FACTORS INFLUENCING THE THROUGHPUT OF POSTGRADUATES IN A SOUTH AFRICAN UNIVERSITY OF TECHNOLOGY

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Sanelisiwe Precious Dlamini

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Supervisor: Dr S.P Moyane Date: 01 December 2020
(Doctor of Literature and Philosophy in Information Science)

Co-Supervisor: Mr N. Nkomo Date: 01 December 2020
(Master of Arts in Library & Information Science)

DECLARATION

I, SANELISIWE PRECIOUS DLAMINI, hereby declare that this dissertation is a representation of my own work and has not been submitted at another university of technology or university. Where use was made of the work of others, it has been duly acknowledged.

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Student, S.P. Dlamini	Date
	01 December 2020
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Supervisors, Dr S.P. Moyane	Date
	01 December 2020
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Co-Supervisor, Mr N. Nkomo	Date

DEDICATION

This hard work is dedicated to my late parents; Mrs Tholakele Ngobese and Mr Mfanufikile Ngobese, whose unfailing advice on the value of education instigated my discipline for and an interest in education. My biological father Mr Landokuhle Mtolo, all I know is that; despite the circumstances, every parent wants the best for their child as well as my second and my spiritual mother, Mrs Ziphindile Ndaba, for her unfailing love; emotional support; advice; encouragement; and the blessings she gave me before she passed on.

My forever beloved parents may your precious souls continue to rest in power.

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ABSTRACT

Failure of students to complete postgraduate studies is a matter of concern globally to several stakeholders among them academics, postgraduate candidates, government representatives, HEIs administrators, and postgraduate funders. The contemporary terminology for this phenomenon is throughput, regarded as the completion of studies within a minimum or maximum allocated timeframe. Throughput related issues in higher education include the length of time it takes for students to graduate, the students' success rates, termination of studies and dropping out of the system before graduation or remaining in the system inactively, etc. In the context of South Africa, postgraduate throughput is noticeably lower in Universities of Technology (UoTs) given that research was previously not their primary focus. With reference to the above, this study, aimed to examine the factors influencing the throughput of postgraduates in a South African University of Technology. The aim of the study was achieved by establishing awareness of and adherence to the completion timelines for postgraduate studies, determining the research capacity available for the completion of postgraduate studies and determining the factors hindering the completion of postgraduate studies.

To fully appreciate the concept of postgraduate studies and issues associated with postgraduate throughput, the literature on the factors influencing postgraduates' throughput was reviewed. The theory of Student Integration (Tinto 1975) was employed to guide the present study. Tinto's theory recommends that the extent of students' integration into the academic life and social life within academia, and the extent of students' commitment and diligence to their studies and the university-oriented goals are the symptoms signifying students' persistence within academia.

The study was informed by the post-positivist research paradigm allowing for the combination of both qualitative and quantitative approaches in a single study within a survey research design. The population groups targeted for data collection were postgraduate students, academic supervisors, faculties' research coordinators, and library personnel (librarian). Self-administered semi-structured

questionnaires were used to collect data from postgraduate students and academic supervisors. Data from librarians was collected by means of face-to-face semi-structured interviews. The collected quantitative and qualitative data was analysed through descriptive statistics and thematic content analysis, respectively. Analysis through descriptive statistics was limited to frequency counts, percentages, tables, charts, and graphs. Qualitative data results were presented in a narrative form (textual formats).

The study findings outlined the importance of awareness of completion timelines, and rules and regulations governing postgraduate studies to throughput. It was, however, clear that there was laxity in terms of adherence to rules and regulations, even though the study could not determine whether the extent of laxity extended to failure to meet completion timelines as the majority of those who responded were still within their candidature. The study also found that there is optimum visibility of the core research capacity (in terms of facilities including library and research support programs, and trained personnel) for throughput and the satisfaction thereof was by and large on the moderate to satisfactory scale. The availability of academic writing skills was reported to be low yet significant to postgraduate throughput. The study confirmed the significance of personal/students, supervisory, and institutional related factors to throughput. The most influential factors were slow feedback; challenges associated with financial resources; lack of readiness to conduct research; lack of commitment to conduct research, lack of research skills; supervisors' workload, commitments associated with family responsibilities; lack of sound training in research methodologies and methods as well as lack of technical support. The institution has the opportunity for significant improvement regarding the factors hindering the throughput of postgraduates.

