generalise these results to other people and other contexts. As stated in 1.5, an interpretivist paradigm is frequently associated by several scholars with qualitative research (Goldkuhl 2012; Antwi and Hamza 2015; Thanh and Thanh 2015).

4.2.2 Case study

A single holistic case study has been adopted in exploring the phenomenon of the low percentage of academic staff with PhD in this institution.

A case study is “an empirical enquiry that investigates a contemporary phenomenon within its real-life context” (Yin 1994:13; Baxter and Jack 2008:344). Yin (2003:01) maintains that a case study is appropriate for answering the ‘how or why’ questions. A case study therefore is an appropriate research design for this study because:

Firstly, doctoral education in general and challenges of increasing the percentage of academic staff with PhDs is a contemporary issue in the HE system particularly in this country. Secondly, it seeks to understand “why” this particular institution has the lowest percentage of academic staff with PhDs in the country (ASSAf 2010:61).

In a case study, a phenomenon is studied within a bounded context. A boundary that clearly draws what should and should not be included in the scope of the project should thus be indicated (Miles and Huberman 1994; Patton and Appelbaum 2003). Several scholars (Baxter and Jack 2008; Creswell 2013) emphasise the value of a qualitative case study methodological approach in developing theory and interventions because of its flexibility and rigor. They suggest that it does so by facilitating the exploration of a phenomenon within its context using a variety of data sources. The variety of qualitative data collection methods are documentation, archival records, interviews, physical artefacts, direct observations, and participant-observation (Luna-Reyes and Andersen 2003; Bryman 2012; Creswell 2013). Use of a variety of sources facilitate the exploration of a phenomenon from a variety of lenses which allows for its multiple facets to be revealed and understood (Baxter and Jack 2008).

In this regard, I selected a **single holistic case** to explore the complex phenomenon of increasing the percentage of academic staff with PhDs within one UoT. The justification for the adoption of a single holistic case study research design was argued in 1.5. The challenges of increasing the percentage of academic staff with PhDs in HEIs in South Africa are broad and varied and dependent on if the institution is a HWU, an HBU, a traditional university or a UoT, an urban or a rural university amongst others.

There are six UoTs in South Africa, each with its own set of peculiar and unique set of challenges with respect to academic staff development and retention. This institution, as mentioned in Chapter 1 has the lowest percentage of academic staff with PhDs amongst other HEIs (ASSAf 2010; Badat 2010). It is a historically disadvantaged institution (HDI),

a UoT which is situated in a peri-urban locality. Furthermore, it is the only UoT as illustrated in ASSAf (2010:57) which does not have a PhD in its PQM.

A research design that enabled an in-depth investigation of the challenges of production and retention of academic staff with PhDs at an HBU, which is a UoT and located in a township, was selected. Furthermore, Patton and Appelbaum (2003:63) and Johansson (2007:08) as stated in 1.5 argue that a single case study is appropriate if it is an extreme or a unique case. They argue that single cases that exhibit notable failures or outstanding successes are worth exploring individually. The location of this institution and its PQM alone justify exploring it as a unique case. However, the challenge of a PQM that does not have a PhD cannot be construed as a notable failure but a unique case nonetheless when one considers the historical debates of the structure of HE system and the evolution of doctoral education in this country.

In addition, similar studies in doctoral education and academic staff development and retention (Backhouse 2009; Kipkebut 2010; Roy 2014) have used a variety of data sources in exploring multiple facets of academic staff development in the HEIs. In the same vein, university records, documents, and interviews form the hallmark of my data collection protocol which will be explored later under data collection. Three groups of participants were selected to ensure that the phenomenon was viewed from a variety of lenses; this too will be explored later under site and participant selection. The multiple data sources and different categories of participants allowed me to explore the phenomenon of production and retention of academic staff with PhDs from a variety of lenses. Themes that emerged from the analysis of data from these sources formed the basis for the construction of CLDs discussed in Chapter 6.

4.3 Research methodology

As specified in 4.1, this study adopts a different methodology to answer the four research questions. This section explores the research methodology used to answer questions 2 and 3 of this study. As stated earlier, it adopts a qualitative research methodology to explore

the challenges of production and retention of academic staff with PhDs in this institution. In this regard, the following aspects will be explored at length, sampling, data collection and data analysis.

4.3.1 Sampling

For the current study I selected purposive sampling method which restricts the investigation to a small but information-rich group of participants (Bless, Higson-S.C and Kagee 2006; Roy 2014). The size of the sample however was determined by data saturation whereby all possibilities and aspects of the phenomenon were explored and no additional information was generated.

Ghuri and Grønhaug (2002) elucidate that sample selection procedures consist of the following steps: defining the population, identifying the sampling frame, selecting a sampling procedure, determining the sample size, selecting the sample units and collecting data from the sampled units. However, in line with similar studies in academic development and / or academic staff retention (Backhouse 2009; Kipkebut 2010; Ng'ethe 2014; Roy 2014), this section addressed the population, sampling techniques and sample size to explain the sampling protocols for the current study.

4.3.1.1 Population of the study

Ng'ethe (2014) defines the population as the larger group from which the sample is taken. The target population of this study was comprised of 208 academic staff (including 8 nGAP lecturers) across the three faculties of the university as of the first semester of 2017 according to the enrolment key performance indicators (KPI) from the HEMIS office. This study has adopted a single holistic case study methodology; hence the population was selected from one research site. Part-time or contract academics were excluded from the population because they do not enjoy such benefits as study grants and sabbatical leave amongst other academic staff development benefits. The population included 4 administrative staff from the Human Resource & Development (HR&D) unit. The unit

comprised of the Senior Director, Director, Organizational Design (OD) specialist, Skills Development Facilitator (SDF) and administrative staff responsible for academic recruitment amongst other HR services. The OD and SDF positions are held by the same person in this institution and the Senior Director resigned before the interview. In addition, there are 4 academic managers comprising the deans of the three faculties and the Deputy Vice-Chancellor (DVC) Teaching and Learning referred to as DVC Academic in most institutions.

4.3.1.2 Sampling technique

For this study, purposive sampling strategy was adopted to collect data from academic management, administrative as well as different categories of academic staff, whose experiences and viewpoints could shed more insight into PhD production and retention policies and practices. Purposive sampling allowed me to actively select the most productive sample based on some characteristics that made them a rich source of information for the current study (Marshall 1996; Creswell 2013). The productive selection was based on my knowledge of the population, the research area and the available literature. As per Marshall (1996) if the subjects are known to the researcher they may be further stratified according to known specific characteristics. Thus, the academic staff category was stratified into three levels. I was mindful of the fact that the results cannot be generalised to the population because it was a non-probability sampling approach (Marshall 1996; Bless, Higson-S.C and Kagee 2006; Maree 2007). However, the sample was selected in such a way that it answers the research questions (Bryman (2012).

It was difficult to establish from the onset which groups or how many people would be interviewed (Bryman 2012). I initially contemplated interviewing academic staff registered for a PhD only, however, as the investigation proceeded, it became apparent that groups who were not anticipated at the outset should be interviewed to gain a more holistic overview of the problem. In this regard, Bless, Higson-S.C and Kagee (2006) points out that in qualitative research, a unit of analysis might change in the course of the

research resulting in the need to add other types of units which have not been anticipated. Thus, the nGAP lecturers were interviewed as a separate group because only two were registered for a PhD and the remainder did not hold master's degrees, and thus could not be registered for a PhD. Furthermore, the academic support programmes for the nGAP lecturers are peculiar to this group. However, the justification for the inclusion is that their programme is intended to produce academics with a PhD at the end of their six-year contract.

4.3.1.3 Sample size

In selecting a sample size for the study, available literature was reviewed for guidelines. Several studies maintain that the sample size for qualitative research is small, however there is little or no consensus on what the sample size should be (Marshall 1996; Marshall et al. 2013). Having reviewed 83 percent IS qualitative studies in leading IS journals, Marshall et al. (2013) recommended that a single case study should generally contain 15 to 30 interviews. They reported that 69 percent of all qualitative IS studies sampled employed fewer than 30 interviews. They concluded that it would be rare that additional interviews would be a wise time investment.

There is however a consensus that an appropriate sample size for a qualitative study is one that adequately answers the research questions. In addition, data saturation determines the sample size. Suri (2011) suggests that data saturation is determined by the nature of the data source as well as the type of questions, arguing that the more precise a question, the sooner data saturation is reached. Thus, the sample size for semi-structured interviews might be smaller than open-ended interviews because saturation could be reached sooner than in the latter. More importantly, proponents of qualitative research emphasise that the sample size in qualitative research should not be so small as to make it difficult to achieve data saturation or so large that it is difficult to undertake deep analysis of the phenomenon which is the hallmark of this research approach (Onwuegbuzie and Collins 2007; Bryman 2012).

In selecting the sample size, I considered the arguments and recommendations discussed above to justify the sample size for this study. The sample size for the current study is 25 interviews, conducted from three categories of employees in the institution, the academic management, academic staff and administrative staff to answer the research questions. Because the subjects are well known to me (Marshall 1996) the academic category was further stratified into three groups, those who were registered for a PhD, those that had completed the qualification and the nGAP lecturers. As illustrated in the population, there was a headcount of 208 instructional /research professional staff in 2017, of these 14% (29) had PhDs while 58% (120) had at least a master's degree and 8 nGAP lecturers. In-depth interviews were conducted with the following categories of participants:

Table 4.2 Number selected for a Purposive Sample

Categories	Total population	Sample size
1. Academic Management	4	4
2. Academic staff	208	18
3. HR&D	4	3
TOTAL		25

Category 1: Four academic managers comprising of the three deans and the DVC T&L were interviewed to solicit their views on the challenges of the production and retention of academic staff with PhDs in their respective faculties and the institution at large from a managerial perspective.

Category 2: Eighteen academic staff from across the three faculties of the institution were interviewed. The challenges of production and retention of academic staff was viewed from the perspective of those who have completed the qualification and remained in the institution, those who are currently registered for the qualification and the nGAP lecturers whose contract is intended to fast-track the acquisition of a doctoral degree by the end of the six-year contract. Only phases one and two of the nGAP cohort were available for data collection in 2018. As suggested by Suri (2011), saturation was reached after ten

interviews because of the semi-structured nature of the interview questions. Academic staff development and retention challenges are universal to a certain extent. However, the type of institution, its location and size presented peculiar challenges affecting this institution only, hence I continued until no new insights were generated from additional interviews. It became apparent that more than eighteen interviews would not be a wise time investment (Marshall et al. 2013).

Category 3: A minimum of four participants were to be interviewed from this category, however the Senior Director resigned before the interview was conducted. A Director, Skills Development Facilitator and OD and the consultant responsible for recruitment and retention of academic staff were interviewed. This unit is the custodian of HR policies and programmes that cover processes such as staff development and retention.

4.3.2 Data Collection

Similar to Ng'ethe (2014) selecting a qualitative methodology allowed me to collect data in words rather than numbers and then to describe the complex problem of the low percentage of academics with PhDs in words which would not have been possible with a quantitative study. In this regard, I used various sources (interviews and archival records) to gather data which facilitated the reaching of a holistic understanding of the phenomenon being investigated (Baxter and Jack 2008).

Similar studies (Backhouse 2009; Ng'ethe 2014; Roy 2014) investigating academic support, retention and doctoral education have used interviews and documents amongst other instruments in data gathering. These research instruments have facilitated in-depth investigation of the complex phenomenon of doctoral education in the country in general and challenges faced by HEIs in increasing the percentage of academic staff with doctoral degrees.

4.3.2.1 Developing interview guide and piloting

Prior to commencement of data collection, three research instruments (interviews) were designed for the different categories of participants (academic management, academic staff and administrative staff) in the study attached as (see Appendix A 1-5). The interview guide for academic staff was further customised to probe relevant issues within similar groups. For example, the issue of mentorship and 20% teaching load is peculiar to the nGAP cohort.

In designing the interview guides, a comprehensive review of the relevant literature was conducted to answer questions one to three of this study. The literature review explored the evolution of doctoral education in this country and contemporary issues in the production and retention of academic staff with PhDs. The research guide was divided into three sections, personal information, challenges of producing academic staff with PhDs and lastly, challenges of retaining academic staff with PhDs. Semi-structured coupled with few open-ended interview questions were designed. The intention was to allow in-depth probing in order to uncover the thoughts and feelings of participants.

Three pilot interviews were conducted to test the flow and the duration of the interview and gain some experience prior to the actual interviews (Creswell 2013). Furthermore, the pilot study was carried out in order to ascertain whether the questions were stated clearly, unambiguous and able to answer the research questions. Participants were asked at the end of the interview to highlight questions they found to be ambiguous or were uncomfortable with and to make any suggestions that would improve the interview (Kipkebut 2010). Those questions were rephrased before the actual collection of data. Piloting of the interview guides was carried out on the participants currently registered for a PhD. However, piloting other groups of participants was not feasible because the population was very small.

4.3.2.2 Interviews

The gatekeeper's letter and ethical clearance were both obtained in July 2017 (Appendix B and C) before the empirical work commenced on the study. Individuals whose experiences and viewpoints could shed more insights into PhD production and retention processes of the institution were identified. Thereafter, participants were approached individually face-to-face, by email or telephone to seek their willingness to participate in the study. Subsequently, a letter of information was emailed to all participants wherein the purpose of the study and procedures were clearly outlined (Appendix D). In addition, the informed consent form seeking participants' signature before engaging in the research is attached (Appendix E). This form acknowledges that participants' rights will be protected during data collection, analysis and interpretation. Thereafter, those that were willing to participate were assured that no one, other than me, would have access to their responses except for the supervisor. The interviews were subsequently conducted.

The pilot study commenced in October 2017. The instrument was subsequently refined and interviews commenced in December 2017. Twenty-five (25) face-to-face semi-structured in-depth interviews of approximately 45 to 60 minutes were conducted with each participant. As outlined in the interview guide, I had a list of questions and specific topics to cover (Bryman 2012). The interviews were designed to elicit detailed information from the participants within these parameters. During the interview, probing questions were asked to seek clarity based on what was said (Bryman 2012; Creswell 2013). As suggested by Mack et al. (2005) some aspects of the interviews were flexible, allowing adjustment of questions based on what was learned.

Interviews were conducted in meeting rooms or the participant's offices at times convenient to them as arranged. Participants were informed of their right to refuse to answer questions they were uncomfortable with or their right to terminate the interview at any time even though their participation was appreciated. As articulated by Backhouse (2009), in this study too, participants were academics and thus familiar with research protocols and likely that they understood the implications of consenting to participate.

Furthermore, consent was sought to digitally record the interview for ease of access to the original information after the interview. In addition, I took notes during the interview that captured the essence of what was said should the instrument fail (Creswell 2013). I also recorded certain aspects of the interview such as phones ringing or the general surroundings in the offices as part of the observation memo. The latter was intended to determine whether the offices were conducive for carrying out research as some participants complained about sharing office space or noisy surroundings and inflexible working hours.

4.3.2.3 Documents

Creswell (2013) asserts that during the process of research the qualitative investigator may collect documents. Creswell further illustrates that these may be public documents (newspapers, minutes of meetings, official reports), or private documents (personal journals and diaries, letters, e-mails). In this regard, I collected policies and minutes of meetings on academic support and development as well as retention of academic staff. Policies related to academic staff workload, the five-year Strategy 2015 – 2019 which provided insights into the direction of the university in terms of academic staff qualifications and targets was vital.

The draft Strategy 2020 – 2025 of the institution provided insights into the direction of the institution particularly under the new academic executive leadership because the institution has had a very high leadership turnover within a short space of time. Other official documents such as funding documents from the Institutional Planning unit, staff profiles and employment equity plan from HR&D, minutes of meetings and emails amongst other documents were collected to verify information or in some instances to seek clarity on information gathered through interviews. These archival documents were used for triangulation purposes. They were also used to generate insights into the context in which academics operate and the policies that guide the parameters of their operations in the institution (Roy 2014).

4.3.3 Data Analysis

This section focuses on the data analysis methodology adopted and the coding process followed in determining the themes and codes for this study.

4.3.3.1 Thematic analysis

In analysing data for the current study, I adopted thematic analysis. According to Maguire & Delahunt 2017: 3352, “thematic analysis is the process of identifying patterns or themes within qualitative data”. These authors further laud this method for its flexibility and considerable advantage in theme development. Similarly, Braun and Clark 2006 argue that thematic analysis, unlike many qualitative methodologies is not tied to a particular epistemological or theoretical perspective.

Maguire and Delahunt (2017) recommend the use of Braun and Clarke (2006) 6-step framework which is arguably the most influential approach, in social sciences because it offers a clear and usable framework for doing thematic analysis. Braun and Clarke (2006)6-step framework was thus followed in developing themes and codes for the current study. As suggested by several scholars (Braun and Clark, 2006; Maguire & Delahunt) my goal in adopting thematic analysis was to identify patterns in the data sets that were interesting and important in addressing the research questions rather than summarising the data.

4.3.3.2 Coding process

This stage was very confusing and time consuming. What emerged from literature was that: i) there is no universal method of coding qualitative data, different authors suggest different steps ranging from 3 – 6 steps in developing codes, categories and themes. ii) Data analysis is a continuing, developing, repetitive and non-linear process which requires practice and improves with time. iii) It is a myth that the qualitative software program will code the data (Miles and Huberman 1994; Braun and Clarke 2006; Kim and Andersen

2012; Creswell 2013; Roy 2014; Saldaña 2015; Stuckey 2015; Eker and Zimmermann 2016; Erlingsson and Brysiewicz 2017).

Although authors differ in how data should be arranged and coded, they capture a similar essence of how themes and categories should be developed. However, Table 3.3 below outlines 6 steps suggested by (Braun and Clarke 2006:87) even though some steps were combined while still capturing the essence of each step.

Table 4.3 Phases of thematic analysis

Phase	Description of the process
1. Familiarising yourself with your data	Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas
2. Generating initial codes	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code
3. Searching for themes	Collating codes into potential themes, gathering all data relevant to each potential theme
4. Reviewing themes:	Checking if the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic ‘map’ of the analysis
5. Defining and naming themes	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme
6. Producing the report	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis

Source: Braun and Clarke (2006: 87)

Familiarising yourself with your data:

I conducted all the interviews personally and recorded some notes in a memo. The memo served three purposes, firstly recording some aspects of the interview manually should the electronic version fails. Secondly, it was used to record some insights which were beginning to emerge, for example a puzzling or striking event. Thirdly, a memo wherein the themes related to the research questions that were starting to emerge even at that early

stage were recorded. Keeping a memo before and during the coding process is highly recommended by several scholars (Luna-Reyes and Andersen 2003; Miles, Huberman and Saldana 2013; Saldaña 2015). Saldaña (2015) insist that memos are important because they can guide the entire coding process.

Having conducted the interviews, I engaged with data analysis already having some prior knowledge of the data, and some initial analytic interests or thoughts (Braun and Clarke 2006). Regardless, I was immersed in the data completely. I transcribed the first five digitally recorded interviews in order to get a feel of the process. Thereafter, the remaining twenty interviews were transcribed verbatim by a service provider. I listened to each interview recording while carefully reading the transcripts word-for-word to ensure that the transcription was indeed an accurate account of what was said. This was a very laborious and time-consuming exercise. Subsequently, the transcripts were read twice as suggested by Clarke and Braun (2013) while recording on a memo (Saldaña 2015) the initial observations, themes and patterns that were beginning to emerge from the data that told a story line. This was the first level/cycle coding.

Generating initial codes and Searching for themes:

In developing themes for this study, steps 2 and 3 were combined. Several scholars (Creswell 2013; Saldaña 2015; Erlingsson and Brysiewicz 2017) suggest that while qualitative data analysis software is widely available, it is imperative that the researcher knows how to create codes. Miles, Huberman and Saldana (2013) whilst claiming that software is good and quick in sorting data, argue, however, that it cannot determine meaningful categories for coding and analysis for the researcher. Similarly, Erlingsson and Brysiewicz (2017) emphasise that software cannot be used as a substitute for learning data analysis methods. Throughout the coding process I found it easier to use manual coding. Miles, Huberman and Saldana (2013) further pose a question that because it takes time and money to become adept in utilising a given software package, is it a worthy investment for the researcher? It is generally accepted by several scholars that regardless

of whether you choose to use data management software or code the data manually, you will follow the same process.

Bless, Higson-S.C and Kagee (2006:344-5) emphasise that codes should be organised in a hierarchy, in terms of higher-level codes. Higher level codes are those that are broad in scope and should then be broken down into lower-level codes that are narrower in scope. The two initial higher-level codes for this study were the challenges of producing academic staff with PhDs and challenges of retaining academic staff with PhDs.

A table of four columns was developed with condensed meaning units, codes, categories and themes. In this regard, raw data was taken and condensed into meaning units as a way of shortening the text while still preserving the core meaning. Codes were then generated from these meaning units. A long list of codes was developed which were subsequently grouped into categories and sub-categories. Thereafter, similar categories were grouped to form themes for this study. As data from interviews and perusing documents was analysed to identify the prevalence of important ideas, three new themes emerged, academic staff profiles, production of academic staff with PhDs and retention of academic staff with PhDs. The three themes (higher level codes) and categories that emerged from data analysis were presented as major findings for this study. They were presented under separate headings and supported by direct quotations from raw data gleaned from mental databases as well as written databases (Creswell 2013).

Reviewing themes and Defining and naming

Steps 4 and 5 were combined in reviewing and refining themes. These phases entail refining the developed themes from the previous phase. In this regard, going back to the data to determine if the generated categories and themes captured the essence of the data was important. Using thematic analysis, I identify patterns in the data sets that were interesting and important in addressing the research questions rather than summarising the data. This process was undertaken to ensure that each theme and category told a story that fitted in with the overall story line of this study. In the end three high level codes or themes emerged from the data. These were stated and discussed as separate headings in the results

and discussion chapters. The themes and categories tell the overall story of the reasons why this institution has the lowest percentage of academic staff with PhDs in the country.

Producing the report

The write-up in Chapter 5 provided sufficient evidence in the form of extracts across the data set to illustrate the prevalence of each theme. In Chapter 6, the dynamics involved in each category were illustrated in the form of individual CLDs. Thus, in Chapters 5 and 6, the writing-up involved the “weaving together of the analytic narrative and (vivid) data extracts to illustrate a coherent and persuasive story about the data for the reader and contextualising it in relation to existing literature” (Clarke and Braun 2013:121). This culminated with the presentation of a QSD model that graphically illustrates the dynamics involved in the production and retention of academics with PhDs at an aggregate level through a systems lens.

4.4 System dynamics

This section outlines the methodology used to explore Question 4 of this study: From a system’s thinking perspective: What is the causal relationship between the production and retention of academic staff with PhDs in HEIs in South Africa? The study adopts a system dynamics aided by a systems thinking (Morecroft 2015) theoretical lens in viewing the production and retention of academic staff with PhDs. Thus, this section explains how the information gathered through participants’ mental databases and written databases was integrated with the literature in building the conceptual model for this study. A qualitative CLD that illustrates the interconnectedness and interrelationships between the production and retention of academic staff with PhDs is the conceptual model for this study.

In designing SD models, several scholars (Wolstenholme 1985; Keating 1999; Yang 2015) have argued for the adaptation of the modelling process to suit a particular researcher’s circumstances. Wolstenholme (1985) in particular, argues that a general methodology for system enquiry has been in existence for some time with limited success advocating for the adoption of different methodologies. Keating (1999) concurs, stating

that system dynamics modellers often pursue a similar development pattern, mostly relying on the stages discussed in Chapter 2 by different authors ((Randers 1980; Richardson and Pugh 1981; Richardson and Pugh 1989). However, (Wolstenholme 1985) advocates for an acceptance of the fact that there are cases where it is not necessary to carry out the complete stages of the SD method.

The current study acknowledges that there is a consensus amongst several SD practitioners that qualitative system dynamics (QSD) can be applied as a separate methodology outside the domain of computer simulation in articulating deeper insights about complex issues of a strategic nature (Wolstenholme 1985; Binder et al. 2004; Zaini et al. 2013). In a similar fashion to Yang (2015) the current study adapts Wolstenholme (1985) two step model. This two-step approach proposes a “Problem Exploration and Model Analysis”. Keating (1999:03 & 04) refers to the two steps as, “The model analysis phase and the model design phase”. Similar to Yang (2015:88), the nine steps of model analysis or design phase, were grouped into three key areas as published by Wolstenholme (1990) i) explore the current situation; ii) identify key variables, organisational boundary, and construct linkages between variables; and iii) create the causal loop model.

I used qualitative data for both stages in the modelling process. Several system dynamicists insist that the use of qualitative research methodology in SD is imperative, the question is “not whether to use it, but rather when and how to use it” (Luna-Reyes and Andersen (2003:274). Several scholars (Luna-Reyes and Andersen 2003; Kim and Andersen 2012; Eker and Zimmermann 2016) maintain that qualitative data and their analysis have a central role to play at all levels of the modelling process. However, they argue that in some instances it is mainly used in the first stages of the modelling process, particularly stage 1. It is not surprising because stage 1 as discussed in Chapter 2 is the most important stage that guides the entire process if done effectively. As explained in Chapter 2, the aim of this study is not to build a complete SD model. Thus, the focus is only on the two steps of the modelling process, the problem exploration and creation of the QSD model.

4.4.1 Problem exploration

This is the most important step in the model-building process that shapes the entire project. This step requires the modeller to clearly outline the nature of the problem the model seeks to resolve. System dynamics practitioners emphasise that a clear purpose is the single most important ingredient of successful modelling as stated in 3.4.3.1. The purpose of the current study therefore is to explore the challenges of the low percentage of academics with PhDs at XYZ. The two powerful methods SD relies upon to elicit information about the problem are the reference mode and time horizon (Keating 1999; Sterman 2000) which use qualitative data (Richardson and Pugh 1989; Wolstenholme 1990). These tools thus guided the nature of the information gathered in exploring this phenomenon and to set parameters for the study. Chapter 2 traced the evolution of doctoral education from the first qualification through to 2030 as envisaged by NPC. This was an attempt to explore how the problem arose and was likely to unfold into the future.

The problem this study seeks to explore is the challenge of producing and retaining academic staff with PhDs at XYZ. In exploring this phenomenon, I used interviews and perused archival records to unearth the qualitative data from the participants' mental databases (actor's heads) as well as written databases (written texts) (Luna-Reyes and Andersen 2003). The use of qualitative data in model building is recommended by SD practitioners. Sterman (2000) emphasises that surveys generally do not yield data rich enough to be useful in developing system dynamics models, arguing that interviews are an effective method to gather data useful in formulating a model.

As discussed in 4.3.2 these research methods formed the hallmark of data collection for this study. Forrester (1995b) who is regarded as the founding father of SD maintains that qualitative data for conceptualising the problem, resides in the participants' mental and written databases. Similarly, this study found that although these different methodologies add value to data collection for exploring the problem, the most important source, "both in quantity and significance" for me was the mental database (Forrester 1995b; Luna-Reyes and Andersen 2003). Thus, data gathered through exploring the actor's heads

(mental database) features more prominently in the model building process of this study. Written text (written databases), although not as prominent in the quantity of data gathered was important for triangulation purposes. More importantly, all relevant documents as outlined in 4.3.2.3 were perused to unearth relevant information not mentioned by the participants as well as to confirm data gathered through interviews. The objective of this process was to ensure another layer of rigor and authenticity of the information used in conceptualising the problem. This was an attempt to overcome the criticism of QSD modelling, which is seen as “imprecise and lacking rigor by those trained in scientific methods” (Jackson 2003:79); (Coyle and Exelby 2000:12). Once the problem was clearly defined, the process progressed to the next step in the modelling building exercise. The identification of key variables that formed the boundary of this study were developed through analysis of data gathered through the mental and written databases.

4.4.2 Model Creation

The final stage entails the creation of CLD models. In Chapter 5, variables within the boundary of the study were discussed under each heading. Subsequently, all the dynamics involved in each variable were reported under those headings and subsequently used in the construction of individual CLDs in Chapter 6. Thereafter, these were integrated in the creation of the QSD conceptual model that visually illustrated both obvious and hidden interconnections between variables (Morecroft 2015) at an aggregate level for a holistic overview of the problem.

The previous literature clearly shows that modellers employ different styles to complete this phase. Several system dynamists (Wolstenholme 1985; Braun 2002; Yang 2015) argue that there is no right or wrong method of model creation, a researcher must choose that which is appropriate for their needs. While adapting the model creation from different styles, I was mindful of the key aspects of model building. Firstly, the purpose of the model at this stage was clear. The purpose of the model was to graphically present the dynamics involved in the production and retention of academic staff with PhDs. Secondly, Keating (1999) emphasises the importance of the purpose of a model, arguing that without

it, it is impossible to define the system boundary. The strength of a well-drawn boundary is to know what to include and not to include in model building. The boundary of the models emanated from the data analysis. The themes and codes that emanated from data analysis were used to create individual CLDs. Lastly, in building a QSD model, data available to me was qualitative in nature. As argued by Wolstenholme (1985;1999) QSD can be applied as a separate methodology for systems description and model analysis outside the domain of computer simulation.

As stated in Chapter 1, the aim of the current study is to initiate a discussion in adopting a systems approach to the challenges of the low percentage of academic staff with PhDs, particularly in the UoT sector. SD tools are used to provide senior and middle managers with models for strategy and operational policy development at many different levels of an organisation (Wolstenholme 1999:04). The current study initiated the discussion with the creation of CLDs and system archetypes. This is based on the assertion by Wolstenholme (1999:02) that causal loop diagrams alone could add value to issue structuring and behaviour assessment. This author claims that these diagrams are sufficiently rigorous enough to provide a significant increase in assistance to thinking when compared with other emergent diagrammatic tools. This methodology is in line with recent studies of SD modelling carried out by Singh (2015) and Yang (2015), albeit in different fields. A full-blown SD modelling process that progresses to quantification of variables, development of stock flow maps, testing and computer simulation is the scope for further research.

The model building process for the current study commenced with identifying the variables of interest. For the purpose of this study, scientific qualitative data collection and analysis methods were followed as discussed in 4.3.2 and 4.3.3 in identifying variables of interest. These variables formed the boundary of the current study. The current study has few exogenous factors as suggested by Sterman (2002b) that a good SD model must have few exogenous factors. Thereafter individual CLDs were created for each variable. User friendly software programmes are now available that allow

practitioners to construct CLDs hence, VENSIM software was used to develop CLDs in Chapter 6.

I found the process of building a conceptual model as suggested by Sterman (2000) very useful. He emphasises that few people can understand a complex causal diagram unless they have a chance to digest the pieces one at a time. In this regard, he suggests that modellers must build up the model in stages, with a series of smaller causal loop diagrams. Most importantly, each diagram should correspond to one part of the dynamic story being told in the conceptual model. Equally important is that each diagram contains enough detail to show how the process actually operates. However, the conceptual model should represent this dynamic story at an aggregate level. Presenting a complex causal map all at once makes it hard to see the loops, understand which are important, or understand how they generate the dynamics. I was always consciously aware of the fact that this study is aimed at assisting non-technical system managers to solve complex business problems. Thus, the most important links in the diagram are colour coded for this particular reason. Sterman (2000) cautions that a large, wall-filling diagram may be perfectly comprehensible to the person who drew it up, but to the people with whom the author seeks to communicate it might not be valuable.

Hence, in Chapter 5 individual themes and codes were discussed under separate headings supported with direct quotes. Most importantly, variables embedded under each code were clearly identified. In Chapter 6, these variables were visually illustrated in the form of CLDs to illustrate all the dynamics involved. For example, participants complained about a heavy teaching load which negatively impacted on their progression rate with their studies. They identified factors such as the three tenets, part-time teaching, large class sizes, and administrative duties amongst others. All these variables were identified through data collection and analysis and reported in Chapter 5. These were woven together in words to tell a coherent story about the data. Thereafter in Chapter 6, this coherent story is told in the form of CLDs contextualising it in relation to existing literature to assist managers identify leverage points for policy analysis and change.

The individual CLDs are more comprehensive, revealing all the dynamics involved through links with positive or negative polarity. Reading link polarity in this study is; “a negative link means that if the cause **increases** the effect **decreases** below what it would otherwise have been, whereas a positive link means, if the cause increases the effect increases above what would have been. Link polarities thus describe what would happen **IF** there were to be a change” (Sterman 2000:139). Important to note is that, when reading CLDs, one must look at two variables at a time. Furthermore, one must always assume an increase in the former variable and consider its impact on the latter to assign a link polarity. For example, looking at Figure 3.5, a high mobility rate of academics with PhDs leads to high attrition rates hence a link with a positive polarity.

Further, CLDs pinpoint leverage points. Important to note when reading the CLDs in this study is that the links represent the ideal, and where the converse applies, management intervention is required. For example, participants reported that insufficient funding is one of the main obstacles to progression for completion of their studies. Ideally, availability of funding facilitates progression rate and a link with a positive polarity illustrates this dynamic. However, at XYZ, emerging from themes in the boundary, funding hinders the progression rate, causing unnecessary delays, thus, revealing a leverage point where management intervention is required. Once all the individual CLDs were built, these were woven together to build a QSD conceptual model that communicates the feedback structure of the system at an aggregate level.

Thereafter, system archetypes that exhibit at XYZ were identified. System archetypes are highly effective tools for gaining insights into patterns of behaviour underlying the structure of the system being studied (Špicar 2014:1351). Whereas CLDs graphically illustrate the dynamic interaction between variables embedded in a system being studied, archetypes assist managers see beyond the apparent behaviour and leads them to understand the system in its entirety. This can thus help managers to make better strategic business decisions.

Important to note however is that a model can never be perfect or reveal all the truth, yet as long as they initiate a discussion for further research, they should be acknowledged. In this regard, Sterman (2002b) article puts this assertion into context as he aptly states that all models are wrong, they can never represent all of the truth.

“The concepts of system dynamics people find most difficult to grasp are these: All decisions are based on models, and all models are wrong. Yet accepting them is central to effective systems thinking” (Sterman 2002b:525).

Similarly, Keating (1999:26) announced that “A model is simply an ordered set of assumptions about a complex system. The model we have constructed is, like every other model, imperfect, oversimplified, and unfinished”. An unpublished article by Georg Rasch (n.d) a Danish mathematical statistician says: “Imagine a world where physics like precision is prized over usefulness. We would lack medical care because a medicine or procedure can never be perfect. In a world like this, we would possess little scientific knowledge, because research can never be 100% accurate. We would have no technology because there are always little flaws which can be ironed out”.

Thus, the most pertinent question to ask in this thesis is, does it matter if the qualitative CLD models in this study are not perfect, as long as they initiate a discussion in viewing HE problematic phenomenon of the low percentage of academic staff with PhDs graphically and holistically? As articulated by Burnham and Anderson (n.d), over time, incremental improvements happen through unending experimentation and research.

4.5 Trustworthiness

Several scholars (Bless, Higson-S.C and Kagee 2006; Creswell 2013) insist that reliability and validity are not suitable for evaluating the quality of qualitative research, opting for the use of concepts such as trustworthiness, credibility, transferability, dependability, authenticity, reflexivity and credibility instead. In the same vein, Golafshani (2003) argues that reliability, validity and triangulation, particularly from a qualitative point of view, have to be redefined in order to reflect the multiple ways of establishing truth.

Firstly, Korstjens and Moser (2018) suggest the use of multiple sources of data and categories of participants to add another layer of authenticity and credibility. In this regard, I gathered data from three different categories of participants through interviews and document analysis. Secondly, the authors further advocate for reflexivity, a process of critical self-reflection about oneself as researcher (own biases, preferences, preconceptions). An attempt was made to monitor my own biases throughout the data analysis process in order to produce authentic results. Involving a peer coder served as a source of ensuring authenticity particularly because of my lived experience as a PhD candidate myself, my perceptions could easily cloud my own judgment. To ensure that my assumptions, opinions, and personal beliefs did not influence, consciously or unconsciously, the results of the study, caution was always maintained.

To ensure trustworthiness, I transcribed five interviews and an expert transcribed the remaining twenty interviews. I read the transcripts twice while listening closely to the digitally recorded interviews to ensure that the transcripts captured accurately what was said. Subsequently, data from different sources and different categories of participants was triangulated to ensure corroboration of data in forming themes. To ensure dependability in the themes generated, a peer coder, who is a retired research director from the institution was involved. In addition, sufficient direct quotations from the transcripts were included in the findings/results chapter to share excerpts of the participants' stories using the same vocabulary and context (Luna-Reyes and Andersen 2003).

4.6 Ethical considerations

Ethical issues for the current study were addressed at various levels of the institution in order to ensure adherence to the research policies (Yin 1994). In this regard, at individual level the appropriateness of my behaviour in relation to the rights of the participants was guided by institutional research parameters and protocols (Kipkebut (2010). In adhering

to ethical considerations, I ensured anonymity and confidentiality of participants as well as authenticity of research findings.

Participants were assured that data would be protected by encryption with a password in a computerised system or saved as PDF files where necessary. This was to ensure that their information did not fall into the hands of other researchers who might appropriate it for other purposes. The information will be stored for 5 years and deleted thereafter. On the consent form, they were asked to select a pseudonym in place of their names, and the gender and racial/ethnic terms they prefer in reference to their identity should they need to do so.

4.7 Conclusion

This chapter outlined the research design and methodology followed in conducting a single holistic case study at XYZ. An emerging research methodology of systems thinking and system dynamics was adopted in viewing the problem of low academic staff qualifications holistically. An in-depth literature review conducted in Chapter 2 led to the identification of important topics and subsequent design of research questions for the study. The design of research schedules was informed by these topics and research questions. Through piloting, the research schedules were further refined before data collection.

The chapter outlined how the data was gathered from different categories of participants and sources to ensure that the phenomenon was viewed from different perspectives. Gathering data from different categories of participants and sources was necessary for triangulation purposes. This was an attempt to add another layer of authenticity of the findings from the current study.

Chapter 5: Results

5.1 Introduction

Chapter 5 is an integrated report from interviews conducted with 25 participants, academics across the three faculties, academic management and administrative staff to answer the research questions from this study. In this regard, semi-structured interviews were conducted to determine key constructs that facilitated or inhibited the production and retention of academics with PhDs at XYZ. The design of the interview schedule comprised of three components which answered questions 1 – 3 of this study:

Academic staff profiles – for the purpose of this study, biographical data was necessary i) to ascertain the age of PhD candidates at entry into the PhD study, ii) determine the size of the family, iii) the hiatus period between obtaining masters and registration at PhD level and iv) the type of the candidate's master's degree,

Production factors – to determine the academic support provided by the institution and the challenges experienced by PhD candidates.

Retention factors – to explore the factors that influence staff to leave academia altogether, change universities or stay at XYZ.

The findings are presented and discussed under the three broad themes namely, academic staff profiles, production of academic staff with PhDs and the retention of academic staff with PhDs in Sections 1-3. As suggested by (Bless, Higson-S.C and Kagee 2006) academic staff profiles, production and retention themes were broken down into lower level codes with a narrower scope that emerged from coding interview transcripts. The key constructs that emerged from these three broad higher-level codes are presented in Table 5.1.

Table 5.1 Factors facilitating or inhibiting production and retention of academic staff with PhDs

Academic Staff Profile Theme	Production Theme	Retention Theme
Age at entry Family responsibilities Hiatus period Type of masters degree	Academic support: Funding HR processes Research infrastructure	PQM: Level Breadth
	Challenges experienced by PhD candidates: Academic workload Supervision Research skills PhD administrative processes	HR processes: Remuneration Promotion Spirit of Ubuntu

Codes that emerged from the three components will be discussed under each section. Each code is discussed and supported by raw data emanating from the participants' mental databases (actor's heads) in this chapter. Quotations from data are reported verbatim. Subsequently, these will be depicted in the form of CLDs. The way these codes influence each other is the starting point for the construction of the final CLD which answers the overarching question of this study. Table 5.1 illustrate the themes and categories which have been used to label the headings and sub-headings in Chapter 5.

5.2 Academic staff profiles

Question 1 of this study seeks to determine "Why is there a low percentage of academic staff with PhDs in South African HEIs in general and UoTs in particular?" This was explored in the first section of the interview schedule. The results of this study found that the profiles of academics, particularly in the UoT sector contributed to the low percentage of academics with PhDs in this sector. Technikons were teaching-led institutes with no

research and PhD mandate. As a result of the change to UoT in 2004 and programme offering mandates, academics are under pressure to improve their qualifications.

Analysing the biographical data of academic staff revealed that the age of academics at entry into the doctoral studies, hiatus period between their completion of a master's degree and registration at PhD level, the type of master's degree and the size of the family were the main determinants of the rate at which academics progress in their studies. Due to the legacy of the apartheid era, academics teaching at UoTs and in rural or peri-urban institutions did not have PhDs because these institutions had previously no mandate to offer postgraduate qualifications. The pressure to improve academic staff qualifications only came to bear after the 1994 elections, when Technikons became UoTs in 2004 and their mandates with respect to programme offerings were changed. XYZ University Council only pronounced in 2009 that the minimum qualification for an academic must be a master's degree. A PhD or a significant progress towards a PhD was set for academic management.

As a result of the XYZ Technikon legacy, existing academics were in their 30s and 40s, thus juggling family responsibilities alongside their studies. They have had a long hiatus period between completion of their masters and registering for a PhD. The majority of these academics had obtained masters by course work and mini dissertation, the most popular form of master's degree in this country (DHET 2014). The analysis in this section profiles academics and excludes academic management and HR participants because their profiles have no bearing on the percentage of academics with PhDs.

5.2.1 Age at entry into PhD

Findings of the current study revealed that approximately 77.8% of participants were above 40 years old at entry into their PhD studies. The remaining 22.2% age category 25 – 34 was comprised of nGAP lecturers, which is not surprising as the programme is designed for introducing and nurturing young people into an academic career, thus the recruitment process specifically puts the ceiling at 40 years for potential nGAP candidates.

The current study found that age goes hand in hand with family responsibilities. Except for the youngest participant (29 years old) all other participants were juggling family responsibilities. Table 5.2 illustrates the breakdown of participants in terms of age category at entry into their PhD studies.

Table 5.2 Age profile of academic staff at entry level into PhD studies

No.	Age category	Number of participants
1	55 – 64	3
2	45 – 54	5
3	35 - 44	6
4	25 - 34	4
Total		18

5.2.2 Family responsibilities

On average, participants had three children ranging from age 4 to adults (pre-primary school to university students). All participants reported challenges of balancing family responsibilities with work and their PhD studies. Surprisingly, this applied to both participants with young families and those with children at university. Two young single mothers expressed feelings of guilt for not being able to give full attention to their young children. One of them said:

“What’s really hard for me especially being a single mom to a 4 year old? Now moving to Durban without any family support or people that you can go to. That has been very hard because you in the middle of a breakthrough in terms of your research but if your son needs you because there is nobody else you need to stop everything, there’s no back-up plan, it’s just you. Finding time to do my research and time to teach and everything that comes with it and having time to take care of my son. Weekends help but it’s also time for my research. You have to mark 360 scripts, be with family and do research. It’s like

where is time for me? That's when you go and jog. We have evening classes and sometimes you can't even put your child to bed" (nGAP 4)

A married participant with grown up university children also expressed similar sentiments as the two young single mothers about the challenges of balancing family, workload and studies saying:

"Well, as for my younger son, he was still in primary school when I started doing my PhD. When they come back from school, you have to help them with homework, and sometimes he is not well, and sometimes during the weekends he has got to go and play sports, I have to take him there, bring him back, all those kinds of things. And my eldest son was in high school and then he went to varsity. When he was in varsity, when he was doing his honours, he also needed my assistance as well. So, I had to put aside my work and assist him with his work, because you know I had to push him" (Aca 12)

5.2.3 Hiatus period

Literature refers to the time that lapses between completing a master's degree and registering for a PhD as a hiatus period (Herman 2011d). Findings of the current study revealed that the majority of PhD candidates experienced a hiatus of more than 10 years. Only two academics employed on a "normal" academic contract experienced a hiatus of less than five years. The rest of the category was comprised of nGAP lecturers where the employment contract compels the incumbent to complete a PhD within 6 years. Thus, the nGAP cohort is compelled to register for a PhD immediately upon completion of their master's degrees.

Table 5.3 Number of years between completing a master and PhD registration

No.	Hiatus period	Number of participants
1	10 years and above	6
2	5 - 9	5
3	Less than 5 years	7
Total		18

5.2.4 Type of masters degree

The current study revealed that there are five different types of master's degrees offered by national and international universities. It determined that the most popular type of master's degree in this country is that by course work and mini dissertation. Masters by coursework and "full" research undertaken by 2 participants in Table 4.4 were foreign qualifications.

Table 5.4 Type of participant's masters degree

No.	Type of degree	Number of participants
1	MBA	1
2	Coursework only	1
3	Coursework plus mini dissertation	10
4	Coursework plus "full" research	2
5	Full research	4
Total		18

One respondent with a foreign master's degree and pure research component said:

"It was course work plus dissertation. Not mini, but pure research. Ok. Maybe the starting point is, I did my masters in Zim. The norm there is: there is nothing called mini dissertation. (Aca 3)

5.3 Production of academic staff with PhDs

Question 2 explored “the challenges of producing academic staff with PhDs in South African HEIs in general and UoTs in particular?” From the analysis of the interviews with staff it emerged that the two main factors that facilitate or inhibit the extent to which academics progress in their doctoral studies resulted from the support provided by the institution and the challenges experienced by the PhD candidates themselves (see Table 5.1). In this section, codes under each category will be discussed and supported by quotations from raw data.

5.3.1 Academic support

Several participants highlighted academic support as the most crucial variable that impacted on their PhD progression rate. In this regard, the three variables that emerged as dominant from the data analysis that facilitated or inhibited the progress of academic staff in obtaining their PhDs were:

funding,
human resource processes and
the research infrastructure.

Although the institution makes provision for academic staff pursuing doctoral degrees to a certain extent, data revealed that this information is not effectively communicated to staff or that staff were not actively seeking information on the available programmes. For example, the institution makes provision for staff to ring-fence their leave days for study purposes. In addition, it makes funding for research purposes in the form of a Research Development Grant (RDG) available. However, some were not aware of these programmes.

5.3.1.1 Funding

The availability and impact of timeous funding was explored under the second component (production factors) of the interview schedule. The availability of funding determines the rate at which the candidates progressed with their studies. The following issues were prevalent in the analysis of data:

Knowledge about the sources of funding,
Criteria for sourcing and utilising allocated funding,
Funding requirements at different stages of the research and
Discipline specific funding requirements

Sources of funding which came first to mind for most participants were the NRF fund and the RDG. Although research funding is available in the form of the RDG which has recently been incorporated into the University Capacity Development Grant (UCDG), some participants were not aware of this academic support programme, alluding to poor communication or lack of initiative on the part of academics. One respondent summed up as follows:

“Not familiar because of the stage in my research. I am not certain about the amount” (Aca 6)

The majority of participants however complained about the cumbersome nature of accessing NRF funding and RDG. Divergent views were expressed in this regard by academics and academic management alike. Participants further bemoaned the recent changes in the utilisation of allocated research funds. They alleged that from 2017 funding requirements changed, the criteria for what the funding can be used became more restrictive to the extent that some academics stopped applying for the RDG altogether: These changes provoked very strong negative views from participants as follows:

“Yes, that one (RDG) I had access to it, over the last couple of years, but it does have a lot of red tape, in terms of the DHE requirements, what they can do or not do. So, I needed a lot of consumables, a lot of inputs, so they

do not pay for that, which resulted in me having to source out external funding, and fortunately my supervisor was able to do that...” (Aca 8)

One respondent complained about the cumbersome nature of the application for NRF funding and the lack of support provided in this regard.

“I just got the email, and the deadline for it was around the corner. It was saying we must fill it as the deadline is on such a date. Only to find out that when I look at this thing it needs a lot of documentation that I might not even be in possession of at that time. And there is no assistance, the emails that have been sent prior, and we waited thinking that there will be a time when people will take us through how you go about applying. Then later on, another email comes through saying that the deadline is just on this date....” (Aca 9)

Two academic managers concurred with the sentiments of the above respondent saying:

“It does, the NRF certainly makes provision for replacement lecturers as far as studies are concerned, so that is available, and according to the research office...when you speak to them they say it is easily available, however my personal experience is that it is not, not that easy. It is not automatic”. (Mngt 4)

Conversely, one respondent from Science, Engineering and Technology (SET) felt that the NRF funding was easier to secure than the internal RDG grant saying:

“Well if you follow through the NRF process, it is not difficult. But the institutional ones are more of a challenge..... But the NRF one is fine because for that you just need to apply and the call goes through the DVC for research and they approve it” (Aca 8)

Furthermore, the study revealed that funding requirements are dependent on the stage of the research and discipline. There was a consensus that during the proposal stage of the

research, funding provided by the institution from the RDG was sufficient for the needs of all respondents. However, beyond that stage of the research, while respondents from Management Sciences felt that the RDG funding provided by the institution largely satisfied their research needs, candidates from Natural Sciences and Engineering indicated that funding from the RGD was grossly insufficient. The views of both the participants and academic management from the faculties of Natural Sciences (FNS) and FE were consistent:

“I had a serious challenge with my funding needs, I needed a lot of money because I had to do about 4 tests, blood tests.... from the research itself I needed quite a lot of money....” (Aca 8)

Another challenge is the software that we are using, demands high spec computers. We find it difficult to buy it because they said we must use the university one and that one is just a generic computer. That alone is a challenge because we should be asked what specification computer we need. With the university low spec computer, something that can take you 30 minutes can end up taking the whole night. It causes so many delays. (Aca 10)

“...It (NRF) is not easily accessible it takes a long time to get it, and the deadlines are restrictive, so it is not easy to get that as far as replacement staff are concerned. Funding in the science discipline as we are, there is quite a lot of either field or laboratory work, where there are instruments and things to be purchased. There is consumables that are used. The internal funding (RDG) in the university, I have found to be very good as far as accessing is concerned, but obviously it is limited” (Mngt 2)

5.3.1.2 Human Resource processes

National policies and the HE ecosystem have brought pressure on HEIs to increase the percentage of academic staff with PhDs. Changes in legislation with respect to the types

of institutions in this country has resulted in technikons becoming UoTs. Consequently, their mandate in terms of types of qualifications has also changed as stated in Chapter 2. These changes brought about pressure on academics in the UoT sector to improve their qualifications.

As a result of these policy changes, the institution (XYZ) embarked on a project of fast-tracking academic staff qualifications by creating a Research, Innovation and Engagement (RIE) unit headed by the Deputy Vice Chancellor, and the appointment of research professors in all the faculties. These initiatives have contributed somewhat to the changes in the research culture of the institution. Although participants acknowledged the stimulation of the research culture brought about by these changes, they still bemoaned the actual support in terms of their studies from the RIE unit and the HR&D unit. Prior to these changes, participants stated that there was no culture of research, academics who had previously completed their studies were not encouraged or motivated to pursue doctoral degrees. Consequently, academics who completed their masters before 2004 have experienced a hiatus of more than 10 years. They attributed the erosion of their research skills to this long hiatus period which in turn has, to a certain extent, had a negative impact on their progression rate.

“I know more people are engaged in research in our department in particular there was a time when nobody was interested in research, but the culture has now since changed. And we have got many staff members that are engaging in research and wanting to conduct studies and present papers” (Aca 13)

“I finished my masters in 2003. Now that’s a long time not to be studying up to 2016 right. But I always wanted to start a PhD, but I feel like I didn’t have the necessary support and the guidance from the institution in 2004 when I had graduated with my masters. Everybody was telling us do PhD but there was no one giving us the guidance.” (Aca 4)

There was a consensus amongst participants that academic support is one of the most crucial factors that can facilitate or inhibit the PhD progression rate. Participants emphasised the need for clearly articulated support programmes at all levels (departmental, faculty and institution-wide). However, the positions of DVC administration as well as the academic leadership in the institution, and the positions of DVC Teaching and Learning and Dean of all three faculties were held by acting candidates. Lack of policy clarity and availability thereof were attributed to this management instability by participants. One telling statement was summed up by one academic manager as follows:

“... as a caretaker ..., it is often quite restrictive as far as putting strategies into place are concerned because you are never sure exactly how long you are going to be there” (Mngt 1)

Variables such as time off emerged as those that required coordination between the department, faculty, RIE as well as the HR&D units. Time off however requires HR policies in order to ensure consistency in its application. Data revealed that the majority of academics and academic management alike were not aware of the HR&D policies that are intended for academic staff development. Those that were aware of some of the policies and initiatives claimed that they were very confusing. The high turnover of senior management in the HR&D unit has contributed to poor management of academic staff development initiatives. As stated earlier in Chapter 3, the senior Director for the unit resigned before he could be interviewed for this study. In this regard, an HR&D director not responsible for the management of the entire unit shockingly revealed that:

“At this stage we do not have [sabbatical leave policy]. We have developed a draft of a sabbatical leave, as far back as 2013, but it hasn't, as far as I know it went to all the structures; the faculty board, the senate, and to council for noting, but it has not yet been approved....” (HR1)

Academics have an option of taking sabbatical leave if funding through external sources such as the NRF is secured to pay for replacement staff. The other option is through the

utilisation of ring-fenced leave days. The institution encourages academics to accumulate and ring-fence leave for study purposes. Academics are entitled to a-day-for-a-day leave for study purposes. However, the difference between sabbatical leave and ring-fenced leave are not understood by academics and academic management. The lack of policy clarity in this regard has created the confusion alluded to by participants.

“... what I need to read further maybe is that how does the leave that we ring-fenced related to sabbatical. I know that the leave that we ring-fenced is on one on one, the employer gives you one day, and you give one day. So that is what I understand. With sabbatical, I am not sure if we have a policy” (Aca 5)

“The only policy I know is that there is just leave policy. There is issues about sabbatical leave, there is issues about long leave, and there is no clarification from HR what so ever regarding these policies” (Mngt 3)

The inconsistency in the application of study leave is best illustrated by a respondent who secured NRF funding and utilised her ring-fenced leave days simultaneously. The respondent said:

“Yes. My leave...the NRF funding has to coincide with also the availability of the fact that you have got available days. NRF simply provides funding for a replacement for you. You need to work out our own leave days. But even though the funding came from NRF, HR had to get involved and allow for the rollout of that leave, otherwise if I didn't have days, they were going to have a problem with it” (Aca 8)

The inflexibility of working hours was another bane of academic staff, some even used unflattering terms such as “glorified high school”. Academics are expected to keep core working hours between 08:30 and 14:30. Although the institution encourages staff to pursue doctoral degrees, the inflexibility of working hours is not conducive for research

because of the shared office space and noisy surroundings. Strong negative views were expressed by participants regarding working hours as follows:

“We are expected to also confine to working hours and things like that. So, it does impact on your research. I just believe that sometimes the work can get done from out of the university, but we are expected to be at work. I think the whole notion that we have working hours, it really needs to be abandoned. I have colleagues from other universities, I mean their research output is amazing, and their academics actually do work from home. They are far more productive, they are very accessible, and should there be a crisis at work they come in. We have not emerged in our ideas and our thinking. People want to see you at work, and if you are not at work, the impression is that you are not working” (Aca 7)

5.3.1.3 Research infrastructure

Research infrastructure not only emerged from data analysis as a factor that inhibited the participants' PhD progression rate but as one of those that influences their decision to stay or leave the institution. Career progression in academia is governed by both one's academic qualifications and research output. Provision of research infrastructure is therefore an important consideration not only when participants are pursuing their doctoral degrees but beyond such a qualification for career advancement purposes.

In addition, the level and breadth of the institutions' PQM emerged as the determinant of the type of research infrastructure provided by the institution. The institution offers a limited variety of programmes compared to other institutions under three faculties. Many of these programmes are offered at lower levels. As stated earlier, the institution has set a target of only 6% postgraduate enrolment by 2025.

In a similar vein to research funding, research infrastructure is, to a certain extent, discipline specific. For the purpose of this study, research infrastructure refers to research related equipment, laboratories, library, databases and network amongst others.

Participants from FE and FNS were the hardest hit by the lack of physical infrastructures such as laboratories and equipment. Two participants from FE and FNS revealed that:

“I think that these challenges vary from department to department. You know the biggest challenge in the beginning goes to establishing the infrastructure needed for research, because it is not feasible for people to look for equipment elsewhere, if they are working” (Mngt 2)

Another respondent concurred saying that:

“We should be able to buy equipment and have a lab. Having a lab would not be possible until we move to a space where we have higher qualifications. For me lab, equipment and higher qualifications are interconnected” (nGAP 3)

The majority of participants regardless of their discipline complained about the difficulty of accessing suitable reading material. This problem was attributed to the limited number of database subscriptions available, with participants linking this directly to the restricted length and breadth of PQM offerings. Some complained about inaccessibility of these limited available databases off campus. Participants reported that they rely on reading material from the institutions where they are registered. However, beyond the PhD, these same challenges will also have impact on any future research output and career advancement. Extracts from academics and management regarding these challenges are as follows:

“So, the infrastructure I can say is limited, when I go to XYZ library I couldn't find the resources that were relevant to my study due to the level of the programmes offered by the institution. Here we have diplomas and BTech but when you are looking for material for masters or PhD books you couldn't find anything unless you go to the subject librarian to assist you in terms of downloading e-books but there was nothing on the bookshelves, so that was another challenge for me” (nGAP 1)

“... no sufficient reading material because the institution does not offer programmes in my discipline cannot access databases from here, have to use databases from where I am registered” (nGAP 3)

“.... you know we have access to the databases, it is only that we struggled with accessing them from home.... That is why I ended up using my son’s one, because when he was at UKZN, it was easily accessible even at home, but ours here, there are times when it is not accessible. It was the EBSCO host, so it was not accessible all the time” (Aca 12)

One academic manager summed up the research infrastructure challenges as follows:

“In my view the access to databases is totally insufficient. The access to online resources cannot compare to what traditional universities have, because then you are travelling, you have the opportunity to access databases of other universities. It is so much. And especially... perhaps it relates to the range of discipline that we offer... Because if a university is large and offers a wide range of disciplines, than off course the subscription to databases would be much wider. And there is obviously factors that pertain to more than one aspect or disciplines, where you have the ability to access literatures maybe from different fields, but it is still relevant to what you are researching, whilst here, it is much, much narrower.

“But I think that they are both related because as a university, they mostly cater to students rather than staff developmental needs. Students are the customer, so our first obligation is to provide everything for the student. The majority of the students are registered for a diploma, the research component is non-existent. There are a few BTech, so their level of resources which are provided are tuned to their level. If we could offer

more masters programs, I suppose that we need to expend on that, our databases”. (Mngt 2)

An nGAP lecturer summed up the infrastructural challenges experienced by academics pursuing doctoral degrees as follows:

“The internet is a problem, I don’t have an office, I’m sitting in a park home and the network is bad You can’t have them sharing offices... When you want to do your research, the server is down you have to use your data that should not be the case. University should provide infrastructure.... when you are applying for these nGAP programmes as an institution you have to be ready in all aspects of what they might need. You can’t have internet problems and expect people to do research. You can’t have them sharing offices, you need to provide proper equipment” (nGAP 1).

5.3.2 Challenges experienced by PhD candidates

Workload, supervision, participant’s research skills and the administrative processes associated with a PhD emerged from data analysis as the main factors that inhibited a participant’s PhD progression rate (see Table 5.1). However, one staff member brought up an important issue of staff morale saying:

“I think the biggest problem as far as motivating people to undertake post graduate studies is staff morale. Staff morale plays a critical role, I mean if staff are not motivated to come to work, they are not going to be motivated to study further.... I think the biggest problem is direction, and direction from the top. The sort of top floor is certainly creating a problem in staff morale as far as I am concerned. Staff do not see light at the end of the tunnel, because there is so much in fighting on the top floor that it is really difficult for them to see where to go. And one would think that what happens on the top floor doesn’t emanate down, but it certainly does. And it gets right down, through the full academic and non-academic side of it....” [...]

5.3.2.1 Academic workload

There are two distinct and different employment contracts for permanent lecturers at XYZ – the “normal” academic employment contract and the nGAP contract. The main difference between the two contracts is the restricted 20% teaching load assigned to the latter. For that reason, the views of nGAP lecturers from the three different faculties will feature prominently in this section.

Workload emerged as the main variable that inhibited PhD progression rate, not only for academics but for nGAP lecturers alike. Surprisingly, the timeframe for the completion of a PhD was set at an average of 5 years by participants irrespective of their employment contract. Understandably however, important as reduction of workload is, nGAP lecturers were still constrained by other challenges that the other academics grappled with.

Variables cited by participants that contributed to an increase in the academic workload are, research requirement, community engagement requirement, class size, number of groups per academic, academic administration, extra effort needed in assisting under-prepared students and part-time teaching particularly for the faculty of Management Sciences (FMS) where all programmes are offered on both a full-time and a part-time basis. Some programmes in the faculty of Engineering (FE) are offered on a part-time basis as well. Exogenous as family responsibility might be, participants viewed it as a variable that increases their workload.

Regarding the three tenets of an academic portfolio, it is universally acknowledged that academics are expected to participate in teaching, research and community engagement particularly if they aspire to advance their careers in academia. Participants alluded to the challenges of balancing the three while at the same time improving their qualifications.

“At work, I think to juggle between your lecturing, research and community engagement and finding time to work on your thesis it requires a lot of discipline” (Aca 13)

Data revealed that the institutional enrolment has been increasing; however, this increase has not been accompanied by a comparative increase in academic staff numbers. High enrolment has had a direct impact on the class size, academic administration, number of groups per lecturer and the requirement to expend extra effort to assist under-prepared students. The large class sizes, however, were cited by participants from FMS and FE. On the contrary FNS reported very small class sizes and attributed the small class sizes to restrictions from professional bodies and from infrastructure such as laboratories. Academics, regardless of their discipline and employment contract complained about the academic administration. The bane of all was that the institution makes no provision for marking assistance which is a norm in other institutions.

Compounding the challenges of a heavy teaching load is the issue of part-time teaching in the faculties of FMS and FNS. On paper part-time teaching is voluntary at the institution; lecturers have an option to sign a new contract of employment annually for the evening programmes. However, in practical terms the contract is not voluntary at all. It is the responsibility of the HOD to look for a part-time lecturer when an academic refuse to teach the subject in the evening programme. The same academic is dependent on the same HOD for their overall well-being in the workplace. Although academics are compensated for taking on extra teaching, for most academics pursuing doctoral degrees, the main reason for taking on part-time teaching is trying to avoid “biting the hand that feeds you”. Below are some of the comments from academics on part-time teaching.

“You see, even though it is a little bit of a grey area because we are being reminded that it is part of our working contract. However, you have to sign a separate working contract to do the evening lectures, so there is a bit of a grey area, but we are expected. There is an expectation of us....” (Aca 2)

“The impact is that I only have one day free in a week. I only have one evening free in a week So I end up not having enough time, you know to do my studies, because I have to be here in the evening” (Aca 5)

The views of one participant from NS were:

“To tell you the truth for me, the workload I do not have a problem with, as long as I do not have evening classes. That one is just destruction because you cannot cope” (Aca 8)

One academic further highlighted the issue of taking on phased-out modules due to the higher education qualifications sub-framework (HEQSF) requirements.