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LIST OF ABBREVIATIONS

BTech – Bachelor of Technology

CHE - Council on Higher Education

CHET - Council on Higher Education and Training

DHET - Department of Higher Education and Training

DUT - Durban University of Technology

Etc. – Etcetera

FMF - Fees Must Fall

FRC - Faculty Research Committee

FRO - Faculty Research Office

FTE - Full-Time Equivalent

HEIs - Higher Education Institutions

HEQSF - Higher Education Qualifications Sub-Framework

IREC - Institutional Research Ethical Committee

MIS - Management Information System

NRF - National Research Foundation

PhD - Doctor of Philosophy Degree

PSET - Post - School Education and Training

UK - United Kingdom

UoT/s – University/ies of Technology

CHAPTER ONE

INTRODUCTION AND BACKGROUND OF THE STUDY

1.1 Introduction

This first chapter introduces and provides the background to the study examining the factors influencing the throughput of postgraduates in a South African University of Technology. The study sets out by presenting the conceptual and contextual backgrounds. Thereafter, the research problem underpinning the study was stated and the study aim formulated. Derived from the study aim were the objectives of the study and the critical questions. The study rationale was then provided, followed by the scope of the study and limitations. An indicative review of literature and research methodology were then presented. The chapter continued to present an overview of the thesis' structure and concluded with a summary.

1.2 Conceptual background to throughput of postgraduates in South African higher education

Throughput has been on the global agenda of higher education and several other stakeholders for quite some time (Letseka and Karel 2015; Bain, Fedynich, and Knight 2011). This has remained a topical issue because there is widespread acknowledgement of challenges with regards to the completion of tertiary level studies.

Throughput is regarded as the contemporary term representing the discourse on matters relating to the completion of studies encompassing the failure to complete timeously, attrition, departure, retention, discontinuation or dropping out, remaining in the system inactively, etc. (Hadi, and Muhammad 2019; De Villiers 2019; Heide *et al.* 2019; Costa 2018; Li and Carroll 2017; Alcaine 2016).

The emphasis on throughput at the global level is exemplified when in Australia universities are required to provide evidence of the quality of research outcomes together with the throughput rates (Halbert 2014). In Ghanaian universities, it was revealed that there are several initiatives and reforms made by government, HEIs

and other related stakeholders to increase postgraduates' throughput, however, throughput in research continues to be a challenge (Alabi and Mohammed 2018). In Sweden, supporting research, especially in low-income countries has been a priority for decades with Mozambique and Tanzania being the first line recipients (Cross, Khossa, Persson, and Sesabo 2015).

In South Africa, triggered by among other things the fact that postgraduate throughput challenges are not limited to a particular university typology, McKenna (2019) reports that Council on Higher Education (CHE) planned to conduct a national review of higher learning institutions offering postgraduate qualifications to develop and implement quality assurance systems. There are currently 26 public universities in South Africa (South Africa, Department of Higher Education and Training (DHET) 2017) categorized into: traditional universities, comprehensive universities, and universities of technology (UoTs) (Council on Higher Education and Training (CHET) website 2010). Traditional and comprehensive universities are a little ahead in addressing throughput challenges, while the UoTs are still battling (South Africa, DHET 2013-2018). UoTs are behind when compared to their counterparts because beforehand, research was a secondary pillar. The mandate of Universities of Technology changed, from a vocational only to the inclusion of theoretical research and innovation, as well as on ways and means of resolving problems linked with commerce and industry (CHE 2010). It is for the above reasons among others that this study examined factors influencing the throughput of postgraduates in a selected South African University of Technology.

1.3 Contextual background of the study

The study context was the Durban University of Technology (DUT), a South African Higher Education Institution (Universities South Africa website 2017). Arising from the merger in April 2002 between ML Sultan Technikon and Technikon Natal, the institution was named the Durban Institute of Technology and later changed to the Durban University of Technology (DUT website 2018; Qwabe 2016).

DUT is a multi-campus university located in the Kwa-Zulu Natal province's, Metropolitan City Durban, and provincial capital Pietermaritzburg (DUT website 2018). In total DUT has seven campuses, five of which are in Durban Metropolitan namely: Brickfield; City; ML Sultan; Ritson; and Steve Biko. Two campuses are in Pietermaritzburg namely: Indumiso and Midlands. DUT campuses house six faculties namely: Accounting and Informatics; Applied Sciences; Art and Design; Engineering and the Built Environment; Health Sciences; and Management Sciences (DUT website 2018). Of the approximately 23 000 students studying at DUT, 1729 were pursuing postgraduate studies in different faculties as of the 29th of August 2019 (DUT, Management Information System 2019).

The Revised Higher Education Qualifications Sub-Framework (HEQSF) of 2013 is the document that guided the introduction of a unified national qualification framework for all higher education institutions in South Africa intended to improve the ability of students to move easily and effectively from one qualification to the next as well as between institutions (South African Technology Network 2017). This resulted in the revision and alignment of existing qualifications or development of new qualifications that meet the requirements of the new sub-framework. The majority of the UoT students are registered in the diploma pathway affording progression from a diploma to an advanced diploma to a postgraduate diploma and then to a Master's degree ending with a doctoral degree. This study is limited to higher degrees that is Master's and Doctoral Degrees level only.