“Ok, alright in terms of the workload, we have high student ratios, right, we have day class, and we have evening class, which takes a lot of time and energy, right. Then also we are required for phasing out programs, we are required to assist with those subjects, so it takes up quite a lot of our time, right” (Aca 1)

Another element as indicated in Chapter 2 is that UoTs are still burdened with underqualified staff because they were established as teaching technikons with no research mandate. Consequently, the majority of staff, HODs and Deans do not hold PhDs. In addition, the change from technikon to UoT has put pressure on the academic leadership (HODs and Deans) to improve their qualifications to PhD level. One HOD highlighted the challenges of carrying a heavy workload while pursuing a doctoral degree. The participant aptly put it as follows:

“I think the administration consumes most of my time, but if I say lecturing, I have 2 subjects that I lecture, and it is a workload which is sometimes equal to a senior lecturer. So, I have 2 subjects that I am taking, and also, I do administration of the department, like your registration.... The other challenge is like I mentioned administration and included in the administration is the number of meetings that we have as HOD's. We have quite a number of meetings, HOD meetings, faculty board meetings, representing the faculty at Senate.... because we also have the evening load, you know which has its own challenges. Yes, I am lecturing in the evening, and I am also doing 2 subjects as well” (Aca 5)

While nGAP academics are assigned a 20% teaching load (DHET 2015), this was not applied consistently across the three faculties. Although the terms and conditions of the employment contract for nGAP lecturers are the same, data analysis revealed that the actual implementation is solely dependent on the discipline and academic unit. The DVC Teaching and Learning pronounced in a meeting attended by HODs with nGAP lecturers that for the institution, 20% workload constitutes one subject. However, the most salient features of the workload such as class size with all the academic administration that goes with it, part-time teaching and assigning teaching assistance was left to the discretion of line managers or the meeting was silent on such matters. Thus, the following excerpts will illustrate the variations in the implementation of the workload for three nGAP lecturers in three faculties.

nGAP lecturer 1 said:

“I definitely think that aspect should be reviewed and revisited both internally by the HOD as well as DHET. We were for example the first ones this programme was rolled out to and as we are going are encountering problems and DHE is assisting us in fixing them, so I think especially in the third year the fourth year when the workload is increasing those aspects would be revisited. Lucky that DHET comes annually we can talk about all these issues because as I am looking at it, I couldn't even complete my masters on time because of the workload. I have already been speaking to my HOD about the fact that my workload cannot increase in my fourth year because I have been sitting at 80% of my workload since I started. There is no way you can increase that to 90% already in the fourth year because initially I was supposed to be sitting at 20%. The first year I have been sitting at 80% as we speak, which is not fair.... Not quantified by me but by the HEMIS department. We were told to take the amount of time me spend in teaching and marking. All that information is quantified but I don't know how it is done. We are told at the end of the day how much our workload is.

They quantify it for us given the fact that I had for example 360 students last year. The 80% that I'm talking about was assigned to me by the HEMIS office.... when I was sitting at 70% to 80% workload and I wanted to get tutors the first response was, you are an nGAP lecturer therefore you will not get a tutor. And I'm thinking is it not the converse, because I'm an nGAP lecturer I should have a tutor to assist me because I'm not supposed to be sitting at this workload"

nGAP lecturer 2 said:

"DHET created a platform for young academics to come into academia, give them less workload but push them to complete the next qualification they want to achieve. It's a tool to attract young academics especially in [discipline] because academia is not particularly attractive. For me there is no difference between the employment contract of a normal lecturer and an nGAP lecturer. For me the only difference is the workload.... no one was able to explain this (20%) to me. In the university they said it is one subject. For me the class size is not big, so it is not bad. I have seen other colleagues who have about 300 students. I do not know if that is still 20%. Last year I had 120 students and an assistant who helped us with the marking. If this was not so it will be difficult"

nGAP lecturer 3 said:

"My current workload, even though I would not be able to measure it accurately, in terms of percentage, it is basically one subject with a total of 80 students. This is both day and evening students. I also teach a small group of about 30 students, which is perfect from a workload point of view"

5.3.2.2 Supervision

Data analysis revealed that supervision is one of the main variables that play a key role in facilitating or inhibiting a PhD candidates' progression rate. Key constructs cited by participants in this regard were, the supervisor's workload, frequency of meetings, feedback turnaround times, research skills of both the supervisor and the PhD candidate as well as the relationship between the two.

Data revealed that the workload of a supervisor is comprised of teaching, supervision at masters and doctoral level as well as administrative duties. Two participants reported an uncharacteristically heavy workload for their supervisors as follows:

“When I registered in 2016, for my masters in [...], the university fortunately or unfortunately only have one expert who is a specialist. The three modules are done by the lecturer who is ultimately going to be your supervisor for your mini dissertation. He is appointed for all the students that are in that class. As you mentioned, I think it is very critical, he is already sitting with 18 students from last year and he has got students from the previous years and PhDs. He is sitting with that workload, I must be honest, Ja, the supervisor is very busy” (nGAP 4)

“... when I started my honours and my masters my supervisor was the same person. The only challenge I have, even though I know him well he has been my supervisor, is that he is very busy, extremely busy. He is not just a supervisor, he is a professor and he is in management. He is between different campuses” (nGAP 2)

Participants, when asked about the frequency of meetings with supervisors and the turnaround times for feedback on submitted work, expressed negative sentiments. Some reported that their supervisors respond timeously to WhatsApp messages and emails whereas they prefer face-to-face meetings. Some reported delays in the turnaround times and the poor quality of feedback on submitted work, alleging poor quality of supervision.

Few participants attributed poor quality of supervision to the skills of the supervisor. However, the majority of those that complained about the quality of supervision acknowledged that their supervisors were experienced but very busy and inaccessible. In this regard, one participant summed up as follows:

“As far as I am concerned, he is an excellent supervisor, a professor but very busy” (nGAP 2)

The research skills of both the supervisor and the PhD candidate in this country are well documented as discussed in Chapter 2. Findings on the research skills of PhD candidates emerged from data analysis as an important variable that warrants urgent attention and is thus treated separately. As such this will be discussed as an independent variable later. The following excerpts are indicative of the structure of the supervision of PhD candidates in this country:

“In terms of his availability if you make an appointment he would be there, he is so nice so reachable on WhatsApp, leave him a voice message he would get back to you and provide feedback. As I progressed, as I started writing my second chapter in terms of getting feedback from him it took a bit longer because of the students he teaches. The response times were further delayed. It is sometimes demoralising because you want feedback so that you can proceed” (nGAP 4).

“No, no structure, I would have liked that. I would have loved to meet him every second or third week at the very least. He cannot put down dates for me because his schedule is so crazy and most of our meetings is via email, I would have loved more face-to-face meetings” (nGAP 2)

5.3.2.3 Research skills

The findings of the current study cited the type of masters undertaken and the hiatus period between completion of a master’s degree and registration at PhD level as key determinants

of a PhD candidate's research skills. The findings showed that the longer the hiatus, the higher the erosion of research skills. Approximately 50% of participants had experienced a hiatus of more than 10 years by the time they registered for their PhDs (see Table 5.3). The same candidates experienced major issues with respect to supervision and the time it took them to complete the proposal stage. Approximately 40% of the participants had initially set a timeframe of 3 years for their studies however this duration had since been revised to 5 years on average.

Furthermore, most participants who completed master's degrees by full research were found to be better prepared for the rigors of PhD research. These candidates completed their research proposals in a shorter time and were less dependent on supervisors than their counterparts who did mini dissertations. Another element brought up by participants as a key determinant of research skills was the structure of professional degrees that do not have a research component (see Table 5.4). Some of these participants completed their proposals in 2½ years and revised their timeframes. One participant who did coursework and a mini dissertation and another who did coursework took seven years to complete their PhDs. Some participants reported that the recent changes in the research culture of the institution have brought pressure to bear on all academics to publish, resulting in less support provided to colleagues. As stated earlier, participants bemoaned the support from research professors from the RIE unit and their supervisors and tended to rely on colleagues with PhDs for support.

To mitigate against these challenges, the nGAP programme offers numerous advantages to candidates if managed efficiently and effectively by line managers who are responsible for appointing mentors. As stated in Chapter 2, the nGAP programme offers mentorship amongst other benefits. In this regard, one nGAP participant said:

“My research was less than a mini dissertation. So, my research skills were nowhere. The current mentor that I have is very good at researching. I have already spoken to him about it and I said to him this groundwork that we

are doing now [masters level] I would need for my PhD studies. When I start my PhD” (nGAP 4)

This section will utilise the raw data to illustrate the impact of types of master’s degrees as well as the hiatus period on the research skills of participants.

Professional degrees:

“When you study to become a you study 7 years, and do not have a single component of research, so you find that you come here and you all of a sudden you are in a situation where you studied for many years, you professional in your field, you are good practically, but from an academic standpoint your research ability is very poor. So that’s what took me so long to find my feet” (Aca 4)

“Another personal challenge I have is coming from an [professional degree] background, we haven’t been trained to read long journal articles, long books. This whole process of reading to actually learn seriously, I have to learn how to read, digest, and to write in my own words, and not plagiarise.... I consider myself sometimes under prepared in terms of the comprehension literally literacy skills” (Aca 1)

Below are the views of candidates who experienced a long hiatus period:

“I finished my masters in 2003. Now that’s a long time not to be studying up to 2016 right. But I always wanted to start a PhD, but I feel like I didn’t have the necessary support and the guidance from the institution in 2004 when I had graduated with my masters. Well, when I started, I said to myself as a goal I should be finished with this in 3 years. So, the way I see it now it will be gone to March 2018 to do my interviews. So, therefore I am saying this has become like 3 to 4 years to complete”. (Aca 4)

“The time frame that I had set for myself was 3-4 years that was then extended to 7 years” (Aca 12)

5.3.2.4 PhD pre-registration challenges

Data analysis revealed that one of the key variables that had a negative impact on the duration of the PhD was the period before the approval of a research proposal. The majority of participants referred to this period as the pre-registration period. There was however, no consensus on the definition of the term; some participants believed they registered only after approval of their proposal while others believed they were registered from the onset. For the purpose of this study, the pre-registration period will refer to the period up to the approval of the proposal.

“I registered at the beginning of this year I think somewhere in June. Whereas I started my proposal last year. It has been approved. Now there comes the stage where, in this year after they have given me the go ahead, that it has been approved, and I needed to register. Because before your proposal is approved, you cannot register” (Aca 9)

The major challenges cited by participants with respect to this period were availability of supervisors, guidance on the selection of topic, administrative related challenges from the institutions where candidates are registered and securing gatekeeper’s letters.

Different universities have different requirements for consideration of new students during the pre-registration phase. Some participants reported that they were allocated a supervisor from the outset, while some claimed that they were asked to develop a proposal that indicated their area of interest and were subsequently only then allocated a supervisor. The selection of a suitable topic during this stage where students have no proper guidance contributed to the lengthy pre-registration period. The majority of participants reported that they changed their topics several times at various stages of development and had to start from scratch due to poor supervision. As stated earlier, mentors can fill the gap of lack of supervision for nGAP candidates if properly selected by line managers during this phase. The cited positions below of three nGAP lecturers at three different universities are

indicative of the importance of assigning a supervisor during this phase. nGAP 2, did not have a mentor at that stage whereas nGAP 1 and 3 had been assigned a mentor already.

“Right now, I haven’t had much contact with the supervisor, because my proposal was just accepted last year around November. This year I went there once and we discussed the milestones. I do not know how the supervisor was appointed but I think they look at your research interest and who is available in that area. I worked with my mentor when I was putting together my proposal If my mentor was not there I don’t think I would be registered. The system here in SA is different and difficult, when you are not yet registered, still putting together your proposal they delay you a lot, you keep going back and forth and you don’t get much assistance. For me I only manage to progress when the mentor was appointed The first time I presented my proposal, the panel was made up of people who were not in my area of specialisation. That is why there was no buy in on my topic the first time. The mentor assisted in getting a panel that was in my area. That is when I got comments and corrections I needed to do. For me having a mentor played a vital role” (nGAP 3)

“I had a topic and a skeleton proposal. I had to submit it with my proposal. After submission I had to now go and add some meat in the skeleton before the registration could be complete. I decided then I wanted to change my topic a few months later. I started from scratch so my proposal had to start from scratch I am starting my proposal brand new I just started with the new topic last week. I am hoping I will complete and defend my proposal by mid-year” (nGAP 2)

“I’m still waiting for responses but I have applied at UJ, CPUT and UNISA. I went to UKZN and I found that there are no supervisors. I applied in three universities, but my application is still in the process. I have started working with my mentor. We are working on my proposal right now

because I have changed my topic. Now I'm currently working on a proposal for the new topic. Probably I will be done on time because at UJ they told me that their closing date is 31 March 2018 for PhD registration. By 30 March I should have a full proposal for me to submit to them" (nGAP 1)

Another respondent cited the challenges of identifying a suitable topic at PhD level where there was limited or no guidance from the supervisor as follows:

"So, I battled a lot trying to find the exact topic where I wanted to be at, and what I wanted to do. I worked with people at (.....) for a couple of years, even published 2 papers, but we were not able to... I was not able to pin down exactly what I wanted to do in my PhD. So that was one of my challenges. To identify the area I wanted to get into, prior to getting to my PhD" (Aca 13)

The majority of participants regardless of the institution complained about the cumbersome nature of the PhD pre-registration administrative processes and the delays caused. One participant in particular reported that:

"Before my proposal was accepted, it's that institution that I registered with, kept on changing the template for submitting the research proposal. It changed 4 times that I remember very well. Each time I had done it; my supervisor would call me and say; now the template has changed. I asked him why it is, and he said it is not within my domain, it is the research office that had changed it 4 times. That caused a delay of 2½ years" (Aca 10)

Another challenge cited by participants, particularly those who used XYZ as their research site, complained about the cumbersome processes for obtaining a gatekeeper's letter. The first administrative hurdle is that the institution has four scheduled meetings where applications for gatekeepers' letters are reviewed annually, although ad hoc meetings are scheduled when the need arises.

“The second challenge that I have encountered was obtaining gatekeepers, because I decided to collect my data where I am currently working, as it would be convenient for me. That is where I also identified the need to conduct the study where I was working. It became so cumbersome to get these gatekeepers... the first time I submitted all the documentation to obtain gatekeepers, I did not get any joy in terms of the response..... I then provided all of the documentation that was required for the approval of me getting a gatekeeper. At that point, I won't lie, I was getting discouraged, and was thinking about forgetting about pursuing this thing. I had thought that the first stage of developing the proposal would be the one that would pose me a lot of challenges, but I was getting frustrated about getting a gatekeeper, which is important to obtain in order to collect data to pursue your study” (Aca 9)

The findings of this study have shown that while provision of support is crucial in facilitating the production of academic staff with PhDs, equally important is addressing the challenges experienced by academics during their studies. However, increasing the percentage of academic staff with PhDs is not dependent on the rate at which they obtain their PhDs only. Equally important is the rate at which they leave the institution. The ensuing section will focus on the variables that facilitate or inhibit the retention of academic staff with PhDs.

5.4 Retention of academic staff with PhDs

Question 3 of this study seeks to determine “the challenges of retaining academic staff with PhDs in South African HEIs in general and UoTs in particular”. This study adopts a holism approach when reviewing the challenges of increasing the percentage of academic staff with PhDs, in particular at this institution. While addressing factors that inhibit the production of academic staff with PhDs, issues such as lack of sabbatical leave policy and

heavy workload amongst others is crucial, however, not paying equal attention to the retention of such individuals makes such attempts a futile exercise.

Data analysis revealed that the PQM, HR processes such as promotion and remuneration as well as the spirit of Ubuntu are the main factors that facilitate or inhibit the retention of academic staff with PhDs in the institution (see Table 5.1).

5.4.1 Level and breadth of Programme Qualification Mix

A recurrent theme in the interviews was a sense amongst participants that the main factor that inhibits the retention of academic staff with PhDs in this institution was the level and breadth of its PQM. Regarding the level of PQM, the absence of postgraduate programmes was cited as a major area of concern by academic staff pursuing their PhDs. Some argued that while opportunities to supervise at other institutions are available, these are not taken into consideration in the allocation of their workload. The level of PQM now and into the future emerged as the main factor that influences academic staff to leave the institution. This factor was cited as more important than remuneration. It is however directly linked to career advancement. Over 75% of academics interviewed stated that their ultimate career aspiration was to become established scholars, supervise, publish and write books. Career advancement in academia is based on these research activities. In this regard, there is no correlation between the goals of academics with PhDs and those of the institution. The institution emphasises excellence in teaching at lower levels while academics aspire to excellence in research and supervision at postgraduate level.

The breadth of the PQM was another factor that ultimately inhibits the retention of academic staff with PhDs particularly in those four disciplines that do not offer such programmes. Some departments such as Mathematics, Communication, Law and Economics which are offered as fully fledged qualifications in other institutions are service departments at XYZ. Most of the subjects in these disciplines are offered at first- or second-year level at most. Academics with PhDs are thus trapped, teaching subjects at these levels.

When participants were asked what their ultimate career aspirations were, the majority aspired to a career in academia but not necessarily at XYZ. Surprisingly, the nGAP programme which is designed to increase the percentage of academic staff with PhDs in HEIs in this country might perpetuate the skewed distribution between traditional universities and UoTs. Academics and nGAP lecturers alike expressed a strong desire to leave if the institution continued to maintain its focus on lower-level qualifications and narrow PQM. A common view amongst 3 of the 5 nGAP participants regarding the level and breadth of PQM were:

“It (absence of postgraduate programmes) will have a negative impact because there is no one you are supervising, if the other institutions are offering you that opportunity, of course you will consider that. It will have an impact towards the motivation to leave.... The plan in our department is to start with an advanced diploma and a postgraduate diploma. Once those are in place we can move higher. If by the time one has a PhD we have those qualifications, one can consider staying and uplift this institution..... Supervision would do a lot for my career because the more you produce PhDs your credibility is enhanced” (nGAP 5)

According to the 2025 PQM, an Advanced diploma is the highest envisaged programme in the above nGAP lecturer’s discipline.

“It would be easier if here we were offering higher qualifications like BTEch or MTech. Maybe I will have students that I am supervising. I can give a component of what I am working on to my students, that has been the practice in academia but here you have to work on yourself. It is one of the reasons why people finish their PhDs and leave. If there is no growth in that direction, because in (...) if you have supervised about 10 students who get their PhDs you can qualify to be a professor. If you are a co-supervisor you do not get any credit. Those are the disadvantages for us if

you are here. I am hoping that in our department we are going to get these qualifications” (nGAP 3)

Akin to nGAP lecturer 5, the envisaged highest qualification in nGAP lecturer 3’s discipline is an Honours degree by 2025.

“Like everybody else in academia, you want to be the guru of a specific field, you want to be a well-established researcher, you want people to quote you at the end of the day in terms of your career.... Yes definitely, as I mentioned earlier the department of (.....) is not there in this institution, so definitely I would leave to gain experience to become an established scholar. There are definitely many pull factors for me to go elsewhere because you can’t become if you have not supervised. You need to supervise, you need to do research, you need to contribute to the knowledge that’s out there” (nGAP 4)

“... in our program we do not have masters yet and we do not have doctoral students. We have up to BTech. I could consider supervising, becoming a supervisor in my discipline but for students from other traditional universities where they have masters programs So if I want to do it like on a part time basis, I can stay at XYZ, but if I want to do it on a full time basis, because I know it would help my career growth and promotion and so on, then I will have to look at leaving the UoT environment, and going to one of the traditional universities where there are masters and PhD students registered” (Aca 4)

Another element that emerged from data analysis is that young academics make short-term sacrifices for long-term benefits in their careers. They would stay with an employer for personal career development goals, but once those are achieved, they leave the employer for better opportunities if those are not provided.

“Yes, because it is a fantastic opportunity to get my masters done and get my PhD. I applied for every nGAP position that was advertised. When I got this opportunity, at the end of the day you want to become this scholar you would take it....” (nGAP 4)

XYZ is not likely going to retain this participant if one considers the input above regarding the breadth of the PQM.

5.4.2 Human Resource Processes

Career advancement and remuneration emerged as the two most important HR processes that influenced a participant’s decision to stay or to leave academia altogether or to change universities.

5.4.2.1 Career advancement opportunities

For the purpose of this study, career advancement and promotion are used interchangeably. With respect to promotion, the two foremost reasons why academics might leave academia altogether or change universities were the limited career advancement opportunities and the criteria upon which such advancement is based. These two issues are universal, however, in the case of XYZ, these limitations are compounded by the PQM of the institution.

Participants lamented the limited available career advancement opportunities in academia. They maintained that for one to advance, a HOD has to voluntarily leave, die or retire, arguing that job hopping in academia is not as common as in the private sector. Participants claimed that it was not uncommon to find a person holding the same position for more than 20 years.

“I would consider another institution if there was an incentive of a promotion. In academia for you to be promoted the HOD would have to die or retire before you can be considered and sometimes they still have 20 years to go” (nGAP 5)

“I think the lack of growth, you find sometimes that your life is stagnant. You find that there are no further opportunities for growth. You remain in one position for a long time. I think in August this year I will be 20 years in the same position” (Aca 2)

When evaluating the criteria upon which the limited available opportunities are based, participants cited inconsistencies, tedious and cumbersome processes, mismatches between the job itself and the promotion criteria amongst other factors. Linking the promotion criteria to the PQM, participants argued that the absence of postgraduate programmes does not stimulate or facilitate research activity and yet promotion criteria is heavily weighted on research. The promotion criterion of the institution includes supervision as a factor in an institution that does not offer postgraduate qualifications. The workload model is not designed to allocate scores for supervision simply because the institution does not offer postgraduate qualifications.

Participants cited the promotion criteria as an element that discourages academics from applying for promotion. The promotion procedure of the institution entails the development and submission of a comprehensive academic portfolio. Subsequently, the participant’s line manager represents the candidate before the promotion panel. This is a very daunting process for both the line manager and the candidate because there is conflict of interest in the process. As a result, the process can be easily manipulated by the manager or the manager can be unjustly blamed. This procedure creates high potential for unnecessary tension between the candidate and the line manager. The promotion criteria elicited very strong negative views from participants. On the other hand, academic management is of the view that the promotion policy and practices are progressive and fair. They viewed the promotion policy and practices as factors that facilitated the retention of academic staff in the institution. The following extracts are indicative of the general feelings of academics regarding promotion in the institution.

“The promotion policy is there, but it is a very cumbersome process. Developing that portfolio of evidence, has a long criteria that you have got

to adhere to as you develop that portfolio of evidence. And to add to that cumbersome process, you do not also go to the interview, it is your line manager who goes there and speaks on your behalf.... So that is the promotion policy of XYZ. And I think that it is flawed in the sense that you can't even go there as the incumbent, as the person who wants to be promoted. You only develop that thing, then you throw it to the line manager. And the line manager is the one who has got to go see whether you get it or you do not. (Aca 12)

“To be honest, it is very difficult. For me you do not have to beg someone, promotion should just be purely based on your performance and your attitude towards your work. It's quite difficult because the treatment is different, when someone does something there is recognition but when you do the same or publish a paper there is nothing. Some people finish their masters they go on GNF but finish the same qualification and you develop a course, nothing. If promotion policies can be applied consistently and be fair to everyone, maybe I would stay.... if you are a person that questions certain things you will be overlooked even when you deserve the recognition” (nGAP3)

Contrary to the views of academics, academic management is of the view that the promotion policy and practices facilitate the retention of academic staff in the institution. In this regard two academic managers said:

“... we have an academic staff promotion policy. I am not aware of similar policies elsewhere. I think that has gone a long way to retain academics with XYZ, the calls are put out every year. And people who qualify get that opportunity, and I think it is very progressive policy. And I think helped us a lot” (Mngt 2)

“I believe that we have got a very liberal, and a very accommodating staff promotions policy with the [ADOMINOM] promotions situation. And I look

at staff within the faculty that have been promoted, and they are very happy and stable as far as that is concerned. I look at those that have been promoted from lecturer to senior lecturer, from senior lecturer to assistant professor and to associate professor. And those that have been promoted are very stable, and I believe that we will retain them. So, I believe the promotions policy plays a significant role in retention of staff” (Mngt 4)

5.4.2.2 Remuneration

Divergent views were expressed regarding remuneration. Findings were not conclusive on whether remuneration facilitates or inhibits the retention of academic staff with PhDs in this institution. When comparing academia to the corporate, public or private sector, there was a consensus that these sectors paid more. However, other factors such as flexible time and personal development were taken into consideration by participants particularly those with young families in their decision to stay or leave academia. Within the HE sectors, participants claimed that the more prestigious and traditional universities in urban areas offered higher remuneration when compared to their rural counterparts. This might facilitate a decision to change universities if participants intended to pursue careers in academia. In this regard, one participant said:

“When I applied for an nGAP position, different universities offered the same position, there was already a difference between, what UCT was offering for a junior lecturer compared to what XYZ was offering for a junior lecturer... UCT and the University of Pretoria were higher” (nGAP 4)

Contrary to the above, another participant said:

“I think XYZ has a capability to match opportunities out there. I wouldn’t know what their salaries are, but I will answer the question based on my observation? I think salaries here are quite competitive in the sector” (nGAP 5)

The above participant's views regarding remuneration within the HE system were confirmed by the HR&D Director, who stated the following:

“... Quite comparable. However, it depends on the percentile that university is using. By that I mean most institutions of higher learning have subscribed to some Remchannel...that is electronic, you know that one. And again, most are paying at 50th percentile. It means that it is one cycle. There might be some discrepancies here and there, but again the salaries are more or less the same” (HR&D 1)

Furthermore, the Director's views on remuneration between academia and the public and private sector confirmed the participant's sentiments that these pay more as follows:

“... salaries at the industry are far superior, and at the same time...there are other parastatal organizations which a semi...state owned enterprises. Salaries there at Eskom and others ...those are parastatals, municipalities, their salaries are far superior than ours, because they have a way of generating other streams of incomes. Whereas here, really we are purely service orientated” (HR&D 1)

For young participants however, remuneration was not the only consideration in their decision making to leave or stay, flexibility and personal development were viewed as their short-term goals.

“Especially given the years of experience I have, there's a huge difference, you can't even compare. Government positions, that's the sad part. With my qualifications, I could be a deputy director, and I'm like what was I thinking? But the ultimate goal for even entering this programme [nGAP] is that I want to finish my PhD and in that government position I don't even know what kind of time I would have” (nGAP 4)

Remuneration was also linked to promotion as a means of improving one's standard of living. Due to limited career advancement opportunities and the cumbersome promotion

criteria as alluded to in 5.4.2.1, it emerged that XYZ might lose some of its brightest young academics through internal migration.

“Well definitely there is better prospects out of XYZ. The private sector for one pays more. Personally, I prefer being in academia, so I am going to have to look at an alternate university of choice. I would like to move to a university that is more progressive in terms of research, in terms of its promotion policies” (Aca 7)

Overall, however, findings of the current study show that remuneration on its own is not a primary factor that facilitates or inhibits retention of academics with PhDs. Other factors embedded in the problem of retention of academic staff were more important considerations.

5.4.3 The Spirit of Ubuntu

The concept of Ubuntu has recently been embroiled in negative connotations such as black tax, greed and selfishness as more black people transition into the middle class and emanating from the recent political scandals. While the debates on negative Ubuntu connotations are raging on, some academics are still strongly holding on to the values of Ubuntu. Ubuntu emerged from data analysis as the only factor that facilitated retention of academic staff with PhDs at the institution. As stated in Chapter 3, academic staff with PhDs are extremely mobile, their sense of obligation to and affinity with the plight of previously disadvantaged students emerged as the main consideration. There was a consensus amongst participants that academics are under-valued or that there is less recognition for academics in general in this institution. Those academics with PhDs in particular, felt unappreciated. In this regard one academic with a PhD said:

“There is nothing that can influence me to stay at XYZ. Because I do not think they even recognise the fact that I have a PhD, I do not mean that I have to be treated differently, but I am saying just the recognition, acknowledging that I have a PhD. Even the incentive that you get

remuneration-wise, it is only R7000, and that is taxable. What is that?”
(Aca 12)

The consensus amongst academics and academic management alike was that there are no effective retention policies in the institution. Personal factors such as family obligations, which might curtail intention to relocate for some academics and their altruistic reasons were the only reasons keeping those academics at the institution. These sentiments were confirmed by two HR&D participants as follows:

“.... for me the why part, I could attribute it to the nature of our organization. We do not produce postgraduate studies; honours, masters and PhD’s. they cannot supervise anybody. So that is the main part that I think is causing the turnover.... this qualification is like a compliance issue to reach the targets, we are just complying” (HR&D 1)

“We are in a process of reviewing a policy and part of that, it included the element of staff retention, because we do not have retention policy. Personally, I believe that we should have separate retention policy. And we can see from our exit interviews, we can see from our stats that the level of turnover is very high, especially in the academic side. If from January to August, we have lost 16 academics that should tell you something” (HR&D 2)

Despite all these challenges, the academic staff’s sense of service to the under-privileged students emerged as the main variable keeping those that remain in the institution. The following excerpts capture the spirit of Ubuntu amongst those academics that remain. In this regard, there was a consensus in the views of management and staff alike. They said:

“I think they are here simply because they are committed towards driving the goals of the university, but being more student centred, and looking at where our university is located, in a township, attracting mainly disadvantaged students. I think they are here mainly to serve the students

more than anything else.... Industry will pay far more, than what the university would pay staff. And that is why I am saying, we are here more for the passion, for the students. In my own situation as well. I came here more than 20 years ago, and I stayed because of my passion for teaching and to give back to the students more than anything else” (Mngt 3)

“I think the other thing; this comes from a moral point of view, to say if the institution has given me the opportunity, even if it’s from that side, even though it’s not much because I can pay my PhD fees, it’s not much its R14000, but sometimes it comes from the owing part of us, to say we need to show gratitude But sometimes you just think of... maybe should I say the love of Or the duty to care for the students, to say that, if I can just leave them now or what will happen to them....” (Aca 3)

5.5 System Dynamics model presentation

This section explored the challenges of producing and retaining academics with PhDs particularly in the UoT sector from a systems thinking perspective. The variables embedded in each code clearly outlined the interrelationships and interdependence between the variables. This was the starting point in the construction of individual CLDs in chapter 6. Thereafter, the QSD is presented as a simple, more aggregate form of the dynamics involved in increasing the percentage of academics with PhDs at XYZ. As explained in Chapter 4, striking a balance in model creation is very important. Too much detail clutters the diagram making it difficult to understand the overall feedback loop structure of the model while too little makes it difficult to grasp the plausibility and realism of the model (Sterman 2000). The detailed dynamics involved in each variable is presented in the form of individual CLDs in Chapter 6.

5.6 Conclusion

This chapter outlined the themes, categories and codes that emanated from data analysis. These were discussed under each heading and sub-heading to illustrate the story of the low percentage of academics with PhDs at XYZ. The dynamics involved in each theme, category or code clearly emphasised the importance of adopting a holistic approach when viewing complex business problems. These revealed insights cannot be understood without an appreciation of the interdependence and interrelationship between these variables. By holistically viewing the dynamic interrelationships between the variables, one is able to fully comprehend the challenges of academic staff qualifications at this specific institution.

Chapter 6: Discussion

6.1 Introduction

In Chapter 5, academic staff profiles, production of academics with PhDs and the retention of academics with PhDs emerged as key determinants of the percentage of academic staff with PhDs at XYZ. These higher order themes were broken down into categories that illustrated the dynamics involved in this phenomenon (see Table 5.1). This chapter further attempted to explain the extent to which the results are consistent with or contrary to past empirical findings and theoretical arguments. In this regard, data from interviews, perusing internal documents and the literature review was triangulated to tell a coherent story about the challenges of increasing the percentage of academic staff with PhDs at XYZ.

The key findings were discussed under the three themes, academic staff profiles, production of academic staff with PhDs and retention of academic staff with PhDs. Thereafter, the dynamic relationship between these themes were presented through a systems lens. The first theme used a spider diagram to illustrate the impact of the Technikon legacy on academic staff qualifications (profiles) in the UoT sector. The second and third themes, presented findings on the challenges of the production and retention of academics with PhDs through individual CLDs. The last section presented the Qualitative System Dynamics (QSD) conceptual model to provide a comprehensive overview of the dynamics involved in increasing the percentage of academic staff with PhDs at XYZ. Lastly, system archetypes that exhibit in the phenomenon of the low percentage of academic staff with PhDs at XYZ were identified and discussed. Braun (2002) recommendation of using system archetypes in two ways – for diagnosing the problem and / or planning purposes was adopted.

The individual CLDs presented in second and third sections should be read into the context of the QSD conceptual model for a holistic understanding of the dynamics involved in increasing academics with PhDs at XYZ. While all dominant loops were included in the

conceptual model, some relevant loops not depicted in the conceptual model were presented in individual CLDs to provide a comprehensive discussion. This is consistent with the suggestion by Sterman (2000) that modellers must resist the temptation to put all the loops identified into a single comprehensive diagram. He further asserts that such diagrams are impressive only on paper and fail to communicate effectively to the intended audience. In Chapter 3, it was argued that published articles and papers presented at conferences talk to the SD experts only and not the managers who are ultimately responsible for solving the complex business problems such material seeks to address.

In the last section, a comprehensive QSD conceptual model was presented. The QSD conceptual model presented the dynamics of this phenomenon at an aggregate level. It integrated all the dominant loops of individual CLDs into one comprehensive model to visually illustrate the dynamics involved in academic staff qualifications. This was done in an attempt to eliminate cluttering the conceptual model and for ease of understanding the holistic dynamics of the problem while a comprehensive detail is provided in individual CLDs. In addition, system archetypes that exhibit at XYZ were presented in an attempt to reveal qualitative information about the underlying structure of the system, enabling managers to identify current problems and anticipate future trends (Mirchi 2013).

6.2 Academic staff profiles

Due to the legacy of the apartheid system, Technikons had no mandate to offer postgraduate programmes (Mabokela 2000; Roy 2014). This system thus bequeathed the Technikons with poorly qualified academic staff. Figure 6.1 below, illustrates the impact of Technikon legacy on the profiles of academic staff at XYZ decades into democracy.

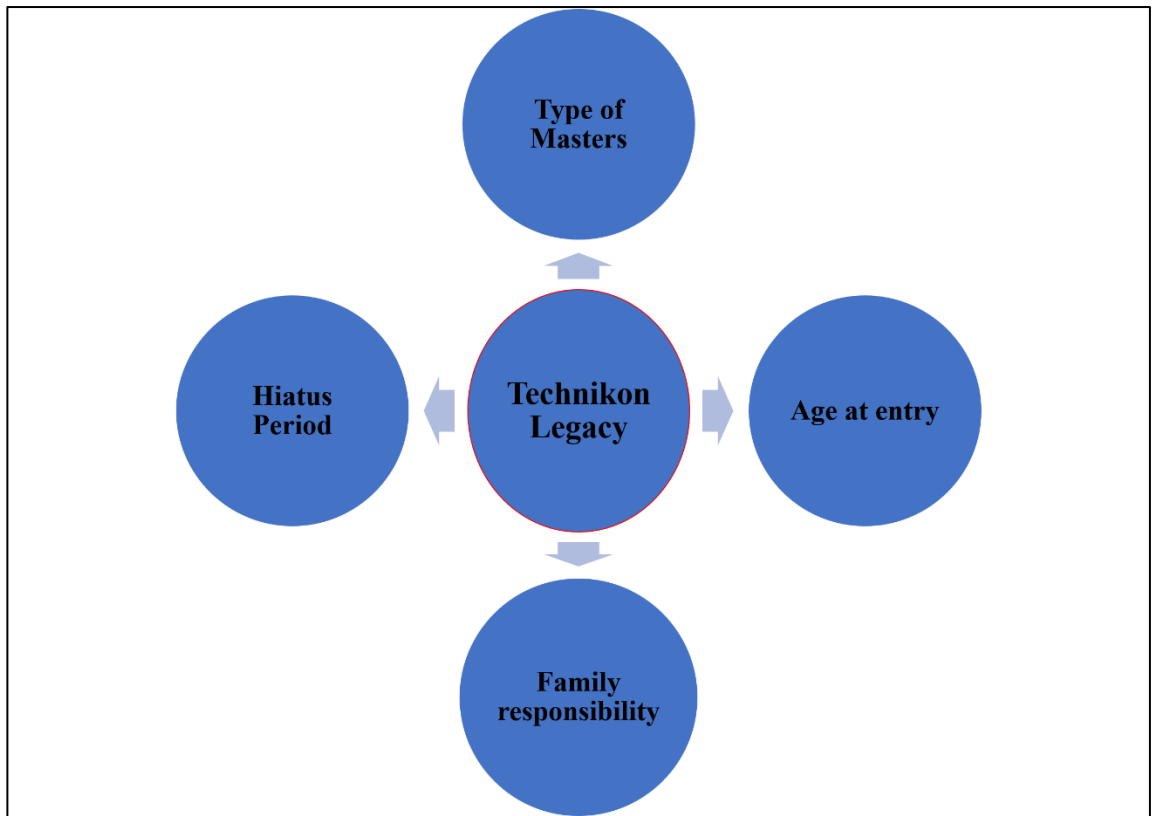


Figure 6.1: Academic staff profiles

6.2.1 Age at entry into PhD

Findings of the current study are consistent with the views of Mouton (2007) and Herman (2011d) that the majority of PhD candidates in this country are on average 40 years old at entry with major implications for preparedness. In the current study only 4 participants were below 40 years old and these were the nGAP lecturers. The nGAP is similar to a practice in Europe and USA where high potential graduates are earmarked for progression and strongly supported and encouraged to continue and further their studies to doctoral level, with typical completion ages being in the late twenties and early thirties (HRDC 2015). Contrary to the South African age profile of academics, in the current study, only one nGAP lecturer was 29 years old at entry into doctoral studies, three were between the age categories of 30 – 34 and one was in the age category 35 – 44. The remaining thirteen academics were between 35 – 64 years old at entry into their doctoral studies. This should

come as no surprise as the university Council only pronounced on academic staff qualifications in 2009.

6.2.2 Family responsibilities

As a result of the age of participants, the majority were juggling work, studies and family responsibilities. This confirms the findings of previous studies that when PhD candidates struggle to balance work, studies and family responsibilities, inevitably it is their PhD studies that are sacrificed (Backhouse 2009; Herman 2011d). A study by Herman (2011d) found that married or students with children viewed family responsibility as a major obstacle to their studies. Surprisingly, the majority of participants in this study found balancing family responsibility, workload and studies as the most difficult challenge to overcome, irrespective of their marital status and age of their children.

6.2.3 Hiatus period

Approximately 50% of participants in the current study had experienced a hiatus period of more than 10 years which had major implications for research skills erosion. In addition, only one third of the participants had obtained their master's degrees through full research.

6.2.4 Type of masters:

The literature review revealed that the majority of PhD candidates in this country are not prepared for the rigors of doctoral studies. The findings of the current study are consistent with previous studies (Herman 2011d; MacGregor 2013) which suggested that the type of masters and the long hiatus period contributed to the erosion of research skills of PhD candidates. As a result, the majority of participants reportedly struggled with academic writing and topic selection. Hence, topics were changed several times leading to extensions of their PhD studies with some eventually dropping out during the proposal writing phase.

This is consistent with findings of the study by Mouton (2016) which found that 45% of PhD candidates lack scientific writing skills while 44% lacked expertise of choosing thesis topics. In confirmation of previous studies, (Backhouse 2009; Herman 2011d; HRDC 2015) the challenges of topic selection were felt to be attributable to supervisors who were too busy, not suitably qualified or uninterested in student topics and problems. Thus, a distinct lack of guidance during this phase of the PhD was lamented by participants. Some of these factors will be alluded to in the ensuing section, highlighting the interdependence and interrelationships in variables embedded in any system of interest, hence the adoption of the SD methodology in viewing the phenomenon of academic staff with PhDs at XYZ holistically.

The evolution of HE system which established technikons as a means of providing technical and vocational programs (Herman 2012; Mouton, Louw and Strydom 2013; Roy 2014) bequeathed the UoTs with a legacy of under qualified academic staff. XYZ, as a predominantly black technikon, was intended to populate the civil service for the apartheid government's Bantustan system and had no research mandate, while its historically white traditional university counterparts were endowed with resources and produced the bulk of the research output and doctoral degrees (Mabokela 2000; Sehoole 2011). As a direct consequence of this mandate, technikons and subsequently UoTs are still burdened with under qualified academics.

The pressure to improve qualifications only started in 2004 when technikons were changed to UoTs and their PQM mandates changed (Herman 2011b; DHET 2014). As stated in Chapter 5, academics who completed their master's degrees prior to 2004 were neither motivated nor encouraged to pursue doctoral degrees because XYZ was offering predominantly diploma qualifications. According to the internal document, Revised Project on the Fast-tracking of Postgraduate Programmes at XYZ, as at December 2017, XYZ offered 32 diplomas, 4 advanced diplomas, 4 BTechs, 1 postgraduate diploma and 1 master's degree.

Therefore, the age of participants, family responsibilities that impacted on progression rates, the hiatus period and the type of master's degree obtained can be directly attributed to the legacy of the Technikon system.

6.3 Production of academic staff with PhDs

The production of academic staff with PhDs is facilitated by the academic support provided by the institution and inhibited by those challenges encountered by academics pursuing PhDs. These findings are consistent with previous studies whilst at the same time they present other dynamics not considered in the literature due to the unique nature of the specific institution. Conducting a single holistic case at XYZ is consistent with previous literature that encourages this methodology in such a situation where the case is extreme or unique (Patton and Appelbaum 2003; Johansson 2007).

A comprehensive discussion will be presented by triangulating the empirical and secondary data, and thereafter individual CLDs will be presented to visually illustrate the dynamics involved in each key variable.

6.3.1 Key research findings

Key findings of this study were consistent with those of previous studies (HESA 2011; DHET 2015; HRDC 2015) with respect to several of the factors that facilitate or inhibit the production of academics with PhDs. Academic workload, funding, research infrastructure, limited supervision, and the age profile of academics emerged from the literature review as the main determining factors involved in the production of academic staff with PhDs. The current study identified similar variables, however, key variables such as the human resource processes of the institution, the PhD administrative challenges experienced by PhD candidates in institutions where they are registered and the research skills (see Table 5.1) were not highlighted although they were alluded to somewhat in the discussions. These variables emerged from the current study as some of the key determinants of PhD production at XYZ.

6.3.1.1 Academic support

Although funding, research infrastructure and HR processes are factors that facilitate the progression rate of PhD candidates, lack thereof inhibits this rate.

6.3.1.1.1 Funding

With respect to funding, the results of this study were consistent with previous research which had cited insufficient funding as the single biggest obstacle to the production of PhDs in this country (ASSAf 2010; HESA 2011; DHET 2014; HRDC 2015). The current study confirmed that insufficient funding in the form of the RDG and the cumbersome nature of accessing NRF funding were factors that negatively influenced the progression rate of PhD candidates. While Herman (2011c) study showed that PhD programmes, especially in the Natural Sciences, relied almost entirely on NRF and DST funding, none of the participants in the FNS and the SET mentioned DST as a source of funding. This finding is consistent with the study of Cloete, Mouton and Sheppard (2015) which found that both students and their supervisors were not conversant with readily available bursaries and scholarships, and instead relied on their Research Units. These authors further claim that the problem is that in some institutions the postgraduate funding office does not function efficiently or communicate well with its students. While participants acknowledged that communication about available sources of funding was effective in the institution, FMS participants complained that it tends to favour SET disciplines at XYZ.

Rybicki (2011) estimated that the PhD funding requirements in SET disciplines is approximately R190 000 per annum, while the RDG grant at XYZ is R40 000 per annum. The author estimated the figure for supporting one postgraduate student was R190 000 per annum in his discipline of modern molecular biotechnology. Laboratory costs alone are estimated at between R70 000 and R100 000 with the remaining R90 000 for personal costs. Personal costs for participants in this study are not a factor because these are employed candidates, however, lack of suitable research infrastructure as reported in Chapter 4 means that participants require funding in excess of the RDG to source research related equipment and consumables. From Chapter 5, it emerged that the faculties of

Engineering and Natural Sciences were affected the most by insufficient funding in the institution.

One of the more significant findings to emerge from this study is that the RDG is very restrictive. Some candidates from the current study stated that they no longer applied for this funding which resulted in further delays in their studies. There is a need to review the criteria for the utilisation of the RDG, particularly for the purchasing of research equipment and research related consumables. One SET candidate in particular complained about the delays caused in conducting experiments with the low specification computers from the university.

Below is a visual graphic presentation in the form of CLDs of the dynamics involved in research funding for academic staff pursuing doctoral degrees. This graphic presentation of the problem illustrates leverage points which can assist managers to make effective policy changes.

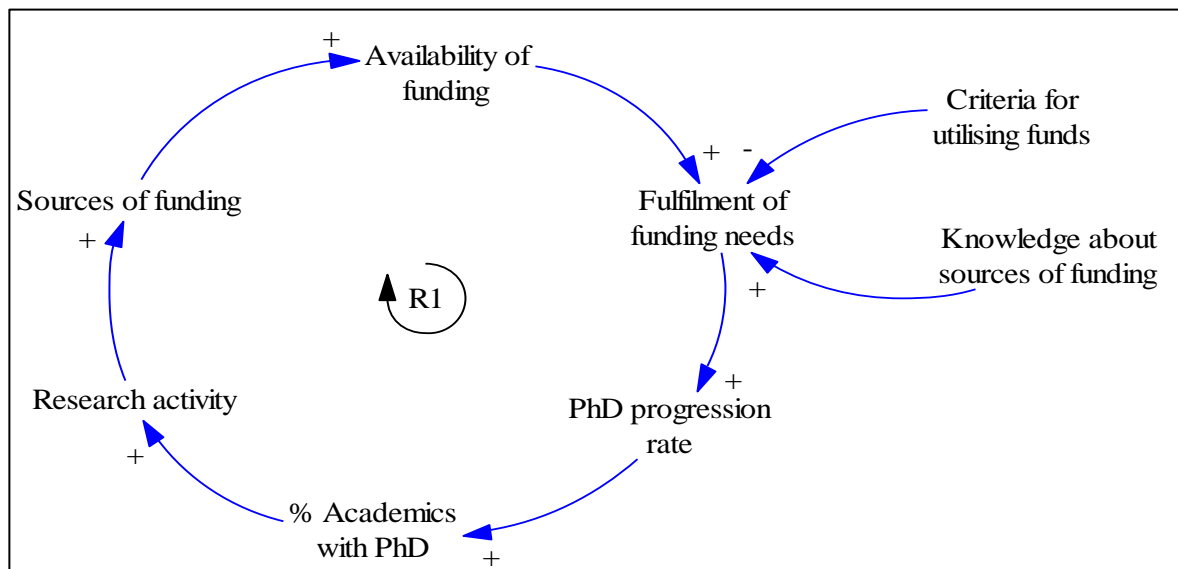


Figure 6.2: Funding Reinforcing loop R1

The causal loop diagram for funding is depicted by reinforcing loop R1. The language in the building of causal loop diagrams was discussed and illustrated by a simple CLD in 3.4.3.3. To reiterate, a reinforcing loop is where an increase in one variable leads to an

increase in itself when traced around the loop. Thus, the availability of sources of funding will eventually lead to an increase in itself when traced around the loop.

Sources of funding – the availability of funding facilitates the fulfilment of research needs of PhD candidates hence the arrow with a positive polarity. **Fulfilment of funding needs** has a positive effect on the rate at which PhD candidates advance in their studies. However, it is influenced by two variables, the knowledge about the sources of funding and the criteria for utilising the available funds. **Criteria for the utilisation of funds** – the higher the complexity of the criteria for utilising funds, the lower the fulfilment of funding needs. As stated above, this should be reviewed. **Knowledge about the sources of funding** – adequate knowledge about the sources of funding has a positive polarity on the fulfilment of funding needs. However, at XYZ, participants reflected a lack of knowledge about external sources of funding other than the NRF. Fulfilment of funding needs lead to high PhD progression rates of candidates. As stated above, insufficient funding is cited as the single biggest obstacle to the completion rates.

Figure 6.2 further shows that, the higher the **progression rate**, the higher the graduation rate which ultimately leads to an increase in the percentage of academics with PhDs at the institution. The higher percentage of **academics with PhDs** in turn stimulates research activity as mentioned in Chapter 5 hence the link with a positive polarity. High **research activity** leads to the generation of third-stream income through publications. This increases the sources of funding available to the institution to fulfil various needs, including the research needs of candidates pursuing doctoral degrees.

The funding CLD therefore illustrates a reinforcing loop. When funding is available to satisfy the needs of academics pursuing PhDs, this ultimately leads to generation of additional funding with other variables such as attrition rates remaining constant. As discussed in Chapter 3, the aim of SD models is to assist managers to solve a problem; therefore, it should identify leverage points where policies can effect positive changes.

Thus, the main areas of urgent attention in this regard are the criteria for the utilisation of research and knowledge about sources of funding. The criteria for the utilisation of the

RDG are beyond the scope of the institution, thus management cannot exert any meaningful change. DHET prescribes what the fund can or cannot be used for. A national conversation in this regard is imperative if the RDG has any hope of accelerating the acquisition of doctoral degrees by academic staff. The current study indicated that most PhD candidates have ceased applying for this funding because of the cumbersome nature of its utilisation. There were divergent views on the criteria for NRF funding. Some participants found the process cumbersome and deadlines unreasonable, while others found application for NRF funding relatively easy.

6.3.1.1.2 Research infrastructure

The current study confirmed previous findings that inadequate research infrastructure hinders the progression rate of PhD candidates. Consistent with the literature, constraints in the provision of infrastructure is not peculiar to XYZ. Several scholars (Habib and Morrow 2006; Hayward and Ncayiyana 2014; Cloete, Mouton and Sheppard 2015) have revealed that this is the case even in those 12 institutions that produce 95% of PhDs. However, the impact of limited research infrastructure is acutely felt by institutions in Cluster 3 as listed by DHET (2014).

XYZ falls under Cluster 3 of the report. It should be noted that poor provision of research infrastructure, not only negatively impact the progression rate of academics in their studies but will influence the introduction of the three envisaged masters and doctoral degrees outlined in the 2025 institution strategy. According to the document on “The Revised Project on the Fast-tracking of Postgraduate Programmes at XYZ”, in 2017 XYZ offered 32 diplomas, 4 advanced diplomas, 4 BTech programmes, 1 postgraduate diploma and 1 master’s degree. However, it is envisaged that the institution will increase this and offer 3 masters and 3 doctoral degrees by 2025. Further, service departments such as Mathematics, Communication, Economics and Law do not offer academic programmes. Currently, the provision of research infrastructure such as library books, and databases amongst others are in the disciplines offered by the institution as well as being at the level at which such programmes are offered.

The institution envisages a 6% enrolment of students at masters and doctoral degrees in the Strategy 2020 – 2025. In addition, according to the CHE template for accreditation of new programmes, Criterion 7, institutions are required to provide a detailed account of the provision of suitable research infrastructure for the envisaged programmes they wish to offer. Similarly, mandatory internal programme reviews require similar detailed accounts for the sustainability of the programmes; hence continuous investment in the provision of research infrastructure is imperative.

Thus, contrary to previous research, the current study linked the inadequate research infrastructure to the Programme Qualification Mix (PQM) of the institution. The narrow breadth and low level of the PQM compounds the limited available research infrastructure at XYZ. Until and unless management reviews its position, academics pursuing postgraduate studies at XYZ must rely on infrastructure from those institutions where they are registered. Whereas research infrastructure is a factor that facilitates postgraduate studies, at XYZ limited research infrastructure is one of the main obstacles to higher progression rates.

The CLD below illustrates the causal relationship between the factors highlighted above. The research infrastructure CLD depicts one reinforcing loop, R2. When this variable is traced around the loop, it depicts a continuous increase in itself. This means that the higher the availability of research infrastructure, the faster academics will progress in their studies ultimately leading to the stimulation of research activity. As stated in the funding loop, research activity contributes to the generation of third-stream income.

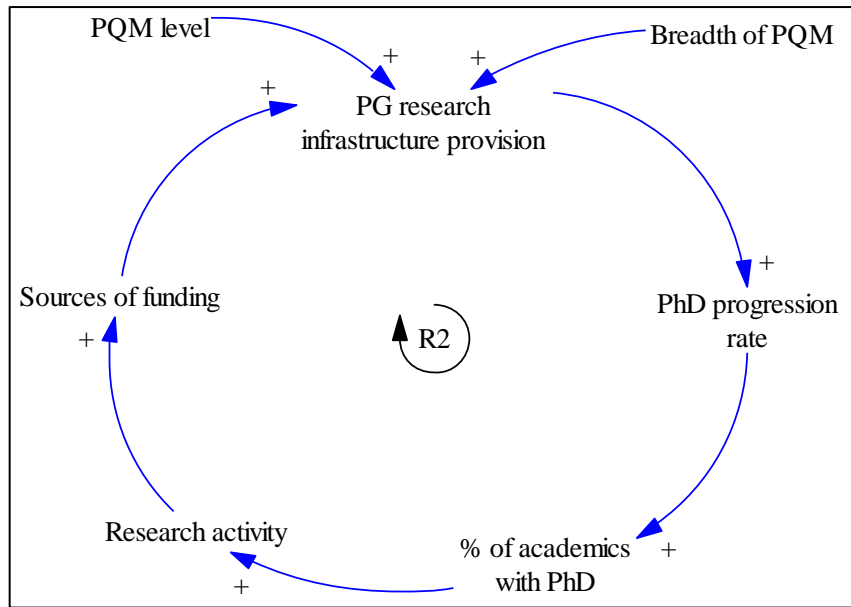


Figure 6.3: Research infrastructure Reinforcing loop R2

Provision of PhD research infrastructure – due to the interdependence and interrelationship between variables in any system of interest, the provision of research infrastructure not only influences the rate at which academics progress in their studies but also the rate at which the institution is able to retain them. This interrelationship will be illustrated under each of these variables. Thus, a linear approach of investing in research infrastructure to increase the percentage of academics with PhDs will not produce the desired results. This interdependence will be highlighted in the QSD model.

The provision of research infrastructure is influenced by the **breadth of the PGM and the level** at which programmes are offered. These two variables, breadth and level of PGM were directly linked by the majority of participants to the provision of infrastructure. Therefore, the broader the scope of programmes and the higher the levels at which they are offered, the higher the provision of research infrastructure will be. Both loops indicate a positive polarity and thus a gap because the institution only has three faculties and a BTech is the highest qualification offered (ASSAf 2010). As stated above, the provision of research infrastructure facilitates the progression rate, and this is depicted by a link with a positive polarity. Similar to the funding CLD, all the benefits that accrue from the

progression rate are the same and are represented in the form of a dominant loop in the QSD model.

Management thus, need to realise that provision of suitable research infrastructure contributes towards an institutional goal of increasing the percentage of academic staff with PhDs and facilitates the offering of higher qualifications. The main leverage points depicted by the research infrastructure CLD are the breadth and level of the institutional PQM. This CLD has shown that there is a causal relationship between the research infrastructure and PQM. The latter will be discussed separately as a retention factor.

6.3.1.1.3 Human Resource Processes

National policy changes have put pressure on HEIs to increase the percentage of academic staff with PhDs. This pressure has been exacerbated by the realisation at national level that the production of doctoral graduates is a matter of strategic priority. The production of doctoral graduates is necessary for the replenishment of academic capacity (Mouton 2016). For example, changes in the status of Technikons to UoTs which allows all universities to offer higher degrees has put pressure on institutions to increase the percentage of academics with PhDs. In addition, the recent recognition of university contribution to economic growth by HRDC (2015), Mouton (2016) and the highest office as alluded to in Chapter 1, has placed additional pressure on institutions to increase their PhD throughput rates. In this regard, the HRDC expressed a concern that throughput rates were too low to support South Africa's developing economy and ultimately knowledge economy. Badat (2010) puts this figure at 11%. To increase the number of doctorate holders per million in this country, more supervisors are required. Thus, an increase in the percentage of academics with PhDs contributes towards global competitiveness. Academics with PhDs contribute to high doctoral throughput rates and the stimulation of research and innovation which are the cornerstones of global competitiveness.

However, the HEQC's audit report on XYZ of 2011 indicated the absence of research capacity and research output as a huge shortcoming which required urgent attention. There is an integral link between the offering of postgraduate programmes, research and

academics with PhDs. The panacea for research output and introduction of postgraduate studies is an increase in the percentage of academic staff with PhDs. The two internal documents, i) Historical enrolment 2010 – 2017 and ii) UoT Performance Indicators Profile: 2014, presented at the strategic planning workshop held at the Country club in Durban in 2017 by the HEMIS office and the Chair of the South African Technology Network (SATN) clearly confirm the direct link mentioned above between postgraduate programmes, research output and academic staff with PhDs. This link is clearly illustrated in Figure 6.4 and Figure 6.5 below.

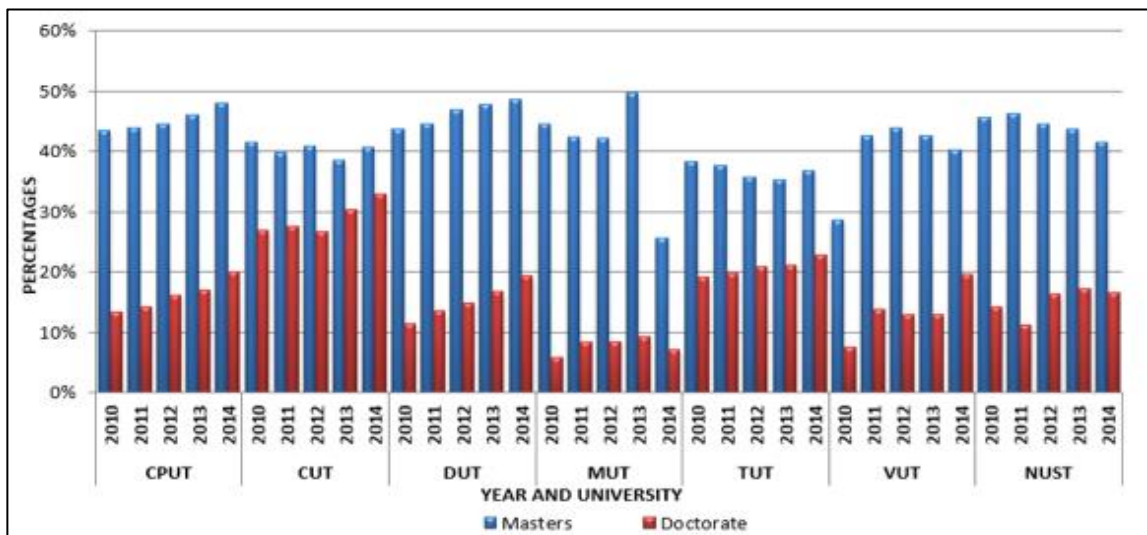


Figure 6.4: Percentage of Permanent Instructional/Research Staff with Masters and Doctorates 2010 - 2014

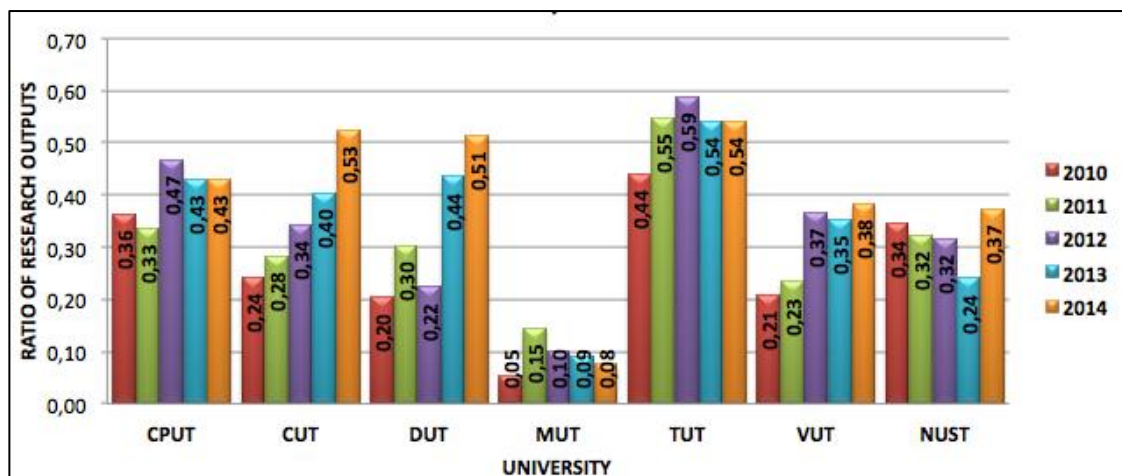


Figure 6.5: Ratio of Research Outputs attributed to Permanent Instructional/Research Staff 2010 - 2014

Both Figures 6.4 and 6.5 are consistent with ASSAf (2010) which stated that XYZ has the lowest percentage of academic staff with PhDs in the country.

The findings of HESA (2011) did not highlight as important factors the crucial role of internal company processes such as HR that facilitate or hinder the development of academic staff. The ultimate responsibility for academic staff development rests solely with the Human Resource and Development unit of any organisation and XYZ is no exception. Although other units in the institution are referred to in this study, coordination of academic staff development activities should be their sole mandate. Thus, the percentage of academic staff with PhDs targets set by national bodies such as DHET, NPC and HRDC put pressure on this unit to “produce academics to meet the high-level skills and knowledge development needs of South Africa” (HRDC 2015:01).

To facilitate the development of academics at XYZ in line with these targets, XYZ University Council pronounced in 2009 that all academic staff must have a minimum of a master’s degree. The minimum requirements for academic management were a PhD or significant progress towards this qualification. However, the HR&D processes of the institution as reported in Chapter 5 do not facilitate the fast-tracking of academic staff qualifications. For example, inconsistency in the application of sabbatical leave due to

lack of policy clarity is a case in point. Academics secure external funding, yet due to lack of policy clarity they are still required to utilise their accumulated ring-fenced leave days. In addition, although challenges of limited physical infrastructure in academia are universal (Backhouse 2009), its utilisation at XYZ inhibits the progression rates. The inflexible HR policies on working hours further inhibit the progression rate. As stated in Chapter 5 academics share office space which is not conducive to conducting research whilst being expected to adhere to core working hours of 08:30 – 14:30.

Below is a graphic presentation of the dynamics involved in the provision of academic support to fast-track academic staff qualifications. It visually illustrates areas where management can affect policy changes.