1.4 Statement of the problem

A growing concern of higher education institutions worldwide is that of the quality of postgraduates training (Amehoe 2013; Botha 2018; Massyn 2018; Bopape 2018), the length it takes for postgraduate students to complete and submit their research thesis for publication (Zewotir, North and Murray 2015); the low success rate of postgraduate students (Schulze 2016); and the high percentage of postgraduate students who terminate their studies by dropping out of the system before graduating or remaining in the system inactively (Botha 2018). The

contemporary terminology for the concerns described above is throughput. Studies on the factors influencing throughput at postgraduate level have become widespread globally. In the South African context, several studies have also been conducted on this topical issue (Murray 2014; Styger, van Vuuren, and Heymans 2015, Sondlo 2013), however, the issue of low throughput rates remain, and South Africa is still unable to produce enough postgraduates who can at best, devote their innovative skills by engaging in the development of the 'knowledge base' of the country's economy (Zewotir, North, and Murray 2015:1).

While in all South African public university typologies; (traditional, comprehensive, and universities of technology) throughput is a matter of major concern, it is noticeably lower in Universities of Technology (UoTs) given that research was previously not their primary focus (the former mandate was vocational and skills attainment) (Wedekind, and Mutereko 2016; Van der Merwe, Kotzé, and Mentz 2008). With reference to the above, it was deemed necessary to examine the factors influencing the postgraduate students' throughput in a selected University of Technology in Kwa Zulu-Natal. Such an investigation may assist in the development of strategies and mechanisms towards the improvement of throughput. The attendant consequences of not addressing throughput include among others:

- Increased academic workloads (Styger, Van Vuuren and Heymans 2015).
- A loss in government subsidies (financial) (Botha 2018; Tshitake 2016).
- A blockage in the higher education system which results in inadequate space for other potential students (Van Der Merwe 2017).
- Institution reputational damage (rankings) (Nkontwana 2014; Sondlo 2013).
- Investors and partner's pull-out due to low postgraduates' performance (Manic and Ramrathan 2015).
- Lack of innovation and productivity that postgraduates contribute to the economy (Valero, and Van Reenen 2019).

1.5 Aim of the study

The aim of this study was to examine the factors influencing the throughput of postgraduate students in a selected South African University of Technology.

1.6 Objectives of the study

The following objectives were set to actualise the above stated aim:

- To establish awareness of and adherence to the completion timelines for postgraduate studies.
- To determine the research capacity available for the completion of postgraduate studies.
- To determine the factors hindering the completion of postgraduate studies.

1.7 Research questions

The study addressed the following research questions:

- How can awareness of and adherence to the completion timelines for postgraduate studies be instilled?
- What research capacity is available for the completion of postgraduate studies?
- Which factors hinder the completion of postgraduate studies?

1.8 Rationale of the study

Research on factors influencing the throughput of postgraduates is of potential significance to several stakeholders including but not limited to government, HEIs, postgraduate students, community members, research funders, and employers. The findings of this study could be utilised to provide feedback, add new insight and knowledge on throughput. This will possibly be of great interest to the research policy developers for the transformation, development, and innovation of research frameworks within the UoTs. The findings of this study may also be of value in enhancing graduation rates, improving, and maintaining

reputation, attracting potential investors, and gaining more government subsidies among other benefits.

1.9 Scope and limitations of the study

In terms of conceptual scope, the study examined postgraduate throughput regarded as a contemporary term for completion of studies. The broad contextual scope were South African UoTs. The specific study site was the Durban University of Technology only, although throughput is an acknowledged problem in all public universities in South Africa. The noted limitation of this study was the use of non-probability – convenience sampling in selecting the target populations thereby reducing the generalisability of the findings. The other limitation of this study was the non-response from the institution's research coordinators as they were initially targeted. Additionally, the challenges brought by the novel coronavirus pandemic resulted in lower response rates.

1.10 Review of literature

A detailed review of literature will be provided in Chapter Two (Literature Review). Literature will be reviewed on the following themes: conceptualising throughput and related terminologies, international and South African perspectives to postgraduate throughput and the factors influencing postgraduate throughput as well as the theoretical framework underpinning the study. Sources of literature consulted included: (scientific research literature e.g. journal articles, theses and dissertations and reports from government).