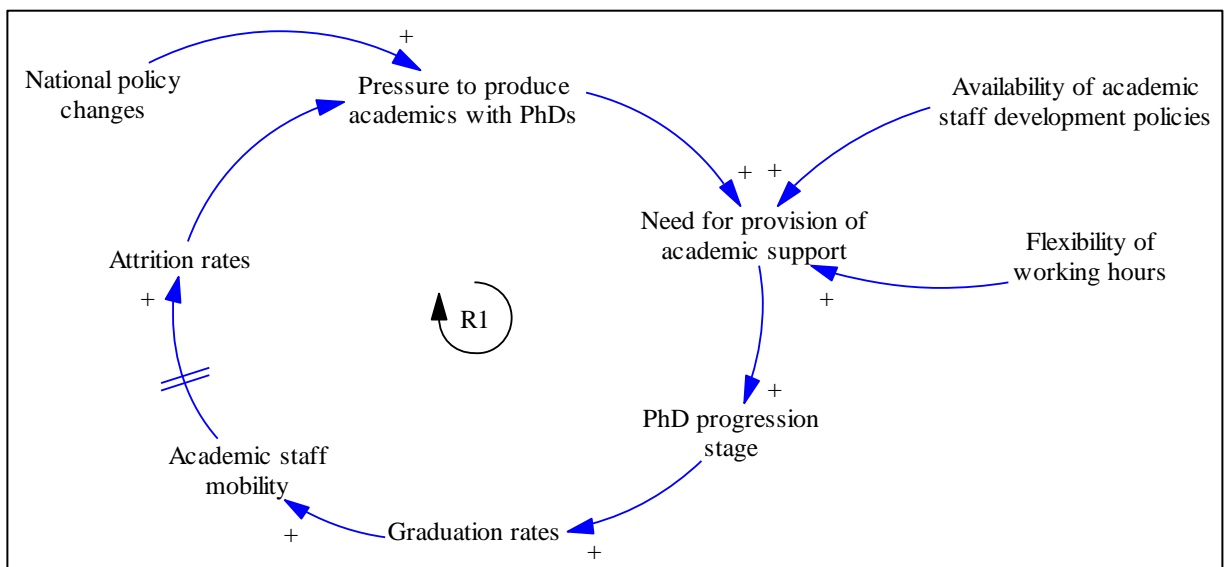


Figure 6.6: Human Resources Processes Reinforcing loop R1

National policies as stated above have put pressure on the HR&D unit to fast-track academic staff qualifications. In this regard, the provision of academic support is essential. The availability of academic staff development policies and flexible working hours should generally facilitate the provision of academic support, however at XYZ this is not particularly the case.

Adequate provision of academic support facilitates progression and subsequently high graduation rates. Consistent with findings of COHORT (2004) acquiring a PhD enables academics to become extremely mobile. Figure 6.6 indicates a time lag, where retention strategies could either facilitate or inhibit the retention rate. At XYZ as stated in Chapter 4, there are no retention strategies hence it was reported that 16 academics left the institution in 8 months. The high attrition rate of academics with PhDs reinforces that pressure to produce more academics with PhDs, thus closing the reinforcing loop.

The areas of concern for management as visually illustrated by this CLD is that availability of academic staff policies and flexibility of working hours will facilitate the provision of academic support. Urgent attention should thus be paid in these areas to facilitate PhD progression rates.

The HR CLD emphasises the need to view a problematic situation holistically. While HR processes facilitate the production of academics with PhDs, the CLD reveals unintended consequences. The mobility of academic staff which accelerates attrition rates is a case in point. This CLD thus illustrates to management the need not only to provide academic support but to develop retention strategies to facilitate high retention rates.

6.3.1.2 Challenges experienced by PhD candidates

Participants cited workload, supervision, research skills of PhD candidates and PhD pre-registration challenges as variables that have impeded their PhD progression rate. These variables have been factored into the conceptual model as advocated by the holism system thinking philosophy to illustrate the dynamics involved in increasing the percentage of academics with PhDs.

6.3.1.2.1 Academic Workload

Consistent with Roy (2014) assertion that academics are expected to participate in research, community engagement and teaching if they aspire to a career in academia, the current study found that participants complained about the time pressures of juggling these 3 tenets of their workload. Compounding the challenges of heavy academic workload is

that in recent years the student enrolments have been steadily increasing, something which has not been accompanied by a concomitant increase in academic staff numbers. This is a universal problem as reported by several scholars (Tettey 2010; Hayward and Ncayiyana 2014; Roy 2014; CHE 2016) in South Africa and the Sub-Saharan universities.

As stated in Chapter 2, policy changes after 1994 elections opened doors to higher education for all population groups. As a result, the stipulations of DHET (2012) which envisaged an increase in the participation rate from 16% in 2011 to 23% by 2030, has been an increase in the part-time programmes at XYZ to achieve these enrolment targets. The increased participation rates and introduction of part-time programmes have resulted in large student numbers per programme. Consequently, academics at XYZ are burdened with large class sizes, 3 groups per lecturer on average during the day and in the evening programmes. In addition, HE legislation (DHET 2013, 2015) has acknowledged heavy workload as an area that requires urgent attention in the production of academic staff with PhDs. The EACEP is designed to support the development of existing academics to complete their doctoral studies; however, this programme has not been communicated to the intended beneficiaries at XYZ. Furthermore, the ever-increasing bureaucratic and academic administrative duties cited by Mlambo (2010) are consistent with findings of the current study. Regardless of class sizes, all participants lamented the pressures of academic administrative duties.

While national policy changes have put pressure on academics, particularly in the UoT sector to improve their qualifications, the burden of heavy workload leaves these academics with little time to achieve this and is in line with the findings of Cloete, Mouton and Sheppard (2015). Acknowledging the legacy of the Technikon system which is characterised by heavy teaching loads in comparison to research intensive universities, Boughey (2010) and Tettey (2010) suggest a reduction in the teaching load for academics registered for doctoral studies. However, funding will always be a limiting factor as alluded to in the EACEP. A reduction in the teaching load would ease time pressures and facilitate higher completion rates.

Below is the graphic illustration of the dynamics involved in academic workload and its impact on the progression of academic staff towards obtaining PhDs.

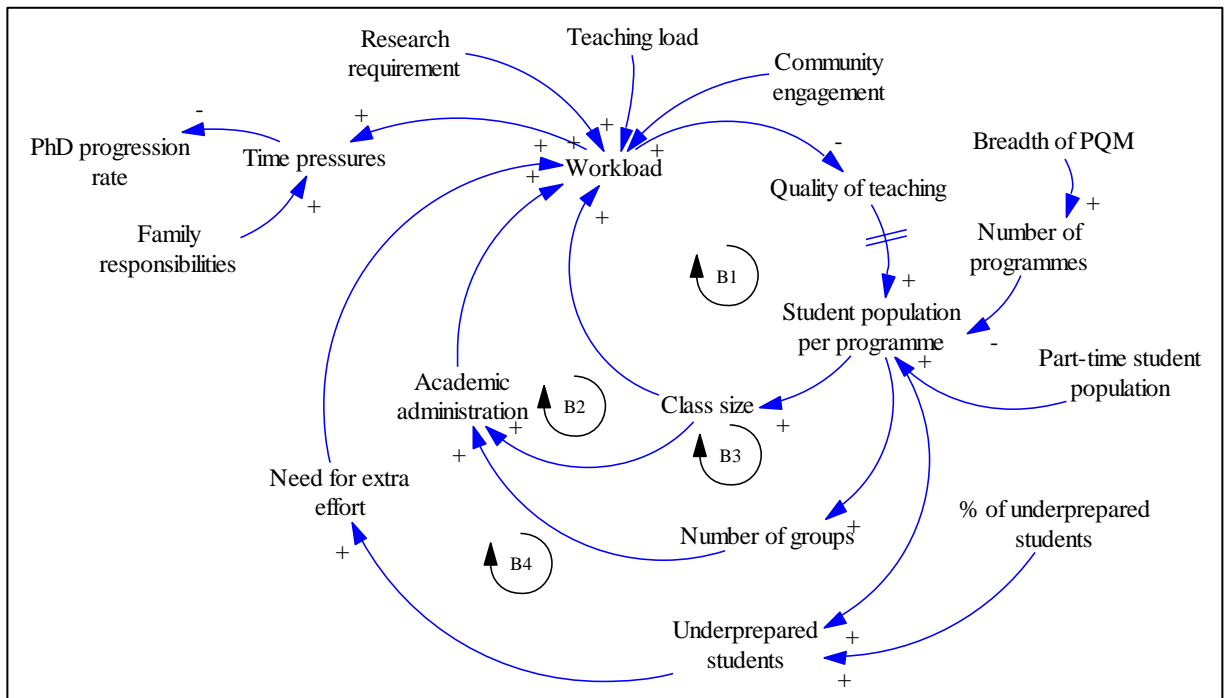


Figure 6.7: Workload balancing loops B1 - B4

The workload CLD depicts four balancing loops illustrating the complexity of factors embedded in the academic workload and its impact on the production of academic staff pursuing doctoral degrees. Looking at the workload CLD, the key variable that drives academic workload is the student population per programme. To facilitate the progression rate of academic staff pursuing PhDs, the student population per programme must be controlled. Any intervention to alleviate teaching load should be directed at this variable. Factors that ideally drive student population per programme are the quality of teaching. Due to limited available space at higher education level, there is an excess of supply, thus in this case the quality of teaching has no direct impact. Indirectly however it impacts on the calibre of students which ultimately in turn determines the percentage of students requiring extra attention in the form of consultations and tutorials. This variable adds an extra burden to the lecturer's time.

Another element that drives student population per programme at XYZ is the breadth of its PQM. A gradual increase in enrolment not accompanied by any increase in the number of programmes increases the population in the existing programmes. Student population in part-time programmes also increases the population in existing programmes. The large student population per programme has a direct correlation with class sizes, number of groups per lecturer, increased academic administration as well as an increase in under-prepared students as a percentage. As the population numbers increase, so all these variables increase adding to the workload of an academic which in turn has a converse effect on the PhD progression rate. Furthermore, a heavy workload leads to a decrease in the quality of teaching which would ideally reduce student population per programme as students would turn away from such programmes. However, due to excess supply as alluded to earlier, this has no bearing on student population. In a balancing loop a change in the condition of a given variable leads to a counteracting or balancing change when the effects are traced around the loop (Morecroft 2015:41).

Therefore, academic staff juggle the 3 tenets of the academic workload, in conjunction with underprepared students, academic administration, number of groups per academic staff and large class sizes (see Figure 6.7). This is consistent with the assertion by Kenny and Fluck (2017) that there is no credible mechanism to identify and quantify the range of tasks that constitutes academic workload. In addition, core working hours (08:30 – 14:30) lamented by academic staff requires an honest conversation. With the “voluntary” part-time teaching, it is not uncommon to see a lecturer coming in for a 07:45 morning lecture and remaining at the institution for a 16:30 – 20:30 evening class. While a legitimate argument could be made that lecturers could use the time in between for their studies, the physical infrastructural limitations mentioned in Chapter 5 are restricting factors.

This CLD visually illustrates the findings of Backhouse (2009) and Herman (2011d) that when participants struggle to balance workload, family responsibilities and their studies, inevitably it is their studies that are sacrificed, hence a negative polarity of workload on the progression rate of academics. Urgent areas of concern, when viewing workload in

isolation is the student population per programme which is not accompanied by an increase in academic staff numbers. A reduction of student population through extension of the breadth of the PQM or reduction of number of groups per lecturer which was reported as high in Chapter 4 could facilitate higher completion rates. These suggestions have been clearly outlined by DHET (2015) through the EACEP.

6.3.1.2.2 Supervision

The issue of the critical shortage of suitably qualified supervisors in this country is well documented, as discussed in Chapter 3. The findings of this study are consistent with those of several scholars (Backhouse 2009; Mouton, Boshoff and James 2015; Mouton 2016) as discussed in Chapter 3 on the challenges of supervision in the country. These scholars emphasised that supervision is the single biggest threat to any desire to increase doctoral output in the country. The current study however, has found that at institutional level, limited supervisory capacity has not deterred institutions from increasing enrolment at masters and doctoral level. As a result, apart from sitting with a considerably high supervision load, many grapple with a high teaching load and or administrative duties as illustrated by findings in this study. Herman (2011c) estimated ratios of 5 – 10 PhD and 2 - 5 masters students per supervisor as well as a teaching load at undergraduate levels. Some participants put these ratios even higher, attributing limited frequency of meetings and longer turnaround times for feedback on submitted work to the heavy load of the supervisors. There is a causal relationship between the supervisor's workload and the turnaround time for the feedback on submitted work as well as the frequency of face-to-face meetings preferred by the majority of participants due to their limited research capacity. Consequently, PhD candidates lamented the quality of supervision in this country. ASSAf (2010) and Mouton, Louw and Strydom (2013) put contact time with the supervisor at an average of 2 hours per month, while the majority of participants in the current study concurred, some even claiming a non-existent contact time or any relationship with the supervisor.

Another major finding regarding supervision which is consistent with literature was the lack of supervision expertise (Backhouse 2009; ASSAf 2010; Mouton, Louw and Strydom 2013; Cloete, Mouton and Sheppard 2015). These authors maintain that it is not uncommon to find recently qualified PhD academics supervising students at this level. They insist that there is a perception that not enough is being done to ensure that inexperienced supervisors such as recent PhD graduates are not supervising doctoral students. These sentiments were evident in the description of the quality of supervision in the current study. In a country where literature maintains that the age of PhD students at entry and the type of master's degree obtained do not prepare the candidates for the rigors of doctoral research, the quality of supervision is unfortunate. One PhD student claimed that she catches the supervisor for 5 minutes when he is jumping into his car if she is fortunate.

The poorly constructed research projects and delays in completion rates were directly attributed to the quality of supervision. Herman (2011d) and MacGregor (2013) attributed these challenges to supervisors who are too busy or are uninterested in student topics or problems. Several scholars (Mouton, Louw and Strydom 2013; Cloete, Mouton and Sheppard 2015; Fourie and Campus 2015) apportioned the blame of poor research projects to lack of training and experience of the supervisors. Many participants in the current study extended the duration of their studies due to poor relationships, supervisors who are too busy or inexperienced but mainly due to the nature of their research projects that were either too big or poorly constructed.

Below is the CLD that visually presents the causal relationship between variables embedded in the supervision of PhD students.

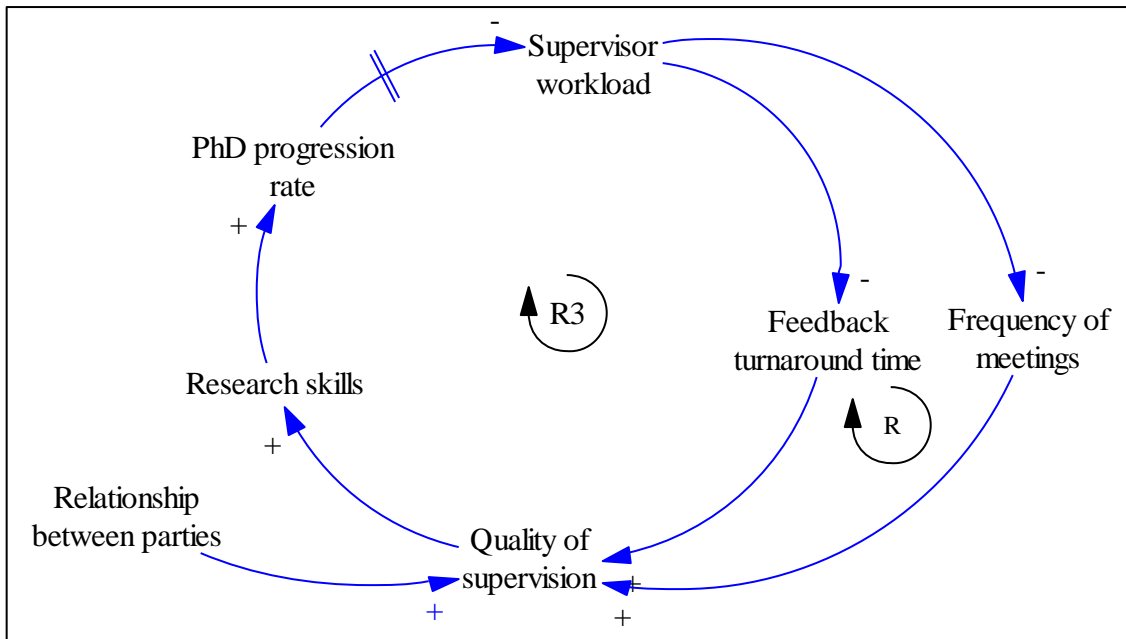


Figure 6.8: Supervision reinforcing loop R3

The supervision CLD indicates a reinforcing loop meaning that a reduction in the workload of a supervisor will eventually lead to a decrease in itself when traced around the loop. The workload of a supervisor as indicated above is comprised of teaching and supervision at masters and doctoral levels. As a result of heavy workloads, scheduled contact meetings are less frequent and the feedback on submitted work takes too long. This leads to poor quality of supervision. Poor quality of supervision leads to poor development of the PhD candidates' research skills. Whereas good quality supervision enhances research skills, the converse applies for participants in the current study. This is then an area of concern that requires urgent attention.

A study by Backhouse (2009) found that a PhD student in this country requires extensive guidance on choosing their thesis topic, organising their thesis, and scientific writing. These typical PhD candidate characteristics coupled with poor quality of supervision results in low progression rates. Low progression rates typically create bottlenecks which

lead to a pile-up in the system. It was stated above that heavy workloads of supervisors have not deterred institutions from increasing their enrolments at postgraduate level.

Ideally, quality of supervision will enhance the research skills of PhD candidates which will lead to higher progression rates. High progression rates lead to high graduation rates. Over time the pile-up or blockages in the system are reduced. As more PhD students graduate the workload of supervisors is reduced. The loop thus depicts a delay or time lag. nGAP candidates have an advantage over their academic counterparts in this regard because the programme comes with a mentorship component in the package. Mentors are supposed to be retired professors with competencies in research amongst others. While this benefit might fill in the void, it can also lead to conflict and confusion where the approaches of both the mentor and supervisor are different. In this regard it is always important to emphasise that the supervisor is the final arbiter regardless of the relationship.

The supervision CLD graphically illustrates that high intake at masters and doctoral level as well as high teaching loads and administrative duties of supervisors is counterproductive. A high intake does not necessarily lead to a high PhD output. On the contrary it reinforces poor quality of supervision and ultimately a high pile-up in the system and / or disillusionment whereby some students may never obtain a PhD. The loop indicates that with manageable workload, the feedback on submitted work and frequency of meetings to provide guidance could improve. As a result, the quality of supervision will improve and the rate at which candidates graduate will increase, thus lessening the workload. However, supervision, when traced around the loop depicts a reinforcing loop, which means it will eventually lead to an increase in itself because of the bottlenecks in the system. Several studies (ASSAf 2010; HESA 2011) estimate first enrolments at doctoral level at 27% annually while only 12% constitutes graduation rates leaving the system with 61% ongoing enrolments.

An honest conversation about the workload of supervisors, the quality of supervision and the research skills of PhD candidates in this country must be had. However, in the case of XYZ, supervision is an exogenous factor and management cannot exert any meaningful

control because candidates are registered at other institutions. The establishment of the RIE as well as the appointment of research professors for the faculties could narrow the gap by providing the necessary support to academics registered for a PhD. Surprisingly, while this initiative was cited as a positive step in the right direction by participants, they bemoaned the actual support provided by the unit. The lack of effectiveness of the research professors from the RIE unit which was highlighted by the participants must be dealt with.

6.3.1.2.3 Research skills

The two reports, HESA and PASHEPI (HESA 2011; HRDC 2015) identified in Chapter 2 which were tasked to identify the challenges of producing academic staff with PhDs in South Africa, alluded to the research skills of PhD candidates but none identified this phenomenon as one of the key determinants of this problem (see figure 2.3). However, data analysis in the current study reflected that the research skills of PhD candidates emerged as one of the key factors that determined the rate at which they progressed in their studies. These findings further confirm previous studies with respect to the amount of guidance and constant contact PhD candidates in this country need from a supervisor as alluded to in Chapter 3 and 5. The current study concurs with previous studies (Backhouse 2011; Herman 2011d; MacGregor 2013) which found that doctoral candidates in this country are not prepared for the rigors of doctoral studies.

The main factors cited by previous studies as the main determinants of a PhD candidate's research skills are, the type of master's degree undertaken and the hiatus period between the completion of their master's degree and registration at PhD level (Mouton 2007; Herman 2011d; MacGregor 2013). Tables 5.3 and 5.4 showed the hiatus period and the types of master's degrees obtained by participants in the current study. In confirmation of previous studies, candidates with long hiatuses were more dependent on the supervisor, requiring constant contact with the supervisor due to the erosion of their research skills. Similarly, Mouton (2007) revealed that most master's degree graduates in the country hold an MBA and argued that these do not convert to doctoral studies. It was argued that those that do are also not prepared for the rigors of doctoral studies. The majority of participants

in the current study who completed their master’s degrees by full research were better prepared for the rigors of PhD research. As a result, these candidates completed their research proposals in less time and were less dependent on supervisors. On the other hand, this study has shown the heavy work load that reputable supervisors, estimated at 10% by Mouton, Louw and Strydom (2013), are grappling with. This goes back to the question Mouton asked at the conference in 2013, “What needs to be done to increase the percentage of academic staff with PhDs” in this country.

The findings of the current study have thus shown that the research skills of academics pursuing PhDs influences the rate at which they complete their studies if at all.

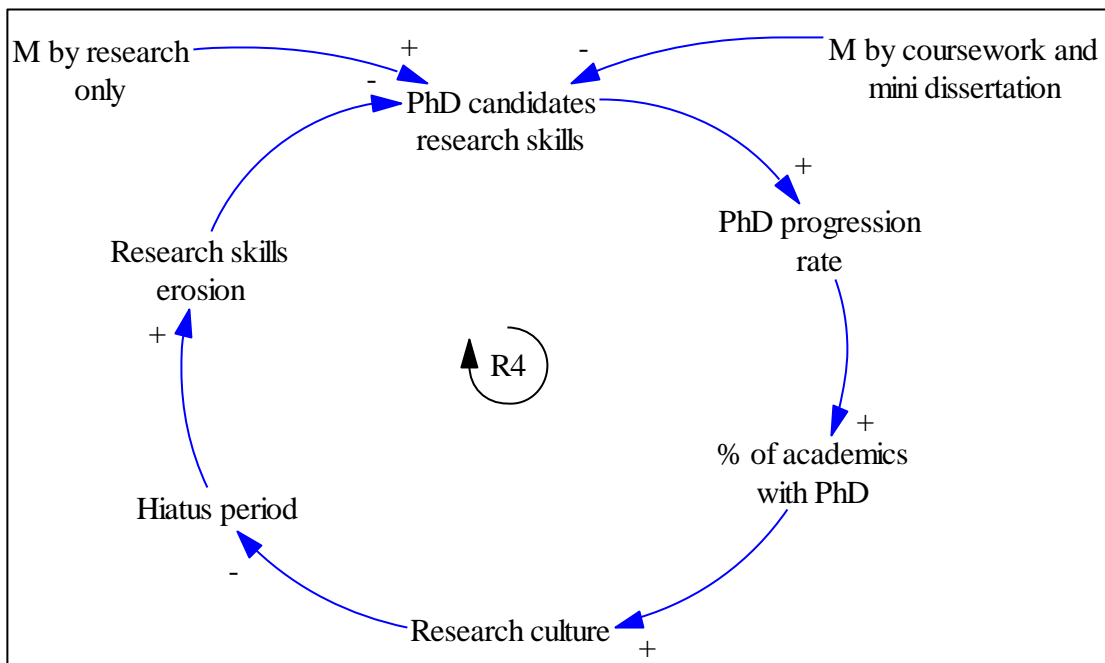


Figure 6.9: Research skills reinforcing loop R4

The above CLD portrays the impact of the type of master’s degree and the hiatus period on the research skills of PhD candidates. It illustrates that only masters by research enhances the research skills of candidates while masters by course work and mini dissertation, MBA and coursework has a negative effect (Mouton 2007). The CLD further illustrates that where candidates are better prepared for PhD research, their progression

rate increases which will ultimately lead to higher graduation rates and a higher percentage of academics with PhDs.

The role of a high percentage of academics with PhDs in any institution of higher learning cannot be over-emphasised. The high prevalence of academics with PhDs stimulates the research culture as indicated in Tables 4.2 and 4.3. As a result of changes in the research culture, data revealed that those who completed their master's degrees within the past five years started exploring topics and research proposals immediately.

The changes in legislation regarding type of institutions and their PQM mandates facilitated the establishment of the RIE unit at XYZ. Consequently, the pronouncements by XYZ Council setting minimum qualifications for academic staff put pressure on academics to improve their qualifications to doctoral level. All these factors stimulated the research culture at XYZ. As stated in Chapter 4, the majority of academics who completed their master's degrees prior to 2004 had experienced a long hiatus period and obtained their masters by coursework and mini dissertation or held an MBA. XYZ, prior to 2004 was a technikon offering predominantly qualifications at diploma level. The institution at the time had no culture of research.

The CLD thus illustrates that the research culture reduces the hiatus period. It further illustrates that a high hiatus period leads to skills erosion and poor research skills of candidates. The leverage point therefore is the stimulation of research culture. A culture of research would lead to the reduction of the hiatus period, reduction of skills erosion and enhance the research skills of candidates.

Due to interrelationships between variables embedded in increasing the percentage of academics with PhDs, stimulating research culture alone, crucial as it might be, cannot reduce the hiatus period for as long as academics are still juggling family responsibilities, heavy teaching loads, limited funding and the unavailability of suitably qualified supervisors who are willing and able to take on students amongst others. In addition, future HR recruitment policies could be designed to take into consideration the type of masters

obtained because it has been argued that some types do not prepare students for PhD studies.

6.3.1.2.4 PhD pre-registration challenges

The pre-registration period was defined in 5.3.2.4 in Chapter 5. The proposal stage of a PhD is poorly understood by candidates and managed differently by different institutions. It took some candidates 2½ years to complete their proposals. This was not identified in the HESA and PASHEPI reports as a key variable that inhibited PhD production (HESA 2011; HRDC 2015). The main variables cited by candidates as stated in Chapter 5 are the availability of supervision during this stage, topic selection, administrative challenges at institutions where candidates are registered and gaining access to research sites particularly for academics using XYZ as their research site.

While previous literature made no distinction regarding the availability of supervision during the pre-registration period and the actual writing of the thesis, the current study found that challenges associated with poorly designed research projects and topic selection, amongst others, were attributable to a lack of guidance during this stage of the research projects. In the main, the majority of participants attributed the prolonged duration of their proposals to the unavailability or inaccessibility of supervision during this period. Consistent with findings of Backhouse (2009) who reported that as high as 44% of doctoral candidates in this country require extensive guidance in the selection of topics, the majority of participants from the current study were found to have changed their topics several times. Similarly, Herman (2011d) attributed attrition at doctoral level, amongst others, to topics that were too big, prove to be poorly designed or were unworkable.

The administrative challenges and those of gaining access to the research sites were stated in Chapter 5. This section will visually illustrate, in the form of a CLD, the causal relationship between the stated variables.

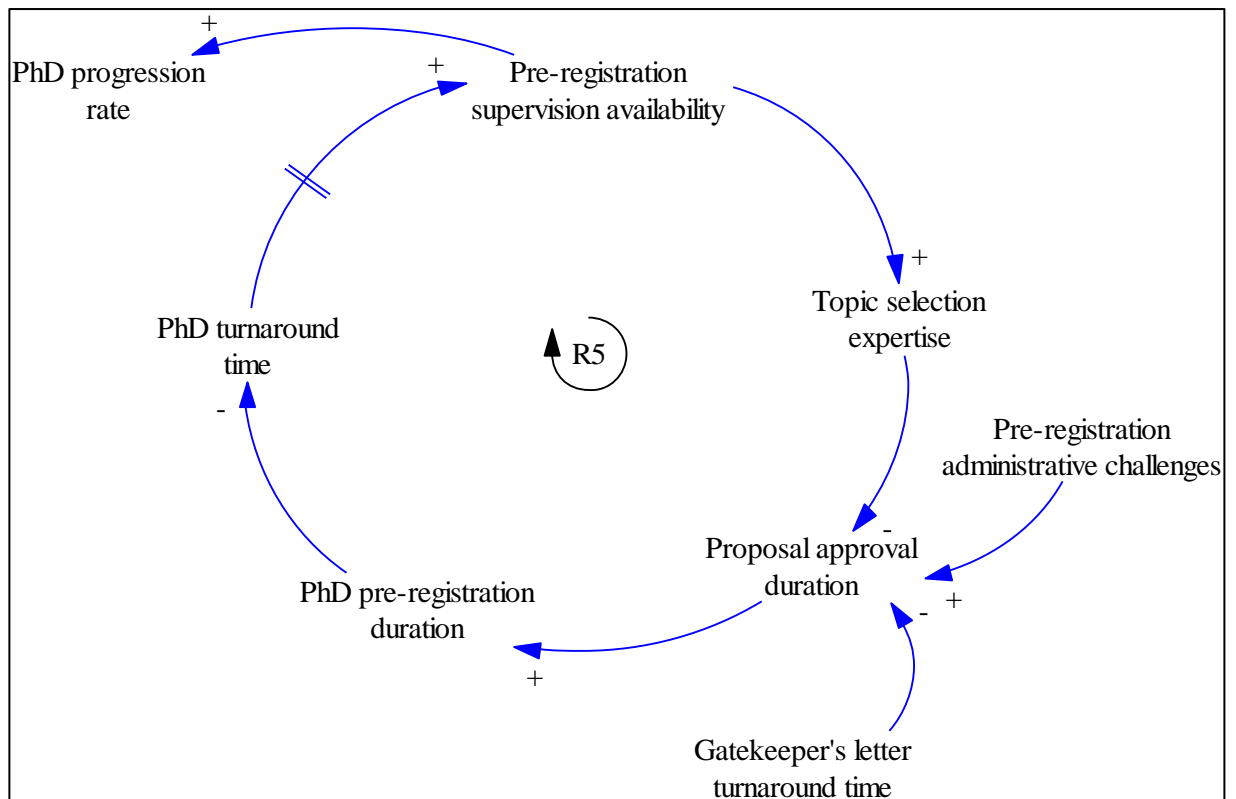


Figure 6.10: Pre-registration reinforcing loop R5

The PhD pre-registration CLD depicts one reinforcing loop, R5. The most important variable that drives this stage is the duration of the proposal approval. This is influenced by three factors: topic selection expertise, administrative challenges and gatekeepers' letters. It is through their supervisors' guidance that candidates develop expertise in topic selection. Where expertise on topic selection is well developed, the proposal duration is reduced. Administrative challenges reported in Chapter 5 also prolong the proposal duration stage. One candidate reported that the template for writing a proposal changed four times which resulted in a 2½ year delay and who then went on to take 7 years to complete his PhD. Challenges of gaining access to research sites are well documented, XYZ has its own peculiar problems however. For example, the desire for anonymity which required participants to change the title and remove the name of the institution on their projects also contributed to further delays because as stated in Chapter 4, XYZ has

only four scheduled meetings per annum. If a project is not approved for this or any other reason, this will create a 3-month delay of the project.

A reduction of the proposal approval duration leads to a reduction in the PhD pre-registration duration however, the converse applies as is the case at XYZ. Due to the challenges cited above, long proposal duration periods have led to a long pre-registration duration which has resultantly had a negative effect on the PhD turnaround times. While many challenges were cited by candidates beyond this point, most candidates attributed the extended duration of their projects to this stage of their projects. The CLD visually illustrates that where PhD turnaround times are enhanced, the workload of a supervisor eases, leaving them with more time to schedule meetings and give constructive feedback which in turn enhances expertise in topic selection and the organisation of research topics amongst others. This reflects the interdependence and interrelationships of variables. It reinforces the notion of viewing a problem holistically and identifying both obvious and hidden interconnections between variables.

However, this is an exogenous factor at XYZ because the institution does not offer postgraduate qualifications, thus all candidates are registered through other institutions. Areas of interventions could thus be: firstly, acknowledgement that the quarterly meetings for reviewing applications for gatekeepers' letters causes unnecessary delays as pointed out by the participants in Chapter 5. A discussion regarding the scheduling of meetings for reviewing of applications should be considered. Secondly, proper support and guidance from the RIE unit could, to a certain extent, assist academics in topic selection to close the gap of unavailability or poor quality of supervision during the pre-registration stage. Findings of the current study are consistent with the literature review which clearly shows that poor topic selection not only causes delays but it also contributes to attrition rates of doctoral students (Herman 2011d).

6.4 Retention of academic staff with PhDs

In this section, a comprehensive discussion will be presented by triangulating the empirical and secondary data, and thereafter present individual CLDs to visually illustrate the dynamics involved in each key variable.

6.4.1 Key research findings

The current study found that the retention of academic staff with PhDs is facilitated or inhibited by the PQM, career advancement opportunities, remuneration and the Spirit of Ubuntu at XYZ (see Table 5.1). These findings are consistent to a certain extent with previous studies (see Figure 1.2). Previous studies found that the availability of career advancement opportunities and the criteria upon which these are based as well as remuneration are key determinants of academic staff retention in many universities (HESA 2011; Robyn 2012; Dube and Ngulube 2013; Theron, Barkhuizen and Du Plessis 2014; Cloete and Maassen 2015). Other dynamics involved in the retention of academics with PhDs at XYZ were the PQM and the spirit of Ubuntu due to the unique nature of this institution.

These individual variables should be read into the conceptual model for a holistic understanding of the dynamics involved in the overall percentage of academics with PhDs in the institution. The conceptual model further reveals the causal relationships between variables embedded in this system of interest, for example how the PQM influences the provision of research infrastructure. These variables will be discussed separately in this section.

6.4.1.1 Breadth and level of Programme Qualification Mix

The current study found that the main factor that inhibited the retention of academics with PhDs at XYZ was its PQM. This is not surprising because the majority of participants when asked about their ultimate career aspirations indicated a career in academia. Featuring prominently in what that entailed were publishing and the supervision of

postgraduate students. The majority of participants stated their intention to resign if there was no intention to offer postgraduate qualifications for their disciplines. Consistent with findings of a study conducted by Theron, Barkhuizen and Du Plessis (2014) which found that 74,5% of academics were actively looking for jobs, of those 31.4% had applied for jobs at other institutions. This study found that although participants aspired to a career in academia this was not necessarily at XYZ. When participants were asked where they would like to go should they leave the institution, above 75% indicated another institution.

Confirming findings of earlier studies by Netswera and Rankhumise (2005), young academics in this study asserted that they would remain at XYZ to accomplish their short-term goals. Opportunities for training and development are the main reason why young academics in the nGAP programme are staying in the institution. These young people are on a training programme that offers them an opportunity to pursue their PhDs almost on full-time basis while permanently employed with all the associated benefits and job security. However, as stated in Chapter 5, if there is no change in terms of breadth and level of the PQM, XYZ will lose these bright young minds to other institutions that will offer them better opportunities for supervision, lower teaching loads and encouragement to spend comparatively more time on research activities (Austin 1996). The envisaged level and breadth of PQM in 2025 comprises 35 diplomas, 22 advanced diplomas, 2 bachelor's degrees, 9 postgraduate diplomas, 2 honours degrees, 3 masters and 3 doctoral degrees. By implication, emerging from 35 diplomas, only 3 programmes will progress to postgraduate degrees (M&D). In addition, there are four departments that do not offer full programmes. By comparison, XYZ focusses on lower-level qualifications and offers too narrow a scope in terms of programmes when compared to other institutions. In addition, the promotion criteria which will be discussed later, has already linked a lack of supervision as a retarding factor to career advancement in academia. As indicated in 5.4.1, XYZ does not offer PhDs in its PQM and only envisages 3 such programmes by 2025. Even within the UoT sector, XYZ is the only institution which currently does not offer postgraduate programmes (ASSAf 2010).

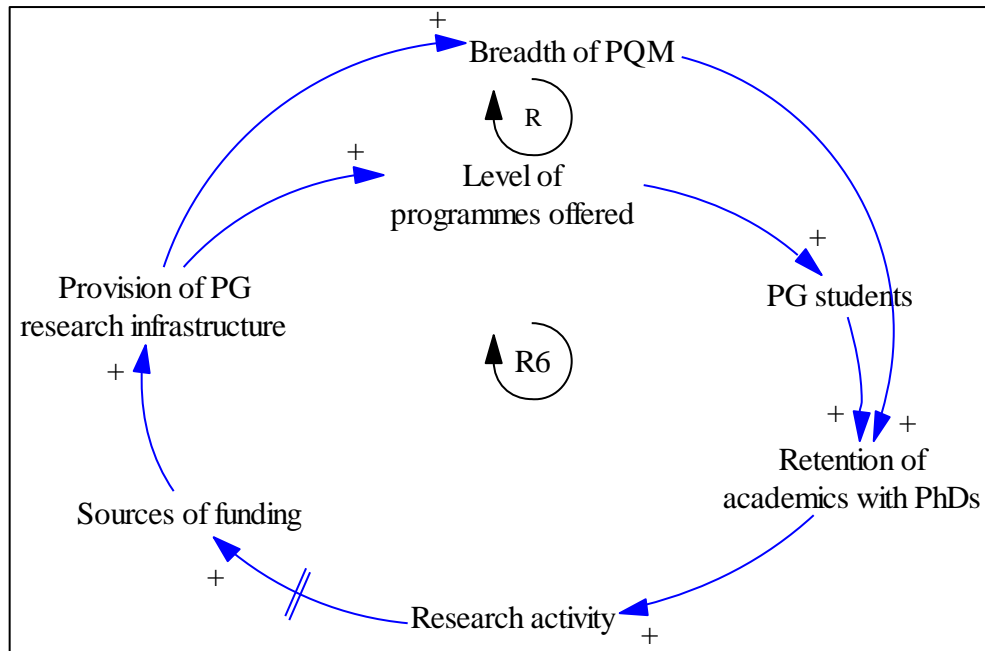


Figure 6.11: PQM reinforcing loop R6

The PQM CLD illustrates the interrelationship between the production and retention factors on the percentage of academics with PhDs. For example, the level and breadth of the PQM affects the provision of research infrastructure, whilst the availability of the research infrastructure influences the introduction and sustainability of postgraduate programmes. The PQM CLD depicts two reinforcing loops. It thus graphically presents the leverage points where management can effect change to stem the attrition rates.

The loop indicates that as higher-level programmes are offered; more postgraduate students will be registered. This, as stated above will stem attrition rates of young academics to other institutions. It further illustrates that the breadth of PQM has an impact on the retention rates of academics overall. As discussed in previous chapters, XYZ has a narrow scope of 3 faculties and some disciplines which are offered only as service subjects. Thus, extending the breadth of the PQM in these disciplines and offering postgraduate qualifications in most, if not all, disciplines might stem attrition rates. A respondent from HR&D revealed that 16 academics had already resigned in a short space of 8 months in 2017.

The loop further illustrates that high retention rates of academics with PhDs stimulate research activity. However, Hayward and Ncayiyana (2014) argued that academics with PhDs find consultancy and part-time teaching more financially rewarding than supervision. It thus remains to be seen whether high retention rates will stimulate research activity at XYZ.

High research activity generates third-stream income in the form of publications and doctoral theses. As Mlambo (2010) argued, financial rewards accrue to the institution where the PhD students graduate. Higher sources of funding facilitate the provision of research infrastructure. However, inadequate research infrastructure is not peculiar to XYZ, literature indicated that this is the case even in those institutions that produce 95% of doctoral students in this country (Habib and Morrow 2006; Badat 2010; Cloete 2015; Cloete, Mouton and Sheppard 2015; Cloete, Sheppard and Bailey 2015).

The role of adequate provision of research infrastructure for programmes offered cannot be over emphasised. Both internal and external programme reviews conducted by institutional Quality Assurance Departments (QMD) and CHE include Criterion 7, which is Infrastructure and Library Resources. Programmes can be withdrawn due to lack of appropriate infrastructure to support a programme. The loop thus, indicates that the provision of appropriate postgraduate infrastructure facilitates the offering of higher-level programmes. Therefore, offering a broad PQM and postgraduate qualifications will facilitate the retention of academics with PhDs at XYZ. As argued in previous CLDs a high percentage of academics stimulates research activity and third-stream income.

Thus, reading this loop into the QSD model will illustrate the importance of sweeping in all the variables embedded in the phenomenon under review while drawing relevant boundaries (Churchman 1968; Coyle 2000; Ulrich 2003; Kim and Andersen 2012).

6.4.1.2 Human Resource Processes

The availability of career advancement opportunities and remuneration emerged from the current study as major HR processes that facilitate or inhibit retention of academics with PhD in the institution.

6.4.1.2.1 Career advancement opportunities

The findings of the current study are consistent with findings of previous studies which cited limited availability of career advancement opportunities in academia and the criteria upon which promotion is based as the main impediments to academic staff retention (Ng'ethe 2014; Selesho and Naile 2014). XYZ has a clearly articulated academic promotions policy and promotion procedures manual. The policy clearly outlines the academic structure while the requirements for promotion are provided for in the manual. In terms of the promotion policy, the academic structure entails junior lecturer, lecturer, senior lecturer, assistant professor, associate professor, professor and senior professor. While this structure gives the impression of an availability of promotion opportunities, the criteria upon which these are based deter academics from applying. Promotion to senior lecturer is heavily weighted on teaching and beyond this level into the professoriate, the criteria is heavily weighted on research and supervision. All other factors that characterise the promotion processes in academia cited in 2.4.2 were prevalent in the current study as well.

However, to counter the technikon legacy of underqualified academic staff, most academics at XYZ are registered for postgraduate qualifications. Internal documents reported that at XYZ only 14% of academic staff had PhDs in 2017. Personal development was therefore regarded as a short-term goal for academics. Limited career advancement opportunities were not regarded as a factor that influenced their decision to leave the institution at this stage of their careers. However, consistent with findings of Netswera and Rankhumise (2005) young academics expressed the intention to leave the institution upon completion of their PhDs if there were no career advancement prospects for them. The criterion for promotion at XYZ is based on research output and supervision of

postgraduate students while academics at XYZ are burdened with heavy teaching loads with less time for research. The current study confirmed the results of Austin (1994) which reported that academics at UoTs are challenged with balancing research with minimal or no research support all the while burdened with heavy teaching duties. In addition, supervision of postgraduate students, though a criterion for promotion, is not factored into the allocation of workloads where academics are supervising postgraduate students at other institutions.

The promotion policy at XYZ, lauded by academic management as progressive, was criticised by academic staff. They characterised the promotion processes of the institution as restrictive, inconsistent and unreasonable.

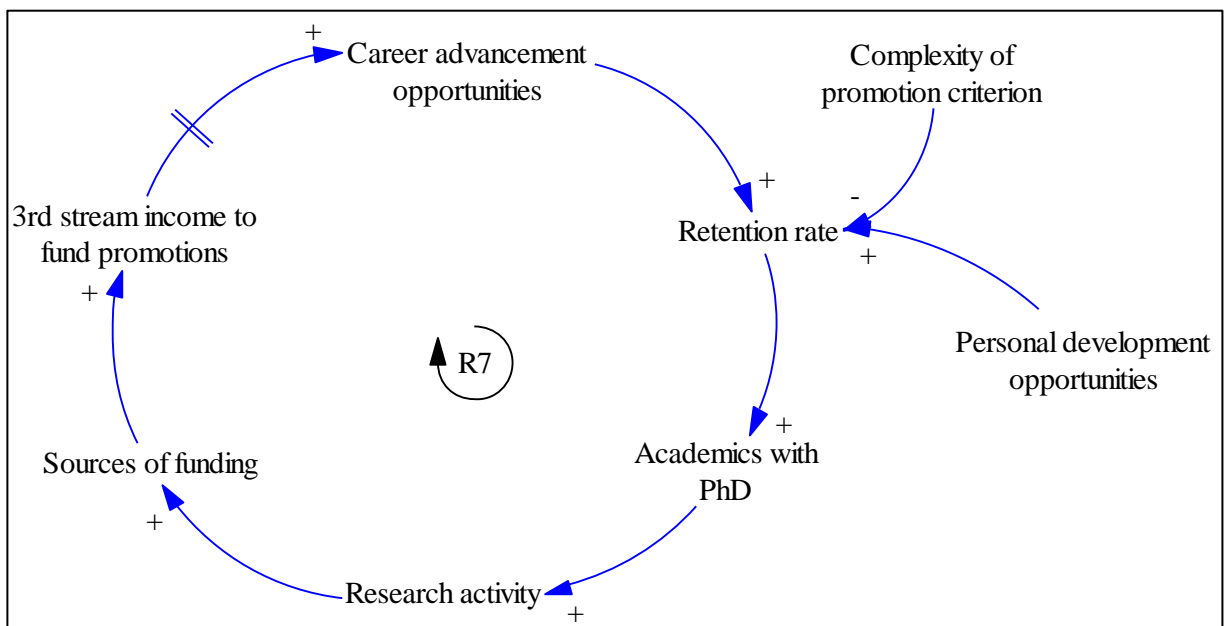


Figure 6.12: Career advancement reinforcing loop R7

The loop with a positive polarity indicates that high career advancement opportunities have a positive impact on the retention rate of academics. However, the converse applies, implying that a lack of career advancement opportunities leads to high attrition rate or poor retention rates. The findings of this study are consistent with those sentiments. The complexity of promotion criteria in academia is characterised as long, tedious,

cumbersome, unreasonable and inconsistent amongst other factors, impacts negatively on the retention rates. On the other hand, the need for personal development facilitates retention rates in the short-term.

However, young academics, nGAPs, were not aware or even concerned about the promotion criteria of the institution at this stage in their careers. Their main concern was on personal development. When probed on their future career aspirations, over 75% indicated their intentions to pursue a career in academia as established scholars which entailed as stated earlier, a less onerous teaching load, publishing and supervision of postgraduate students.

A high retention rate leads to a high percentage of academic staff with PhDs which in turn leads to the stimulation of research activity. The impact of research activity on the sources of funding has been discussed above. The loop clearly illustrates a direct link between the percentage of academic staff with PhDs and an increase in publications through the stimulation of research activity. All other benefits such as research activity, sources of income to fund promotions that accrue from the high percentage of academics with PhDs apply as discussed earlier.

Therefore, while lack of career advancement opportunities and the criteria for promotion are not contributing to the high attrition rates in the short-term, in the long-term however, these can be major factors that inhibit retention rates. As argued above, promotion at XYZ has a direct correlation with the PQM and workload of academics. At XYZ, due to the absence of postgraduate supervision, academic workload carries a heavy teaching load. Yet, the results of a study conducted by Houston, Meyer and Paewai (2006) found that promotion criteria at universities is heavily weighted on research and does not equally acknowledge the different components of academic work which includes teaching. The mismatch between the nature of the job and the promotion criteria was thus evident in the current study and consistent with the experience of the Australian ECAs (Price, Coffey and Nethery 2015).

Thus, it can be deduced from the findings of this study that academics consider changing from UoT universities to those traditional universities that are research led with better research culture, infrastructure and reduced teaching loads. With promotion heavily weighted on research, and nGAP lecturers accustomed to a 20% teaching load (DHET 2015), it begs the question if UoTs, which are teaching-led institutions, will be able to retain the nGAP lecturers once they achieve their short-term personal development goals (doctoral qualifications). Despite annual calls for academic promotion applications, the majority of academics have remained in the same positions for a long time due to the cumbersome nature of the promotion procedures. This phenomenon is likely to persist in the institution when one considers the views of academic management on the promotion criteria of the institution in 5.4.2.1. The loop therefore indicates a negative polarity because the complexity of promotion procedures discourages academics from applying for promotion. A study by Ng'ethe (2014) found that the second most influential factor for voluntary turnover in academia was the opportunity for promotion. Although this was not evident in this study, it could be inferred that upon completion of PhDs, this will prove true for XYZ's academics as well.

6.4.1.2.2 Remuneration

The results of the current study did not conclusively establish if remuneration facilitated or inhibited retention rates of academics with PhDs. It was found that remuneration alone was not a determinant of the retention rate; other factors such as flexible time and personal development were considered by participants, particularly those with young families, in their decision to stay or leave.

Nonetheless, the findings of this study were consistent with the literature review. A general consensus emerged that academics were inadequately compensated when compared to their counterparts in industry and the Public sector for those positions that required similar qualifications and expertise (Badat 2010; Dube and Ngulube 2013; Theron, Barkhuizen and Du Plessis 2014; HRDC 2015). In addition, participants generally concurred with Habib and Morrow (2006) findings that it was common to find masters

graduates with limited experience appointed as Deputy Directors and earning salaries equivalent to professors with 20 years of experience. One nGAP lecturer stated that with her qualifications and experience she could be a Deputy Director.

The feeling of inadequate compensation in academia is universal. Studies of Kenyan universities and select African universities in the HERANA study found that academics felt the need to take on part-time teaching to supplement their income (Kipkebut 2010; Cloete 2015; Hayward and Ncayiyana 2015). In the current study most participants were also involved in part-time teaching, resulting in heavy teaching load which had an adverse effect on their PhD studies.

Despite better remuneration prospects outside of academia, the majority of participants still aspired to a career in academia. Thus, the biggest pull factor for academics is moving to other HEIs. A study by Theron, Barkhuizen and Du Plessis (2014) reported that 31.4% of participants had applied for jobs at other institutions indicative of potentially high movement of academics within the sector. Consistent with findings of several scholars (Roy 2014; Selesho and Naile 2014) salary differentials within the sector were confirmed by HR director. These authors found that traditional universities located in urban areas offered better remuneration in comparison to their counterparts in rural areas and the UoT sector. Due to lack of collective bargaining for salaries in academia, factors such as prestige, rank and location of institutions influenced the rate at which academics are compensated. Ranking and prestige in academia is associated with the research output of a particular institution amongst other factors.

In terms of administrative positions, the findings of the current study were contrary to those of Dube and Ngulube (2013) and Theron, Barkhuizen and Du Plessis (2014) which found that academics are continuously drawn to administrative portfolios and management positions within universities and that some move to the public and private sector. The majority of participants from the current study indicated a preference for academic careers citing supervision and research as areas of interest.

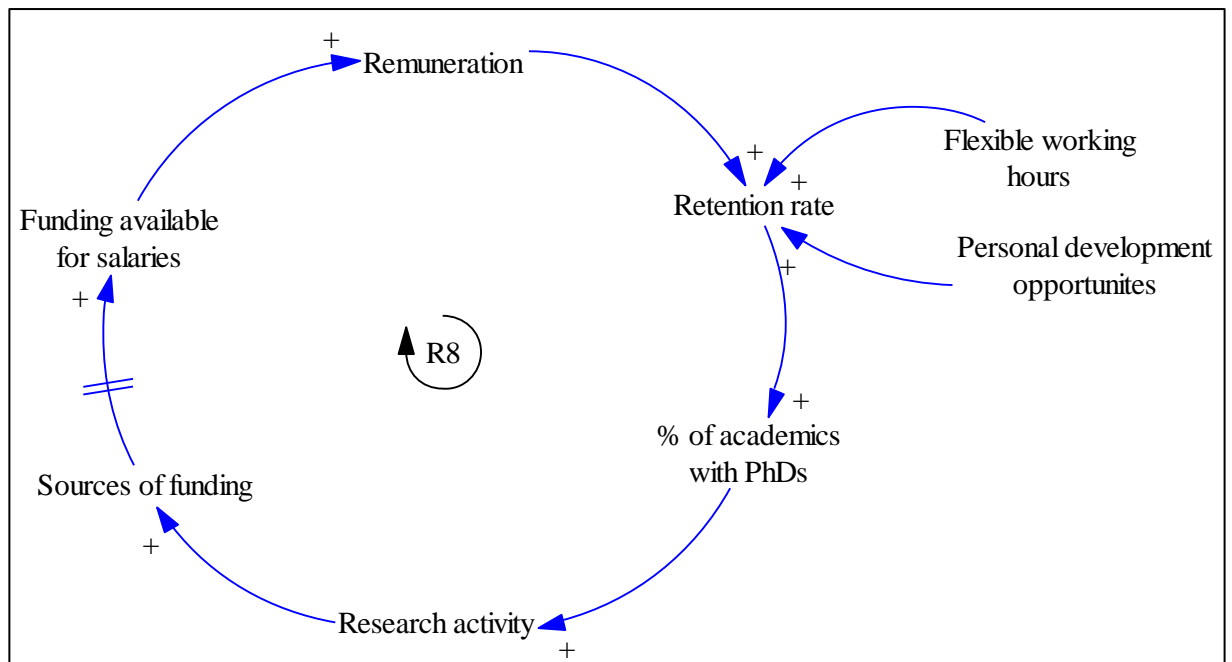


Figure 6.13: Remuneration reinforcing loop R8

The remuneration CLD indicates the interrelationship and interdependence of variables embedded in the production and retention of academic staff with PhDs. Retention of academics is not only influenced by remuneration, but the other variables already depicted and discussed in other CLDs. The diagram illustrates that while a higher remuneration has a positive effect on retention, academics also consider flexibility of working hours and personal development opportunities in their decision to stay or leave. As stated above, while positions outside academia offer better salaries, the nature of those jobs, working hours and limited personal development opportunities were major deterrents. Important to note for management is the fact that although remuneration is not a retention factor, dissatisfaction thereof is a turnover factor (Kipkebut 2010). In other words, remuneration is a hygiene not motivation factor according to Herzberg's Two-factor theory (Kipkebut 2010:57).

The diagram further illustrates that high retention rates lead to a higher percentage of academics with PhDs. This impact on research activity and sources of third-stream income has been discussed in other CLDs and will be illustrated as a dominant loop in the QSD

model. Sources of funding on salaries however, can best be argued by linking Roy (2014) assertion that the prestigious institutions offer better remuneration packages. These prestigious institutions have a better third income generation capacity relative to their counterparts in rural areas and UoTs. The high prevalence of academics with PhDs in these institutions stimulates research activity arguably regarded as the dominant generator of third-stream income. The DHET funding formula, passed in 2003, rewarding institutions for efficiency in postgraduate programmes (Vaughan 2008:90) perpetuated benefits to prestigious institutions. These institutions are better placed to increase doctoral output and research output due to their high percentage of academics with PhDs.

Therefore, while competitive remuneration is critical in the retention of academics with PhDs, a variety of other factors such as the PQM at XYZ plays a role in academic staff turnover.

6.4.1.3 Spirit of Ubuntu

Roy (2014) poignantly captures the concept of Ubuntu as a cultural ethos mainly associated with the black culture. A revered Archbishop Desmond Tutu captured the concept as “I am what I am because of who we all are” according to (Roy 2014:223). Other social constructs associated with this term are, ‘umuntu ngumuntu ngabantu’, it takes a village to raise a child or the spirit of giving back. The more recent social construct which carries a negative connotation of this practice is “black tax”, meaning that the first successful siblings in the family are burdened with the responsibility of looking after parents and the educational needs of any younger siblings. Debates in the media are divided on this phenomenon, while others view it as black tax others express a deep sense of Ubuntu, a need borne out of love for uplifting one’s family. Ubuntu is not particularly confined to the immediate family, but goes beyond to extended family members, neighbours and the community at large in the black culture, hence the saying “it takes a village”.

Roy (2014) further asserts that uBuntu philosophy in South Africa was slowly fading away as greed and selfishness take over. The recent State capture, the Agrizzi exposé on Bosasa

and the VBS bank scandal amongst others bear shocking testimony to the extent of greed and the degeneration of values that black people had prided themselves on for decades. The ethos of communal not individual success is fast becoming a thing of the past. The findings of this study however, revealed that some academics and management alike are still driven by their altruistic values. These values have influenced their desire to remain in the institution despite the appealing pull factors discussed earlier presented by the external environment. The spirit of Ubuntu emerged as the strongest factor that facilitated the retention of academic staff in the institution. The Ubuntu CLD graphically presents how this desire to serve reinforces itself and motivates staff to remain in the institution. One respondent, in particular, expressed a desire to remain and retire at XYZ because she felt that is where she was needed. Very little was found in the literature on the impact of Ubuntu in the retention of academics particularly those with PhDs who were regarded as extremely mobile by COHORT (2004).

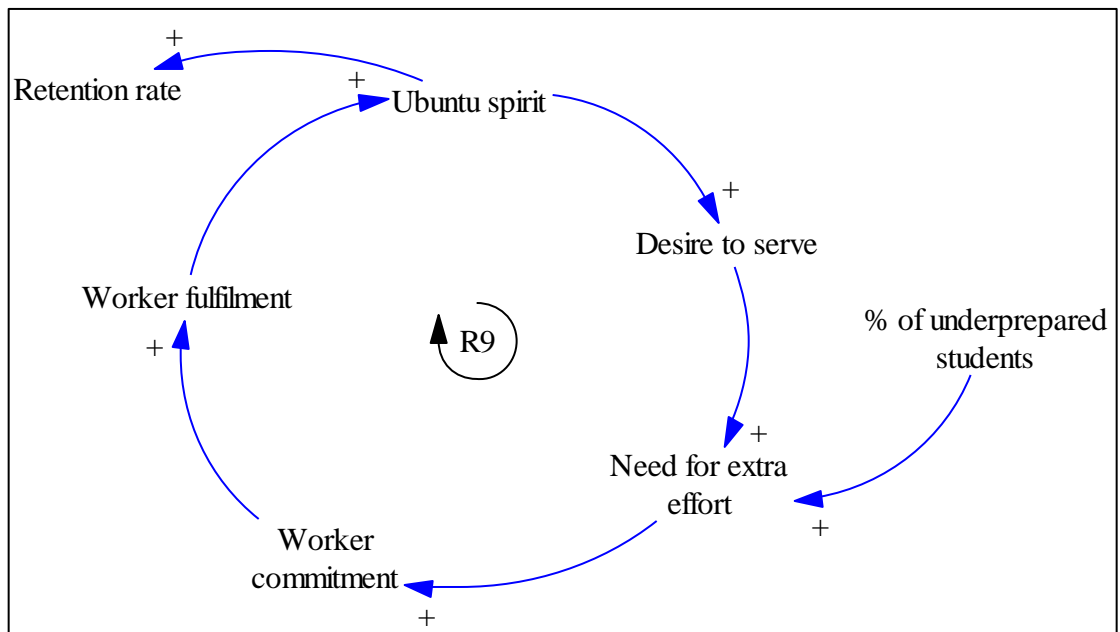


Figure 6.14: Ubuntu spirit reinforcing loop R9

The diagram illustrates that as the spirit of Ubuntu increases, the desire to serve underprivileged students increases as stated in Chapter 4 by one management respondent

who has remained in the institution for more than 20 years. As student participation rates increase leading to a high student population per programme, so the percentage of under-prepared students increases. Large classes diminish the ability to give individual attention to students in need. The desire to serve motivates academics to exert extra effort in the form of consultations, tutorials and other interventions which in turn increases their workload.

The need to exert the extra effort required to assist underprepared and historically disadvantaged students reinforces commitment and ultimately fulfilment as more students progress in their studies. While these feelings of fulfilment encourage staff to exert even more effort, it tends to put more burden on academics pursuing PhDs. As illustrated by a workload CLD, an increase in the workload contributes to time pressure that leads to slow PhD progression rates. Driven by their altruistic values, some academics have sacrificed their career development goals offered by the external environment; hence the spirit of Ubuntu has a positive effect on the retention rate of academics. Their commitment and desire to serve facilitates fulfilment which in turn reinforces Ubuntu spirit.

6.5 Conceptual model clarification

The QSD conceptual model visually depicts the dynamics involved in the institutional endeavours to increase the percentage of academics with PhDs. The model swept in all the variables embedded in this system of interest (Churchman 1968). However, challenges of academic staff qualifications are broad and varied. In drawing the boundary of the current study, many factors that influence the production and retention of academic staff with PhDs were not included. Thus, the boundary of the QSD model was based on the integration of those variables that were gleaned from all the stakeholders in the HESA (2011) report and those that emanated directly from the mental (interviews) and written (perusing archival records) databases from the current study as illustrated in the QSD model below.

This resulted in a broad model boundary that allowed me to explore the problem from different viewpoints (Stermann 2002a). More importantly, Keating (1999) emphasises that the art of model building is knowing what to leave out. Therefore, in testing the validity of the model, the author encourages modellers to ask these pertinent questions “Is the boundary of the model appropriate, given the purpose? Is the model too complex or too simple? Are the important concepts for addressing the problem endogenous to the model” (Keating 1999:11). The model is consistent with (Jackson 2003) assertion that a good model should have few exogenous factors (see Table 3.4) from the current study. The exogenous factors from the conceptual model are supervision and PhD pre-registration administrative challenges. In drawing the boundary of a model and knowing what to include and exclude is critical (Coyle 2000; Ulrich 2003). In this regard, Ulrich (2003) assertion that different people have very different boundaries which determine what they include and exclude in their sense making is thus validated in the QSD model.

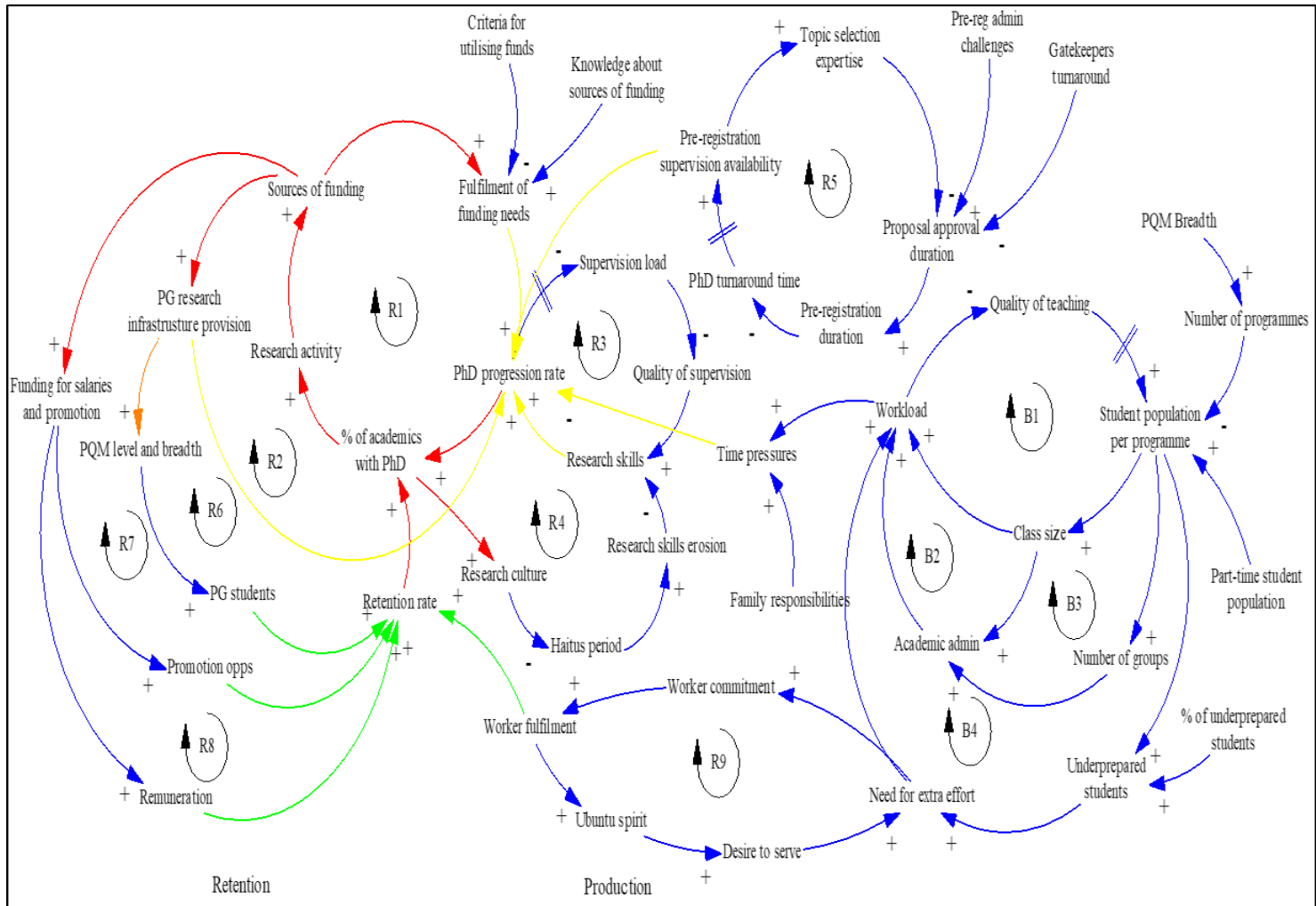


Figure 6.15: Qualitative System Dynamics conceptual model on the production and retention of academics with PhDs

As suggested by Yang (2015) in a qualitative study using system dynamics, constructing causal loop diagrams is usually the main method to graphically represent a system's variables and their interrelationships. The QSD conceptual model above is thus a graphic presentation of all individual CLDs discussed above. It captures the structure of the system, not what has happened but what would happen if other variables changed in various ways. For example, what would happen if HR processes such as sabbatical leave are not provided? This would impact on the progression rate, thus affecting the percentage of academics with PhDs and all the benefits that accrue from there as depicted by the red arrows. This illustrates the strength of SD modelling; it reveals both obvious and hidden interconnections between variables.

More importantly, I was mindful of the fact that presenting a complex causal map all at once makes it hard to see the loops, understand which are important, or understand how they generate the dynamics (Sterman 2000). For that reason, the system's variables were represented at aggregate level, with more detail illustrated in individual CLDs. In addition, the arrows were colour coded to illustrate which are important and how they generate the dynamics.

In building the conceptual model, important loops were integrated to illustrate the impact of each variable on the percentage of academic staff with PhDs at XYZ. The red coded arrows indicate the main loop in academic staff qualifications. The percentage of academic staff with PhDs at the institution is influenced by the rate at which academics progress in their studies as well as the retention rate. The high percentage of academic staff with PhDs stimulates research activity culminating in an increase in third stream income through publications. Additional income from PhD research as academics graduate presents an opportunity cost for XYZ because it accrues to those institutions where they are registered (Mlambo (2010)). As academics graduate, income generated by their thesis and all associated innovations accrue to those institutions where they are registered. Nevertheless, sources of funding stimulated by research activity in the form of publications is another important variable that drives an increase in the percentage of

academics with PhDs. As illustrated in the model, it facilitates the fulfilment of research needs for those registered for PhDs. This facilitates high progression rates as depicted by a link with a positive polarity. On the other hand, it facilitates the provision of research infrastructure which is paramount for the progression rates as well as facilitating the introduction of postgraduate programmes as argued earlier. It also facilitates the retention of academics through salaries and promotion.

All the arrows coded in green indicate a positive polarity. Ideally, an increase in postgraduate students, career advancement opportunities, remuneration and the spirit of Ubuntu enhance the retention of academics with PhDs. However, at XYZ, the absence of postgraduate students has a direct converse effect. In addition, limited career advancement opportunities and the criteria upon which these are based influences intentions to leave the institution in the long run (upon completing PhDs). These are areas of policy intervention by management.

The yellow coded arrows, on the other hand, illustrate those variables that influence the rate at which academics progress in their studies. Workload, research funding, research infrastructure, HR processes, supervision, research skills and PhD pre-registration challenges have a direct impact on the percentage of academic staff with PhDs. All these variables except supervision and PhD pre-registration are endogenous factors; hence management has power to exert meaningful changes. Changes such as developing a sabbatical leave policy which has been in the draft stage since 2013 could facilitate the progression rates. The blue coded arrows illustrate simple dynamics within each variable, with more comprehensive detail read into the individual CLDs.

In analysing SD models, Wolstenholme (1985) suggests identifying the major feedback loop structure of the model and the controllable (endogenous) and uncontrolled (exogenous) variables embedded in the system. As argued earlier, supervision and pre-registration variables are exogenous factors because the institution does not have postgraduate qualifications in its PQM. Therefore, leverage points where management can currently exert any meaningful change are all in the endogenous factors. For example, as

argued earlier, the establishment of the RIE unit, the appointment of retired research professors and a gradual increase in the percentage of academics with PhDs have stimulated research culture. As depicted in the model, the research culture encourages academics to register for their doctoral degrees immediately on completion of their master's degrees thus reducing the hiatus period. Another leverage point is the review of the institutional PQM before it is embedded in the structure and policies of the institution. Its direct and indirect impact on the production and retention of academics in the institution has been sufficiently argued. For example, due to the level of the PQM, inadequate postgraduate research infrastructure cited by participants as an obstacle to their progression was evident, its role in the retention of academics cannot be overemphasised.

6.5.1 System archetypes

According to Braun (2002:01) system archetypes are not sufficient models on their own. System archetypes provide generic CLDs that reveal qualitative information about the underlying structure of the system, enabling managers to identify current problems and anticipate future trends (Mirchi 2013). However, they are generic models that are unable to reveal specific variables that are part of the system structure of a specific problem. Thus, without this explicit awareness of these real variables, it is difficult for managers to pinpoint specific leverage points where changes in structure can achieve sustainable changes in system behaviour. It is precisely for this reason that individual CLDs were created to identify the dynamics involved in the challenges of academic staff qualifications and subsequently to integrate them into a QSD model. For the purpose of the current study, combining casual loop diagrams that identify dynamics involved in each specific variable and integrating these into a comprehensive QSD model and supplementing this with system archetypes was meant to address the phenomenon of low percentage of academic staff with PhDs holistically through a systems lens.

Several scholars (Kim and Lannon 1997; Braun 2002) maintain that there is no right or wrong way of using system archetypes. Braun (2002) suggests using system archetypes in two ways, diagnosing the problem and for planning purposes. Wolstenholme (2004),

on the other hand, suggests that generic archetypes can help with the creation of dynamic hypotheses at the front end of the modelling process and with the communication of systemic insights at the back end of the modelling process. When used diagnostically at the front end of the modelling process, they assist managers initiate the inquiry about the nature of the problem which helps in recognising the patterns of behaviour that are already present in their organisations.

They assist managers answer questions such as “Why do we keep seeing the same problems recur over time?” Thus, XYZ management can ask why “is the percentage of academics with PhDs remaining relatively constant despite efforts in recruitment and annual graduations? For example, the institution has set a target that 20% of their academics will have PhDs by 2019; however, the actual number of academics with PhDs has been fluctuating, showing at 14% by 2017 according to the Historical Student Enrolment 2010 – 2017 as illustrated below. The statutory body targets for academic staff with PhDs are set at 75% by 2030, to put the analysis of the problem into its proper context.

Table 6.1 Headcount of permanent instructional/ research professional staff

Enrolment KPI	2010	2011	2012	2013	2014	2015	2016	2017
Headcount of permanent instructional / research professional staff	152	193	179	195	190	194	201	208
% staff with doctoral degrees	6%	8%	9 %	9%	11%	13%	12%	14%
% staff with at least a masters degree	53%	51%	53%	60%	56%	60%	58%	58%

Source: Adapted from Historical Student Enrolment 2010 – 2017

On the other hand, when used prospectively for planning purposes, system archetypes can assist managers to determine whether policies and structures under consideration may be altering the organisational structure in such a manner as to produce the archetypal behaviour. If managers find this to be the case, they can take remedial action before the

changes are adopted and embedded in the organisation's structure (Braun 2002;01). For example, focusing on low qualifications while encouraging staff to pursue doctoral degrees and recruiting those with PhDs will not yield the desired results while executive management shows "little" appetite for postgraduate programmes. Thus, the PQM under consideration has been shown to inhibit retention rates which then will require management review before it becomes embedded in the academic structure.

Individual CLDs and the QSD model that holistically illustrate the dynamics involved in the problem of academic staff qualifications at XYZ have been presented and discussed above. The following section communicates systemic insights at the back end of the modelling process through the use of generic system archetypes that exhibit at XYZ. Braun (2002) lists ten system archetypes which can be used in any combination. For the purpose of this study, two system archetypes that exhibit at XYZ will be discussed to communicate systemic insights of the problem.

6.5.1.1 Fixes that Fail

'Fixes that Fail' is one of the system archetypes that manifest at XYZ. The findings of the current study are consistent with Kim and Lannon (1997) assertion that almost any decision carries long-term and short-term consequences. For example, the Fixes that Fail archetype displays a steadily worsening scenario, where a quick fix solution can alleviate pressure in the short-term but produces unintended consequences that ultimately exacerbate the original problem in the long-run (Wolstenholme 2004). Thus, the Fixes that Fail archetype can assist managers identify fixes that may be doing more harm than good. This archetype is illustrated below to explain how it manifests at XYZ.

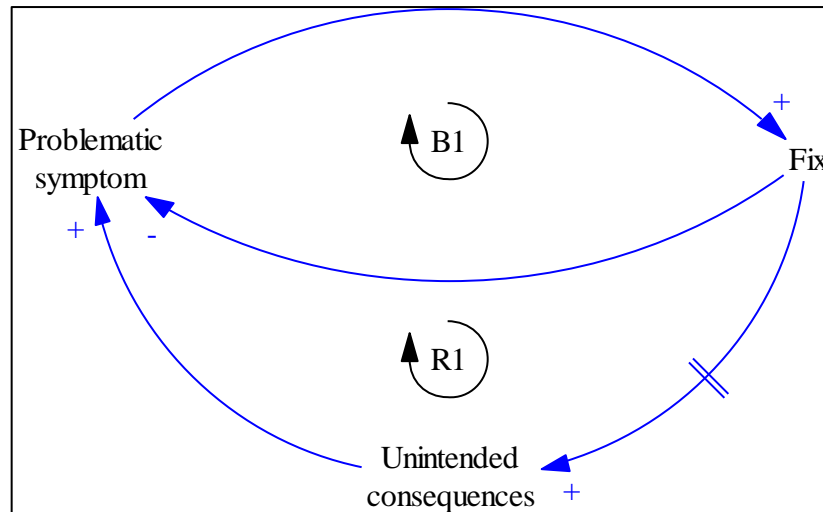


Figure 6.16: Fixes that Fail system archetype

This archetype illustrates that generally when managers are confronted with a problem, they tend to apply a quick solution that releases pressure in the short-term denoted with B1 (balancing loop). However, the fix over time produces unintended consequences which reinforce the original problem symptoms to return to its previous level or even get worse as denoted by R1 (reinforcing loop).

The main problem this study seeks to explore is the challenge of the low percentage of academic staff with PhDs in the institution. Figure 5.16 illustrates that when this phenomenon manifests, academic support must be provided as well as strategies designed to alleviate those challenges experienced by academics whilst pursuing PhDs (see Table 5.1). This fix will alleviate the problem in the short-term as illustrated. XYZ Council announced in 2009 that the minimum qualification for an academic was a master’s degree and encouraged staff to pursue their PhDs. The minimum qualification for HODs and upwards is a PhD. To remediate this problem, management created the REI unit and appointed research professors to fast-track academic staff qualifications. As illustrated in Table 5.1, the number of academics with PhDs immediately increased from 2011 when the full effect of the new policy was felt and has remained constant thereafter. These findings are consistent with Braun (2002) who argue that managers preoccupy themselves with alleviating the symptoms of short-term problem that provide instant results rather

than spending time on the more difficult and time consuming task of identifying the underlying systemic problem.

In this regard, it was stated in Chapter 5 that 16 academics had resigned from January to August in 2017. While data could not conclusively confirm that these were academics with PhDs, the systemic structure of this problem is indicative of this conclusion. It could however, be argued that even those without PhDs were considering the more conducive working conditions offered by traditional universities during and beyond their studies. These entail a smaller teaching load, adequate research infrastructure, flexible working hours, and close proximity to supervisors as well as opportunities for the supervision of postgraduate students amongst other factors. Statistics regarding the percentage of academics with PhDs for 2018 and 2019 could not be obtained from the internal HEMIS office and externally audited HEMIS results. The most pertinent question to ask in this regard is whether “action was quickly taken to respond to a crisis without due consideration of long-term consequences” (Kim and Lannon 1997). Setting minimum qualifications and investing in the establishment of RIE unit are intended to fix the problem without necessarily understanding the systemic fundamental problem. The fundamental underlying systemic problem that emerged from data analysis was the breadth and level of XYZ PQM.

Thus, Braun (2002) argues that this archetype implies that a quick-fix solution can have unintended consequences that can exacerbate the problem. Looking at Table 5.1, there is a low percentage of academics with PhDs, management invests in the solution, from 2010 the number significantly increases from 152 to 193, the fix reduces the problematic symptom B1. However, the fundamental problem of low PQM which does not encourage academics to spend time on research and supervision persists. Over time, the recruitment of academics with PhDs and an increase in the annual graduation rates have no significant impact on increasing the number of academics with PhDs R1. Consistent with findings of COHORT (2004), academics with PhDs are mobile, if there are no career advancement prospects for them, they leave. This can be determined from looking at the actual number

of academics with PhDs from 2011 – 2016. Thus, the fix has had unintended consequences in the long run.

Therefore, attempts to increase the percentage of academics with PhDs by providing support without necessarily reviewing the PQM of the institution, which is the fundamental problem, will exacerbate high attrition rates in the future. More importantly, the opportunity to spend more time on research and supervise postgraduate students is one of the primary reasons for leaving. The majority of nGAP and young academics interviewed indicated a desire to leave the institution if there was no movement towards offering postgraduate qualifications in their disciplines by the time they had completed their degrees.

On the contrary, Executive management held several meetings during the formulation of the 2020 – 2025 strategy of the institution with all university stakeholders. Surprisingly, Executive management displayed clearly less enthusiasm for higher qualifications, and rather insisted that the institution focus on undergraduate programmes despite strong views to the contrary from academics in particular. Executive management further stressed the need to increase the percentage of academics with PhDs through recruitment amongst other means. Muller (2012) argues that suitably qualified academics are deterred by heavy teaching loads and poor research infrastructure amongst other factors in lower ranked universities. Through observation, one can concur with these sentiments if one considers the number of academic positions that are advertised and re-advertised due to poor responses from suitably qualified academics. The PQM of the institution which entails more teaching at undergraduate level than supervision at postgraduate level is the fundamental systemic problem that deters potential academics with PhDs or facilitates intentions from within to leave. Therefore, an institutional target of 20% by 2019 cannot and will not be achieved merely through recruitment or the encouragement and provision of academic support unless and until the Executive management understands the systemic structure of the problem. Put differently, this goal will remain a pipedream (Herman 2011c).

Fundamental problems are more difficult to understand and require time and large initial capital outlays. Diversifying the PQM and designing higher qualifications takes time and requires a large initial capital outlay of physical infrastructure among other prerequisites. Until then, as stated in 5.4.1 there is no correlation between the goals of academics with PhDs and those of the institution. The institution will continue to invest in the provision of academic support programmes, derive instant gratification from increased graduation rates but suffer high attrition rates in the long-term. As argued by Muller (2012) top-tier universities mask over their inability to produce and entice enough PhD graduates to fill vacant posts by relying on movement from within the sector. Academics on the other hand are drawn to top-tier universities because, as argued by Austin (1996), academics in these institutions are encouraged to spend more time on research and supervision.

Therefore, a two pronged approach suggested by Kim (1992) of applying a fix while planning out a fundamental solution will ensure that XYZ management is not solving yesterday's problems. These systemic insights cannot be adequately communicated through CLDs alone even though they provide powerful insights into specific leverage points for implementing policy changes.

6.5.1.2 Success to the Successful

'Success to the Successful' is another archetype that manifests at XYZ. According to Kim (1992) and Braun (2002) in situations where one group is more successful than others, it is important to determine the reasons why the system was set up to create one winner. In terms of academic staff qualifications, traditional universities have the highest percentage of academics with PhDs compared to their UoT counterparts (see Table 2.2). This advantage was created by the legacy of apartheid as explained through the evolution of doctoral education. Traditional universities had a sole mandate of offering PhDs, as a result they were endowed with resources such as adequate research infrastructure and human resources such as academics with PhDs (Mabokela 2000). This anomaly is illustrated by the generic system archetype below.

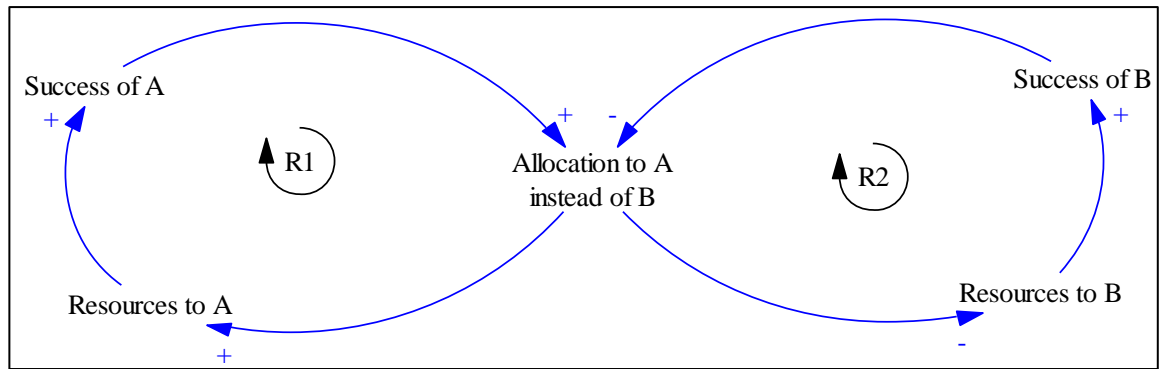


Figure 6.17: Success to the Successful system archetype

This archetype typically captures the scenario between the traditional universities and UoTs. Several scholars (Kim 1992; Kim and Lannon 1997; Braun 2002) as illustrated above, show that where A and B are vying for a limited pool of resources to achieve success, and A is already historically successful, it tends to garner more success. Several studies (Backhouse 2009; ASSAf 2010; Herman 2012; Louw and Muller 2014) have shown that PhD production in this country is reliant on the top 10 institutions which produce 83% doctoral students. These authors further argue that approximately 83% of all PhD awards were produced by the universities, particularly HWUs in 2007. This should come as no surprise why these institutions continue to thrive. HWU’s historical advantage of a PhD mandate and superior endowment in research infrastructure has persistently increased their likelihood for continued success. Their initial success justifies devoting more resources which widens the gap between these types of institutions even further. As Braun (2002:10) aptly puts it, “the Success to the Successful archetype states that if one group (A) is given more resources than another equally capable group (B), A has a higher likelihood of succeeding. It hypothesizes that A’s initial success justifies devoting more resources to A, further widening the performance gap between the two groups over time”.

The historical allocation of research infrastructure to traditional universities (A) to facilitate the production of doctoral students brought more resources through the stimulation of research activity. The DHET new funding formula, passed decades later in 2003, which rewarded institutions for efficiency in the production of doctoral graduates

(Vaughan (2008:90) confirms this reinforcing loop. This formula was designed to reward those institutions that produced masters and doctoral graduates by research only. This new strategy reinforced the resource allocation to A, because of its historical advantage in doctoral education. As stated earlier, the new formula put the monetary value for each doctoral graduate equivalent to three articles in an accredited journal (Mouton, Boshoff and James 2015).

The limited allocation of resources to UoTs (B) on the other hand has reinforced the limited resources in this sector. Due to the historical mandate of producing the workforce for the public service (Mabokela 2000), the entrenched poor resource allocation to B has persisted beyond the apartheid era. The new regulations passed decades later are still perpetuating this historical disadvantage. It should therefore come as no surprise that there is high migration within the sector. The majority of the participants in the current study indicated the desire to pursue their academic careers within the HE system in institutions that will accord them an opportunity to supervise amongst other beneficial career advancement opportunities offered by A over B.

Historical advantage and the current funding formula are exogenous factors over which management has no direct control. However, management does have control over the strategies formulated to mitigate against the loss of academics to traditional universities. The DHET (2014) argues that the PhD mandates have changed, all institutions may offer higher degrees. The PQM of the institution as argued earlier emerged as one of the main factors that facilitate the desire to leave for the majority of participants in the current study.

The above system archetypes have been used diagnostically; further research can thus view similar problems respectively for planning purposes and testing of appropriate policies. Most importantly, Wolstenholme (1999:04) captures the benefits of using system archetypes as follows; “By using archetypal structures, particularly total generic two loop structures, involving policies, boundaries and delays, it enables potential unintended consequences to be anticipated and hence increases the chances of plans being achieved.

The methods bring much needed tools to the strategic areas of management and allow a wide range of managers to access the power of feedback thinking”.

6.6 Conclusion

A qualitative system dynamics conceptual model for the current study was presented. All the individual themes, categories and codes discussed under each heading in Chapter 4 were integrated with data gleaned from perusing documents and the literature when viewing the challenges of academic staff qualifications. These formed the boundary of the model. A comprehensive visual illustration of the dynamics involved in each variable was presented in the form of CLDs. These CLDs were integrated into a QSD model that showed the dominant loops. The attempt was to present a simple, yet comprehensive model that graphically illustrates the dynamics involved in the phenomenon of the low percentage of academic staff with PhDs at XYZ. CLDs assist managers to identify leverage points where they can affect policy changes.

Thereafter, system archetypes that exhibit at XYZ were identified and discussed. The Fixes that Fail archetype indicates the importance of a dual approach in solving complex business problems, it emphasised that, while solving symptomatic problems is important to alleviate the pressure of the situation in the short-term, fundamental solutions produce more sustainable and long-term benefits. The Success to the Successful archetype, on the other hand, apportion the challenges of production and retention of academics with PhDs in UoTs in general and XYZ in particular to the establishment and mandates of different types of institutions in this country. Using the reference mode assisted me to elicit information of how this skewed distribution arose and was likely to unfold in the future (Sterman 2000).

Chapter 7 Conclusion and recommendations

7.1 Introduction

The purpose of this research study was to examine the challenges of the low percentage of academic staff with PhDs, in HEIs in general and UoT sector in particular. This phenomenon cannot be fully understood without adopting a holistic overview of the challenges of production and retention of academics with PhDs within the HE system through a systems lens. The current study adopted a holistic single case study of XYZ, a historically disadvantaged UoT located in a semi-rural locality. The HE system is divided into three distinct types of institutions in South Africa (DHET 2014). This distinction, in the South African higher education context is imperative because the challenges of academic staff qualifications are influenced by the type of institution, its location and historical mandate.

Literature revealed the key challenges influencing the percentage of academic staff with PhDs in this country as outlined in Table 1.2 (HESA 2011; DHET 2015; HRDC 2015). However, through data analysis some of these variables were revised, modified, deleted, or expanded to include new codes. Thus, academic staff profiles, production of academics with PhDs and the retention of academics with PhDs emerged as key determinants of the percentage of academic staff with PhDs at XYZ (see Table 5.1).

While the factors identified in Table 1.2 are generic, their impact is influenced by the type of institution. For example, traditional universities and to a certain extent, comprehensive universities (the hybrid model) were endowed with research infrastructure leaving their UoT counterparts struggling decades into democracy. While HE policies have pronounced on PQM mandates and funding formulas (CHE 2016), these too have entrenched the “success to the successful” archetypes of traditional universities. Until and unless the debates around the differentiation of the HE system in line with international trends raging on are finalised, equally capable UoTs will continue to fail due to historical disadvantages in terms of academic staff qualifications.

In chapters 2 and 3, the current study presented the variables outlined in Table 1.2. Chapter 4 described the methodology followed and how my own subjectivity and biases were monitored. It further explained how a variety of research protocols were followed to ensure provision of authentic and trustworthy results. Chapter 5 reported the results of the study with excerpts from raw data gleaned from interviews. In Chapter 6 data gathered from interviews and perused archival records were integrated with the literature to tell the story about the challenges of production and retention of academics with PhDs in one UoT. SD tools such as CLDs and system archetypes were used to tell this story. This chapter (Chapter 7) presents the conclusion and recommendations of the study as guided by the systems thinking and system dynamics philosophy of holism, interdependence and interrelationships in viewing complex business problems (Reynolds and Holwell 2010; Morecroft 2015). In this regard, it presents the recommendations in terms of research questions, the contribution of the current study to knowledge, its limitations, and areas for further research.

7.2 Recommendations

The main purpose of this study was to determine the reasons why XYZ has the lowest percentage of academic staff with PhDs in the country. Four research questions were designed to answer this overarching question. In this section, the salient features of each research question were presented and recommendations made based on the findings of this study.

Question 1

Why is there a low percentage of academic staff with PhDs in South African HEIs in general and UoTs in particular?

According to HRDC (2015) South Africa relies on 9 top PhD producing universities decades into democracy. PhD throughput rates are necessary for the replenishment of the academic capacity and research and innovation for the 4IR. The reasons for the reliance on few elite institutions are highlighted in the ensuing discussion.

The challenges of academic staff qualifications in South Africa stem from the evolution of the HE system. During apartheid doctoral education was the preserve of an élite few traditional universities. The conditions that created this historical advantage have persisted beyond this era. The funding legislation passed in 2003 in an attempt to encourage institutions to increase efficiency in postgraduate programmes (Vaughan 2008; CHE 2016) entrenched the historical advantage of the already financially strong institutions. These institutions which are well-endowed in research infrastructure resulting from their historical advantage have been able to attract highly skilled academics, hence the high percentage of academic staff with PhDs in these institutions (See Table 2.2).

Programmes, such as the nGAP, designed to address the low percentage of academic staff with PhDs in the HE system are perpetuating the traditional university historical advantage. Positions for nGAP are evenly distributed regardless of the type of institution, its location and current performance in this indicator, they are on average allocated 5 posts. XYZ, the institution with the lowest percentage of academics with PhDs (ASSAf 2010) has been allocated the least number of posts. The institution was allocated 5 posts in 2016 and 2019 and a further 2 posts in 2017 and 2018.

The funding formula and the allocation of nGAP positions exhibit the classic features of Success to the Successful system archetype. Élite traditional universities with a high percentage of academic staff with PhDs are consistently allocated a higher number of posts and funding to strengthen efficiency in doctoral output thus entrenching their historical advantage. Firstly, the changes in the PQM mandates of institutions without any related support in terms of research infrastructure is setting up the UoTs for failure. The promised HDI grant for addressing the historical backlog in terms of infrastructure is yet to be fully realised. Secondly, large and ever-growing student-lecturer ratios which are not accompanied by concomitant increases in academic staff DHET (2014) are more prevalent in the UoT sector. Heavy teaching loads in the UoT sector have a detrimental effect on academics pursuing doctoral degrees. Furthermore, heavy teaching loads

influences the intention to leave for academics with PhDs while it deters potential highly skilled academics (Muller 2012).

Differentiation of the higher education system whereby productive institutions are strengthened is an international trend (DHET 2013). Cloete (2015) argues that the HE system is already differentiated, if it is left to its own devices it will grow modestly or just drift. The most pertinent question therefore is, should the UoTs be allocated nGAP posts, or should these posts be allocated to the top PhD producing institutions? This will partially facilitate high throughput rates needed for 4IR and replace the ageing professoriate in these institutions. The nGAP participants from the current study aspire to an academic environment where they could spend a considerable amount of time on research and supervision. Allocating these posts to UoTs for them to migrate to these successful institutions upon completion of their PhDs is a Fixes that Fail archetype.

This study thus, recommends a longitudinal study in which a cohort of nGAP lecturers beyond the two phases considered for data collection is studied to determine what percentage will be retained by the UoT sector upon completion of their PhDs. This programme was rolled out in 2016. The nGAP programme ties a candidate for an additional two years after the initial six-year contract with the appointing institution. Notwithstanding the deliberations regarding the success or failures of the programme itself, this study focusses on the skewed distribution only. It would thus be interesting to determine how many nGAP lecturers would remain in the UoT sector from 2024. Further, this study recommends an honest debate about the level of PQM and academic staff qualifications at XYZ.

Question 2

What are the challenges of producing academic staff with PhDs in South African HEIs in general and UoTs in particular?

The impact of the legislative framework during apartheid and recent HE legislation that was aimed at redressing the imbalances has not yielded the desired results in certain areas

of the HE system. The skewed distribution of academics with PhDs remains, decades into democracy, because of the legacy of PQM mandates. Although factors that negatively influence the production of academic staff with PhDs are broad and varied, the current study was confined to those that were identified in the HESA report. The current study thus makes the following recommendations in this regard:

Academic staff policies and programmes must be designed to facilitate academic staff development. A leave policy that provides clarity on the difference between sabbatical leave and utilisation of ring-fenced leave days will ensure consistency in the implementation of academic staff replacement. With high lecturer-student ratios, three groups per lecturer and associated academic administration, the workload is one of the main obstacles to completion rates. Effective staff replacement procedures will alleviate this pressure.

Although limited physical infrastructure such as office space is not peculiar to XYZ, strategies to mitigate against this limitation could be implemented. Academic staff working hours in shared office spaces at XYZ are not conducive to conducting research. It is not uncommon to find academics coming in at 08:30 – 20:30 for 3 days on average per week. Implementation of flexible working hours is thus recommended, that is, the notion of core working hours must be reviewed. Academics could be more productive in research and community engagement outside of the offices.

Findings of the current study were consistent with the literature which cited funding as one of the main obstacles to the production of academics with PhDs. Similar to a study by Cloete, Mouton and Sheppard (2015) the current study found that participants had limited knowledge about the sources of funding. The top of mind funding opportunities for the majority of participants was RDG and NRF, despite the assertion that Natural Sciences rely on DST funding (Herman 2011c). The country has 10% of reputable supervisors who produce one PhD graduate per annum. It can thus be deduced that these are the few supervisors who are knowledgeable about available sources of doctoral funding. Only one candidate reported that the supervisor sourced funding for their research needs.

Due to the candidate's limited knowledge about the sources of funding, attendance of workshops on available sources of funding could be made a condition for the allocation of the RDG. Many participants particularly in SET reported that R40 000 from the RDG was not adequate for their research needs. In addition, the criteria for the utilisation of the RDG is very restrictive, a national conversation in this regard is imperative if there is any hope for the return on this investment. Some participants reportedly stopped applying for this funding because of its restrictive nature.

Supervision challenges in this country are well documented. Many participants lamented the quality of supervision. However, this is an exogenous variable at XYZ. A national conversation on these challenges is ongoing; XYZ management can make their input at that level.

This study further recommends the implementation of the EACEP programme because it has been shown that even a full complement of the nGAP allocation constitutes a mere 25% of the annual demand for academics (DHET 2015). This thus implies that over 75% of academic staff will continue to join academia from outside this programme. The internal document on the fast-tracking of academic staff qualifications put the percentage of academic staff with PhDs at 14% in 2017 at XYZ. An estimated 86% of the current cohort of academics who do not have PhDs require academic support.

Question 3

What are the challenges of retaining academic staff with PhD in South African HEIs in general and UoTs in particular?

Similar to Question 2, an urgent development of an academic staff retention policy and the conducting of exit interviews to determine the causes of attrition are necessary. Strategies to curb high staff turnover should begin at executive management level to ensure provision of strategic direction. All academic management positions for the current study were occupied by acting incumbents. First and foremost, academic management positions must be filled by permanent incumbents. One academic manager, referred to this

cohort as “caretaker managers” explaining that it is difficult to formulate any long-term strategies when you do not know how long you are going to be in that position. The institution has had high executive management instability which has led to high attrition rates at this level. As recommended by Badsha and Cloete (2011:20) “DHET should identify those institutions which are in ongoing crisis mode and have not been able to benefit from earlier recovery interventions”. Management instability and infighting raised by participants have a negative impact on staff morale.

Climate surveys to determine academic staff morale raised by one participant should be conducted. Low staff morale has a negative impact on productivity and fosters high attrition rates in any organisation. In addition, several scholars (Robyn 2012; Mugwagwa *et al.* 2013; Theron, Barkhuizen and Du Plessis 2014) have argued that studies have not been conducted on factors that influence employees to stay in organisations. These scholars argue that an intention to resign ultimately leads to actual turnover. Through climate surveys these intentions can be detected earlier, and employee intention swayed. Literature further suggests that if factors that influence the intention to stay or leave are known, it is possible to enhance academic staff retention.

The promotion policy and procedures of the institution should be reviewed. Career advancement was linked to the PQM and the type of institution. Similar to previous studies, challenges of limited career advancement opportunities and the criteria upon which these are based were prevalent in the current study. However, peculiar to XYZ, is that although the promotion criteria are heavily weighted on research and supervision, the institution does not offer postgraduate programmes. A study conducted by Houston, Meyer and Paewai (2006) found that promotion criteria at universities is heavily weighted on research, and that it does not equally recognise the breadth of academic work which includes teaching. This is more concerning in the UoT sector where academics spend more time on teaching with minimal or no research support (Austin 1994).

This mismatch between the nature of the job and the criteria upon which career advancement is based must be addressed. Academics at XYZ are burdened with heavy

teaching loads, consistent with high student-lecturer ratios in the UoT sector (CHE 2016). In addition, the promotion criteria and procedures that have discouraged many academics from applying for promotion need urgent attention. Consistent with literature, participants in the current study felt that promotion procedures were long, unfair, inconsistent and the requirements unreasonable.

Furthermore, the PQM which emerged as the main factor that facilitates the intention to leave should be reviewed. As stated earlier this will ensure alignment of institutional goals with those of academics with PhDs. Regarding the PQM, archival records indicated that XYZ offered predominantly undergraduate qualifications from 2015 – 2019. The 2020 – 2025 XYZ Strategic Plan of the institution envisages 3 masters and 3 doctoral degrees by 2025. On the other hand, most participants aspired to a career that would accord them an opportunity to focus on research and supervision. Consequently, participants indicated an intention to leave the institution if there is no movement towards offering higher qualifications in their disciplines. However, reviewing the PQM requires provision of suitable research infrastructure and academic staff with PhDs who can supervise.

Although a PQM that does not have PhDs is peculiar to XYZ, literature revealed that young academics everywhere leave if there are no career advancement opportunities for them upon achieving their personal development goals. With reference to the nGAP cohort, the programme has insulated them from some of the challenges experienced by academics in the UoT sector. For example, the benefits of the programme are, 20% workload, mentorship, participation in development activities, research study equipment and international mobility amongst others (DHET 2015). Upon completing their personal development goal of obtaining a PhD, the work environment they will be confronted with, will be completely different. Executive management desire to focus on predominantly undergraduate qualifications while career advancement is based on supervision amongst others, exhibit classic features of “Fixes that Fail” archetype.

Question 4

From a system's thinking perspective, what is the relationship between the challenges of producing and retaining academic staff with PhD in HEIs in general and UoTs in particular?

This study illustrated the interrelationship and interdependence of the production and retention of academics with PhDs through a systems lens. System dynamics tools such as the CLDs and system architypes were used to illustrate this causal relationship. These variables and their dynamic interactions were outlined in Figure 6.15, 6.16 and 6.17.

This study recommends the extension of the conceptual model to include other dynamics involved in the percentage of academic staff with PhDs. While other contemporary issues such as differentiation, gender and race amongst others fell outside the boundary of this study, the QSD conceptual model still provided a broad structure against which these can be viewed for a holistic understanding of the challenges of academic staff development and retention in this country. The QSD conceptual model can be extended to include other factors at aggregate level, however each component can be studied comprehensively on its own within this context using similar methodology. As suggested by Sterman (2000) large, wall-filling diagrams fail to communicate effectively to the intended audience.

Understanding the interdependence and interrelationships of variables embedded in complex problems such as the production and retention of academic staff with PhDs is thus paramount. Therefore, the most important lesson in systems thinking and system dynamics is to understand the whole for better insights into constituent variables and their causal relationships.

7.3 Contributions of the current study

The current study has contributed to doctoral education knowledge in several ways.

Firstly, it has contributed a systems thinking philosophy of holism in analysing the complex problem of the low percentage of academic staff with PhDs in the HE system in

South Africa. Churchman (1968) advocates for sweeping in all the variables embedded in the system of interest in order to view the problem holistically. Reynolds and Holwell (2010) have claimed that managers are gradually adopting the philosophy with little understanding of its basic principles and language. This, the author claims, is because conference presentations and published material on the subject is aimed at experts, not managers who are non-experts ultimately responsible for solving business problems. The aim of this study was to present a comprehensive, and yet simple structure particularly for non-technical audiences in a language they will understand as suggested by Mirchi (2013:52).

Secondly, there have been no studies conducted on academic staff qualifications from a holistic, systems thinking perspective, let alone from a SD one, thus this study contributes to both of these deficits (Singh 2015). Many doctoral studies have adopted a linear approach to viewing the challenges of poor academic staff qualifications in the HE system. Studies conducted by several scholars (Kipkebut 2010; Ng'ethe 2014; Theron 2015; Kisoonduth 2017) have focused almost exclusively on academic staff retention in the HE system. Backhouse (2009), Vandenberg (2013) and Roy (2014), on the other hand, conducted studies on various aspects of doctoral education, however none of these focused on the holistic challenges of producing academic staff with PhDs. This study therefore adopted a systems approach of viewing this phenomenon holistically. It can be argued that increasing the percentage of academics without necessarily paying attention to their retention may end up as an exercise in futility. This study has thus developed a QSD model that visually illustrates the dynamics involved in increasing the academic staff with PhDs at an institutional and aggregate level. Both endogenous and exogenous factors that illustrate leverage points where management can exert meaningful policy changes were presented and discussed.

Lastly, ASSAf (2010) claimed at the beginning of the decade that existing data on doctoral output was not sufficient and comprehensive enough. Thus, this study has contributed another dynamic to the production and retention of academics with PhDs at institutional

level. The current study deliberately presented the topic at aggregate level to portray the dynamics involved in academic staff development. Each of the themes and variables can be studied individually to gain a better understanding of the whole. For example, critical aspects of doctoral education such as doctoral success and gender analysed by Vandenberg (2013) and Roy (2014) respectively can be viewed within a proper context. The systems thinking philosophy methodology thus provides a holistic lens and context through which each aspect of doctoral education and academic staff development can be viewed.

7.4 Limitations of the current study

As with other studies, this study had several limitations which should be noted.

Firstly, overall, there are 26 universities which are further divided into three categories, 14 traditional universities, 6 comprehensive universities and 6 UoTs in South Africa. Each category has its own unique challenges with respect to academic staff qualifications. This study does not purport to represent challenges of PhD production and retention in the HE or UoT sector for that matter. Thus, the findings of the current study which focuses on one UoT cannot be generalised to the South African HE system. While the scope of this study is limited to XYZ's unique academic staff development and retention challenges, it should not however reduce the value of the study. Similar studies could be carried out in the rest of the five UoTs in particular, for future research.

Secondly, the current study was limited to the qualitative system dynamics methodology. Although several scholars argue that it can be implemented as a stand-alone methodology, it has its own limitations. Further incremental research can be conducted to refine the methodology and extend the study to a full-blown SD methodology.

Finally, individual variables were not comprehensively discussed because the aim of the study was to present the dynamics involved in increasing the percentage of academics with PhDs at an aggregate level by adopting the holism philosophy of systems thinking and SD as a methodological framework. Delving deeper into each variable would have

provided more insights however, due to time constraints, this was not possible. In addition, a comprehensive discussion of each variable would have rendered the study too large.

7.5 Areas for further research

Here I will recommend three possible future research topics that build on this study. These are, i) the development of a full-blown SD model, ii) delving deeper into any aspect or variable in the model to gain better insights using similar methodology and iii) the determination of whether the equal allocation of the nGAP positions regardless of the type of institution will address the skewed distribution of academic staff with PhDs in the HE system.

Firstly, it was argued that the aim of this study was to initiate a discussion on the use of systems thinking philosophy in solving complex HE problems. Several scholars (Ackoff 2006; Reynolds and Holwell 2010) argued that it is not uncommon to find managers using systems thinking concepts such as holism without the understanding of its basic principles. This study thus presented a comprehensive, yet simple, qualitative SD CLDs in language non-experts can understand when viewing the challenges of production and retention of academics with PhDs at this institution. While this study was confined to the qualitative part of the SD methodology it provided ample insights. `

Secondly, the conceptual model presented in Figure 5.15 visually presented the dynamics involved in the production and retention of academic staff with PhDs. The aim was to visually present the dynamics involved in systematically producing and retaining academics with PhDs holistically. This study thus proposes forest thinking for future research. According to Richmond (1997) forest thinking implies that to truly understand individual trees one must understand them within the context of a forest. Similarly, Zaini et al. (2013) cautions that a single decision in isolation may yield counter-intuitive results, if not coordinated with a number of other related decisions. This is contrary to reductionist thinking where problems are taken apart in order to understand and provide individual solutions. For example, looking at remuneration as a retention factor in isolation without

necessarily understanding the fundamental problem of the PQM will result in the Fixes that Fail archetype where management will keep seeing the same problem over and over again. The context of relationships is thus paramount in dealing with complex problems such as the limited number of academics with PhDs. The current study thus proposes delving deeper into any aspect of the variables depicted in Figure 5.15 for more insights within the context of the whole for future research. To reiterate, the most important lesson in systems thinking is to understand the whole for better insights into constituent variables.

Thirdly, future studies can expand on the ‘Success to the Successful’ archetype discussed in 6.5.1.2 in terms of the nGAP programme. The distinction in terms of working conditions between the traditional universities and UoTs has been well documented in the current study and other studies. The working conditions nGAP lecturers are accustomed to, are almost similar to those of the traditional universities where academics are assigned lighter teaching loads and encouraged to spend more of their time on research and provided support (Austin 1996). This programme has created a bubble for nGAP lecturers in the UoT sector because the working conditions they will be confronted with upon completion of their studies are different. It was argued in literature that young academics remain with employers for personal development reasons, but leave when those goals are achieved if there are no career advancement opportunities for them (Netswera and Rankhumise 2005).

The mismatch between the promotion criteria and the nature of the job in the UoT sector is again well documented (Price, Coffey and Nethery 2015). Academics spend a considerable amount of their time on teaching as is visually illustrated in the CLDs in Chapter 6, however, promotion criteria is heavily weighted on research output and supervision of postgraduate students. For an institution that does not offer postgraduate qualifications, and where academics are involved in supervision elsewhere, this is not taken into consideration when compiling an academic workload, the promotion criteria does not make any academic sense.

Furthermore, the characteristics of the Y generation were well articulated by Du Plessis (2010) and Robyn (2012) in 2.3.2. Further research should be conducted to determine how many nGAP lecturers will be retained by the UoT sector when the terms and conditions of their contracts expire, taking into consideration this cohort's predisposition. A pertinent question to ask is whether the equal distribution of nGAP positions will address the gap between traditional universities and UoTs in terms of academic staff qualifications or if UoTs will remain a breeding ground for traditional universities in terms of suitably qualified academics? Is it not time to intensify the debates around differentiation instead of this phenomenon being left to happen by default? In this regard, UoTs will continue to fail because the resources favour traditional universities. Findings of this study have shown that young academics who aspire to a career in academia will always be drawn to those institutions that offer them opportunities to focus on research and supervision.

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Appendices

Appendix A - 1

Interview Guide for PhD candidates

Interview guide is divided into 3 sections:

Personal information

Challenges of producing academic staff with PhDs

Challenges of retaining academic staff with PhDs

Personal and Contextual Data

1. Gender Male Female
2. What is your age category [25 – 34] [35 – 44] [45 - 54] [55 – 64] 65+
3. Do you have family? Please describe it in terms of size and ages
4. What is your highest academic qualification?
5. When did you complete this qualification?
6. What type of masters' degree did you do? A Master's Degree by research only, or a Master's Degree by coursework and mini dissertation.
7. What is your current designation?
8. How long have you been in your current position?

Challenges of producing academic staff with PhDs

1. When did you register for a PhD? What time-frame did you set for yourself when you started? How far are you at this stage?
2. What challenges have you faced regarding your studies thus far? Do you see these changing or remaining the same as you progress with your studies?

Probe:

Participants were probed on the impact of the variables below if they were not raised in question 2.

Workload: How is your current workload structured? Ideally, how would you like your workload to be structured for the duration of your studies? Are you involved in part-time teaching? What is the impact of part-time teaching on your studies?

Supervision: Can you describe your entire supervision experience, beginning with how s/he was identified to your working relationship on your project. Is it facilitating or impeding your progress thus far? Do you have any suggestions on how this can be improved?

Funding: What research funding opportunities are offered by the institution for academics who are pursuing doctoral degrees? Are these adequate for your needs? What sources of external funding are you familiar with?

Research infrastructure: Is the available research infrastructure provided by the institution adequate for your needs? Ideally, what type of research infrastructure would you need for your studies?

HR processes: In your opinion, do academic staff development policies of the institution adequately address the needs of academics who are pursuing higher degrees? How have you benefitted from these policies?

3. What academic support is provided by the institution for academic staff who are pursuing PhDs? What further support do you need at this level?
4. Lastly, are there any other challenges you have faced that you would like me to note?

Challenges of retaining academic staff with PhDs

5. What are your ultimate career aspirations? What is the impact of your current career towards this ultimate goal?
6. Can you talk about the most important aspects of your employment that would influence your decision to stay on in this institution after completing your PhD?

7. Can you talk about the aspects of your employment that could influence your decision to leave the institution after completing your PhD? Should you decide to leave, where would you like to go and why?

Probe:

Participants were probed on the impact of the following factors if they did not raise them in questions 6 or 7.

Remuneration: How does your present remuneration compare to employees with similar qualifications and expertise in other HEIs, Research Councils, Public or Private sector? Would this influence your decision to stay or quit? What areas of the remuneration package should the university improve on to enhance the retention of academic staff with PhDs?

Promotion

Compare the ease of upward career mobility between academia and administration or any other profession elsewhere that you might consider? What counts most in the academic promotion criteria in this university? In your opinion, what areas with regard to promotion practices should the university improve on to enhance the retention of academic staff with PhD?

Supervision of postgraduate students

How important is the supervision of Masters and doctoral students to you? Does the absence of masters and doctoral programmes in the institutional PQM have any influence on your intention to stay on or leave the institution?

8. What is your perception of academic staff turnover in the institution? In your opinion, do academic retention policies and strategies of the institution address academics staff turnover?
9. In your opinion, what can be done to enhance the retention of academic staff with PhD in view of the current competitive labour market environment?

10. In your opinion, what can be done to enhance the retention of academic staff with PhD in view of the current competitive labour market environment?

11. In your view what are the common factors that influence the mobility of academic staff with PhDs? Please elaborate on each of these.

Do you have any questions for me at this point?

If you would not mind filling out the consent form that would be greatly appreciated.

Also, if I have any further questions, would you mind if I set up another time to meet with you briefly in person, email my questions or call you?

Again, thank-you for your time

Appendix A - 2

Interview guide nGAP lecturers

Interview guide is divided into 3 sections:

Personal information

Challenges of producing academic staff with PhDs

Challenges of retaining academic staff with PhDs

Personal and Contextual Data

1. Gender Male Female
2. What is your age category? [25 - 29] [30 - 34] [35 - 39] [40 - 44]
3. Can you describe your family in terms of size and ages?
4. What is your current designation?
5. When were you appointed in this position?
6. What was your highest qualification when you were appointed on the nGAP?
7. What is your highest academic qualification now?
8. Is / was your Masters' degree by dissertation only or coursework and mini dissertation?
9. What qualification are you currently registered for?
10. What is your understanding of the nGAP employment contract? How do you feel about the terms and conditions of this employment contract? In your opinion, what aspects of your employment contract should be addressed if any?

Challenges of producing academic staff with PhDs

1. When are you going to register for a PhD? What is your anticipated duration of the qualification?

Probe:

What factors have you considered in the determination of this duration?

2. What challenges have you faced regarding your studies thus far? Do you see these changing or remaining the same as you progress with your studies?

Probe

Participants were probed on the following factors if they were not raised in this question.

Workload: Can you comment on the structure of your workload compare to the normal academic workload? As far as you know at what stage of your contract is your workload supposed to start increasing? How do you feel about that? Do you have any suggestions on how this can be changed or improved for the duration of your study?

Supervision: Can you describe your entire supervision experience, beginning with how s/he was identified for your project? Can you describe the nature of your working relationship with your supervisor? Has it facilitated or impeded your progress? Any suggestions on how these can be changed or improved?

Funding: What are your research funding needs? Describe the research funding opportunities offered by the institution for the nGAP academics who are pursuing postgraduate qualifications. Are these adequate for your needs? What additional funding do you need?

Research infrastructure: Is the available research infrastructure provided by the institution adequate for your needs? Ideally, what type of research infrastructure would you need for your studies?

3. What support is provided by the institution to nGAP academic staff who are pursuing Master's or PhDs?

Probe:

What support are you getting from your department and faculty with regards to your studies? What further support do you need from your department and faculty?

What support are you getting from the mentorship programme with regards to your studies? What further support do you need from the mentorship programme?

4. Lastly, is there anything else we have not mentioned regarding your studies that you would like me to note?

Challenges of retaining academic staff with PhDs

5. What are the most interesting aspects of your job? Tell me about the greatest challenges you have faced thus far in your career as an academic. What are your ultimate career aspirations? Is your current career contributing towards this goal?
6. Can you talk about the most important aspects of your employment that would influence your decision to stay after your contract expires or completing your PhD?
7. Can you talk about those aspects of your employment that could influence your decision to leave the institution after your contract expires or completing your PhD? Should you decide to leave, where would you like to go and why?
8. Knowing what you know now, if you had to choose all over again whether to enter academia, how likely is it that you would do so? Please elaborate
9. In your view what are the common factors that influence the mobility of academic staff with PhDs? Please elaborate on each of these.
10. Do you have any suggestions on what the university can do to enhance the retention of academic staff with PhD in view of the current competitive labour market environment?

Do you have any questions for me at this point?

If you would not mind filling out the consent form that would be greatly appreciated.

Also, if I have any further questions, would you mind if I set up another time to meet with you briefly in person, email my questions or call you?

Again, thank-you for your time

Appendix A – 3

Interview Guide for Academic staff with PhDs

Interview guide is divided into 3 sections:

Personal information

Challenges of producing academic staff with PhDs

Challenges of retaining academic staff with PhDs

Personal and Contextual Data

1. Gender Male Female
2. Please indicate your age category [25 – 34] [35 – 44] [45 - 54] [55 – 64] 65+
3. Do you have family? Please describe it in terms of size and ages
4. What is your highest academic qualification?
5. When did you complete your masters degree?
6. When did you register for a PhD?
7. What type of masters' degree did you do? A Master's Degree by research only, or a Master's Degree by coursework and mini dissertation.
8. What is your current designation?
9. How long have you been in your current position?

Challenges of producing academic staff with PhDs

1. When did you complete your PhD?
2. What was the duration of your PhD?
3. What factors facilitated the successful completion of your doctoral degree?
4. What factors inhibited the progress in your studies?

Challenges of retaining academic staff with PhDs

5. Do you think the institutional retention policies and strategies adequately addressed academic staff turnover?

Probe:

Comment on their effectiveness in retaining academic staff with PhDs

6. What are the most attractive aspects of your current employment?
7. What are your career aspirations as a PhD graduate? Are these fulfilled by your current position?

Probe:

How important is the supervision of masters and doctoral students to you?

Has your decision to stay on as an academic at this institution after completing your PhD based on the commitment to the university goals or lack of alternative job opportunities?

Have you applied for a job in the past six months? If so where and why?

8. Considering your qualifications and skills do you think your present remuneration is comparable to employees with similar expertise in other HEIs, Research Councils, Public or Private sector?

Probe:

What areas of the remuneration package do you suggest the university improve on to enhance the retention of academic staff with PhDs?

9. Can you tell me about the policies that presently exist at the university that likely support the career advancement of academics?

Probe:

Can you describe the promotion prospects for academics in the university? Are you satisfied with these? (*If not, why?*)

In your opinion, what areas with regard to promotion practices should the university improve on to enhance the retention of academic staff with PhDs?

10. Can you mention and elaborate on any factors you have not mentioned thus far that would influence your decision to leave the institution?
11. In your opinion, what can the university do to enhance the retention of academic staff with PhD in view of the current competitive labour market environment?

Do you have any questions for me at this point?

If you would not mind filling out the consent form that would be greatly appreciated.

Also, if I have any further questions, would you mind if I set up another time to meet with you briefly in person, email my questions or call you?

Again, thank-you for your time

Appendix A – 4

Interview Guide for academic management

Interview divided into 3 sections:

Personal information

Challenges of producing academic staff with PhDs

Challenges of retaining academic staff with PhDs

Personal and Contextual Data

1. Gender Male [] Female []
2. Please indicate your age category [25 – 34] [35 – 44] [45 - 54] [55 – 64] 64+
3. What is your current designation?
4. How long have you held this position?

Challenges of producing academic staff with PhDs

1. What policies and programmes of the institution support the achievement of goal 5 of the Strategy 2015 – 2019? (*Improve the % of academic staff with doctoral qualifications from 9% to 20% = 4 PhDs pa*)
2. How could the support provided by the institution for academic staff who are pursuing PhDs be improved?
3. What are the greatest challenges of accelerating the production of academic staff with PhDs by the institution?

Probe:

Workload – are there any concessions / relief for doctoral students?

Funding – are there sufficient research funding opportunities for academics registered for PhD?

Research infrastructure – is it sufficient for the needs of academics pursuing PhDs?

4. What units of the institution are driving the achievement of goal 5 of the institutional Strategy? How could they be more effective in this regard?
5. What strategic objectives have you set for YOUR faculty with regards to academic staff qualifications? What strategies have you put in place to facilitate the achievement of these objectives?
6. Is there anything we have not discussed thus far that you would like me to note regarding academic support?

Challenges of retaining academic staff with PhDs

7. What is your perception of academic staff turnover in the institution or your faculty? What has been cited as the main reasons for leaving in the exit interviews?

Probe:

Participants were asked to elaborate on each of the following if not already raised: In your view, do the following factors influence academics to stay on at XYZ, change universities or quit academia altogether?

Remuneration: Do you consider academia as a viable career option in terms of remuneration? How does remuneration for academics in this institution compare to employees with similar expertise in other HEIs, Research Councils, Public or Private sector? What areas of the remuneration package do you suggest the university improve on to enhance the retention of academic staff with PhDs?

Promotion - Compare the ease of upward career mobility between academia and administration or any other profession that requires similar qualifications and expertise elsewhere? In your opinion, what areas with regard to promotion practices should the university improve on to enhance the retention of academic staff with PhD?

Supervision of postgraduate students - In your opinion, how important is the supervision of masters and doctoral students for academics with PhDs? Would this

absence influence their decision to stay on or leave the institution? What strategies would you put in place to mitigate against this loss at institutional and faculty level?

Image of the institution - How do you think the institution is viewed by the academic community? Do you think this has any impact on the academic staff turnover? What strategies have you put in place in your area of influence to enhance the standing of the institution in the academic community?

8. How do current institutional retention policies and strategies address academic staff turnover?
9. What can the university do to enhance the retention of academic staff with PhDs in view of the current competitive labour market environment?

Do you have any questions for me at this point?

If you would not mind filling out the consent form that would be greatly appreciated. Also, if I have any further questions, would you mind if I set up another time to meet with you briefly in person, email my questions or call you?

Again, thank-you for your time

Appendix A – 5

Interview guide for the Human Resource and Development Unit

Interview divided into 3 sections:

Personal information

Challenges of producing academic staff with PhDs

Challenges of retaining academic staff with PhDs

Personal and Contextual Data

1. Gender Male [] Female []
2. Please indicate your age category [25 – 34] [35 – 44] [45 - 54] [55 – 64] 64+
3. What is your current designation?
4. How long have you been in this position?

Challenges of producing academic staff with PhDs

1. What is the role of your portfolio towards the achievement of the institutional Goal 5 of the Strategy 2015 – 2019? (*Improve the % of academic staff with doctoral qualifications from 9% to 20% = 4 PhDs pa*)

Probe:

The strategic plan sets a goal of 4 PhD graduates per annum. Has this goal been achieved in the past five years?

2. What policies and programmes of the institution support the achievement of goal 5 of the Strategy 2015 – 2019?

Probe:

Does the institution have a sabbatical leave policy?

Can you explain the procedure for utilising ring-fenced leave days for study purposes?

3. What other units of the institution support the achievement of 4 PhD graduates per annum? Comment on the coordination and effectiveness of the initiatives designed to support the achievement of goal 5.

4. What has been cited as the major challenges that inhibit the progress of academics towards completing their doctoral degrees between 3 and 5 years?
5. Is there anything you would like to discuss regarding support for academics pursuing PhD that we have not mentioned thus far?

Challenges of retaining academic staff with PhDs

6. Is the turnover of academic staff with PhDs in the institution high, moderate or low? What has been cited as the main reasons for leaving in the exit interviews? What has been cited as the main pull factors in the exit interviews?
7. What are your responsibilities in your portfolio with regards to academic staff retention?
8. How do current institutional retention policies and strategies address academic staff turnover?
9. How does the remuneration of academic staff with PhDs compare to those with similar qualifications in other HEIs, Research Councils, Public or Private sector? What areas of the remuneration package do you think the institution should improve on to enhance the retention of academic staff with PhDs?
10. Can you tell me about the opportunities or policies that presently exist at the university that likely support the career advancement of academics?

Probe:

Does the criteria for promotion facilitate or hinder the upward mobility of academics? Compare the ease of career advancement in the institution between academia and administration.

11. What impact do you think the following factors have on the retention of academic staff with PhDs?: Please elaborate on each
 - Opportunity to supervise Masters and doctoral students
 - Image of the institution in the academic community
12. What can the university do to enhance the retention of academic staff with PhDs in view of the current competitive labour market environment?

13. Is there anything else that you have not shared already regarding academic staff retention that you would like to share now?

Do you have any questions for me at this point?

If you would not mind filling out the consent form that would be greatly appreciated.

Also, if I have any further questions, would you mind if I set up another time to meet with you briefly in person, email my questions or call you?

Again, thank-you for your time

Appendix B



Appendix C



Institutional Research Ethics Committee
Research and Postgraduate Support Directorate
3rd Floor, Breyers Court
Gate 1, Steve Biko Campus
Durban University of Technology
P.O. Box 1334, Durban, South Africa, 4001
Tel: 031 373 2375
Email: instrec@dut.ac.za
http://www.dut.ac.za/research/institutional_research_ethics
www.dut.ac.za

21 July 2017

IREC Reference Number: **REC 2/17**

Ms E Kotelana
No. 3 Aligwen
72 J B Marks Road
Glenwood
4001

Dear Ms Kotelana

A systems approach to the production and retention of academic staff with PhD: A case study of a University of Technology

The Institutional Research Ethics Committee acknowledges receipt of your gatekeeper permission letter.

Please note that Full Approval is granted to your research proposal. You may proceed with data collection.

Yours Sincerely,


Professor J K Adam
Chairperson: IREC



DUT DURBAN UNIVERSITY OF TECHNOLOGY
2017-07-21
INSTITUTIONAL RESEARCH ETHICS COMMITTEE
P.O. BOX 1334 DURBAN 4001 SOUTH AFRICA

Appendix D



LETTER OF INFORMATION

Dear PhD student / PhD graduate / Academic manager / colleague

Thank you for volunteering to participate and contribute your time and valuable input to this research study. My plan is to report the results of this study in my doctoral dissertation, present the results at educational conferences, and in publications.

I hope you will take time to review the consent form herein attached, which outlines the terms and conditions for participation. No one, other than me, will have access to your responses except for my supervisor. On the consent form, I ask that you select a pseudonym in place of your name should you wish to do so, and the gender and racial/ethnic terms you prefer I use in reference to your identity.

Title of the Research Study: A systems approach to the production and retention of academic staff with PhD: A case study of a University of Technology

Principal Investigator/s/researcher: (Ethel Kotelana)

Co-Investigator/s/supervisor/s: (Dr Preeya Daya)

Brief Introduction and Purpose of the Study:

Research shows that there is a low percentage of academic staff with doctoral degrees in higher educational institutions in South Africa. The conversion rate of masters to PhD is 4,8 years, the dropout rates at higher qualification levels are very high and academia is not regarded as a viable career choice.

In this regard, the purpose of this study is to explore the effectiveness of the policies and programmes in place to support academic staff who are pursuing doctoral degrees. In addition, it is intended to explore the effectiveness of the retention strategies particularly of academic staff with PhDs in the institution. You have been selected because it is believed that you can provide valuable information that can shed some insights into the challenges of PhD production and retention at this institution.

Outline of the Procedures:

A one-on-one interview with myself will be conducted. Prior prepared questions will be asked but follow-up questions where necessary will be entertained. Please feel free to elaborate as much as possible. If you do not wish to answer any of the questions please indicate.

The interview will be digitally recorded for ease of access to the original information after the interview. The interview will take approximately 45-60 minutes. A suitable venue which could be my office or yours will be used at a time convenient to you.

Risks or Discomforts to the Participant:

Please feel free to express your thoughts and feelings. There is no foreseeable risk of you being compromised as a result of your participation in this study.

Benefits:

The study will result in a thesis in fulfilment of my PhD qualification. There might be indirect benefits to you if you are pursuing your PhD or dropped out, provided the recommendations of this study contribute towards influencing a policy change regarding PhD support programmes.

Reason/s why the Participant May Be Withdrawn from the Study:

Please note that your participation is voluntary. At any stage, should you decide to opt out there will be no adverse consequences even though your participation would be greatly appreciated.

Remuneration:

No monetary remuneration will accrue from participation in the study.

Costs of the Study:

There will be no costs incurred as a result of your participation.

Confidentiality:

You will be provided all the necessary information regarding the study in order to make an informed decision on whether to or not to participate and give your consent. Your biographical information such as sex, age, date of birth and initials will be anonymously processed into a study report. No comments will be attributed to any single individual in order to maintain anonymity and confidentiality.

Data will be protected by encryption with a password in a computerised system or saved as PDF files where necessary. It will be stored for 5 years and deleted thereafter.

Research-related Injury:

Research is based on interviews with candidates in their offices, the potential for injury is remote.

Persons to Contact in the Event of Any Problems or Queries:

Please contact the researcher E Kotelana on 031 907 7287 / 082 853 1753, my supervisor Dr Daya on 072 479 9177 or the Institutional Research Ethics Administrator on 031 373 2900. Complaints can be reported to the Director: Research and Postgraduate Support, Prof S Moyo on 031 373 2577 or moyos@dut.ac.za

General:

Your participation in the study as stated above, is voluntary. The total number of participants for this study is 3 administrative staff members from the HR&D unit and 18 academic staff members selected across the three faculties and 4 academic managers.

Appendix E



CONSENT

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, Ethel Kotelana, about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: IREC 036/17
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- Please choose the
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

**Full Name of Participant
Right Thumbprint**

Date

Time

Signature /

I, Ethel Kotelana herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