1.11 Research methodology

A detailed presentation of research methodology employed by this study is presented in Chapter Three (Research methodology). The methodology adopted by this study is outlined as follows: it was informed by the post-positivist research paradigm. Post-positivism is an approach advocating for methodological pluralism (Wildemuth 1993). It is pluralistic in its function, balancing positivist, and interpretivist approaches (Panhwar, Ansari, and Shah 2017). The study thereafter presented and motivated for the adoption of qualitative and quantitative research

approaches. Qualitative research is usually used to gain deep insight into the problem or helps to develop ideas or hypothesis for potential quantitative research (Kumar 2018; Creswell and Creswell 2018; Kabir 2016; DeFranzo 2011), while quantitative research is a stimulating and highly educational technique to gather information from known and unknown population using sampling method, questionnaires, sending out online surveys, online polls and more (DeFranzo 2011).

A combination of qualitative and quantitative research approaches was adopted in a single study within a survey research design. A survey research design "involves acquiring information about one or more groups of people", perhaps about their characteristics, opinions, attitudes, or previous experience by means of probing questions to them and tabulating their answers (Leedy and Ormrod 2005).

Data was collected from postgraduate students, and academic supervisors using questionnaires, and from librarians by means of face-to-face interviews. A questionnaire is one of the most popular methods of primary sources of data which is used to collect quantitative data (Ajayi 2017; Curtis 2008). Face to face interviewing is an encounter where the researcher and respondent are having a seat down conversation which leads to a more detailed outcome of the matter being discussed (Fox 2009). The collected quantitative and qualitative data was analysed through descriptive statistics and thematic content analysis, respectively. Analysis through descriptive statistics was limited to frequency counts, percentages, tables, charts, and graphs. Qualitative data results were presented in a narrative form (textual formats).

1.12 Overview of thesis chapters

This study consists of six chapters as outlined below:

Chapter One - Introduction and background of the study

Chapter One introduces the study by providing the conceptual and contextual backgrounds. It provides an insight into the problem investigated, the aim,

objectives, and critical questions for the study. The rationale, scope and limitations of the study were also provided.

Chapter Two - Literature review
Chapter Two reviews literature on the factors influencing the throughput of postgraduate studies.

Chapter Three – Research methodology
Chapter Three discusses the research methodology employed in this study. It also provides justifications for the research methods adopted.

Chapter Four – Presentations, interpretation, and analysis of findings
Chapter four presents, interprets, and analyses data.

Chapter Five - Discussion of findings
Chapter Five provides discussions that relate the findings of the study to literature.

Chapter Six–Summary, conclusions, and recommendations
Chapter Six summarises and provides the conclusions and recommendations of the study.

1.13 Summary of the chapter

This chapter introduced the conceptual and contextual backgrounds of the study. The chapter then articulated the research problem underpinning the study. The aim, objectives and critical questions were then formulated. The rationale of the study was provided, followed by the scope and limitations of the study. Thereafter, an indicative review of literature, and research methodology were outlined. This chapter concluded with an overview of the thesis' structure. The next chapter reviews literature on the factors influencing the throughput of postgraduate studies.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The preceding chapter introduced and provided the background of the study. This chapter reviews literature to broadly understand the phenomena of postgraduate throughput. The focused aim is to examine the factors influencing the throughput of postgraduates. The chapter began by conceptualising throughput and related terminologies. This was followed by a discussion of the international and South African perspectives to postgraduate throughput. The focus shifted to a discussion of awareness and adherence to completion timelines for postgraduate studies. Furthermore, the chapter analysed the factors influencing postgraduate throughput. At the tail end before the summary of the chapter, the chapter discussed the theoretical framework underpinning the study ending with the summary of the chapter.

2.2 Conceptualising throughput and related terminologies

Although the concept 'throughput' is usually used in an academic environment it can also be understood from the production firm perspective (DHET 2019; Barnard and Fourie 2013; Wilkinson 2013; Freeman 2007). From the production firm perspective, throughput is associated with a "number of units of output a company produces and sell over a period of time" (Wilkinson 2013). This study focuses on throughput from the academic perspective. In the context of academia, studies (Botha 2018; Hilton III *et al.* 2016; Roos *et al.* 2016; Sondlo 2013; Amehoe 2013; Abiddin and Ismail 2011) suggest that it is difficult to have a full understanding of throughput concept without referring to related terminologies such as completion rate, graduation rate, success rate, failure rate, drop-out rate, attrition, etc.

The above terms are closely related and often used interchangeably as would be shown in a brief discussion below: The term **completion rate** can generally be defined as the proportion of students who complete their studies within a specific

period of time, usually the proportion or statistics of students who complied with the institutions' completion timelines and graduated (Council on Higher Education 2013). Earlier studies seem to have dominantly adopted the term 'completion' e.g. (Pitchforth, Beames, Thomas, Falk, Farr, Gasson, Thamrin, and Mengersen 2012; Abiddin, and Ismail 2011; Norton 2011; Martin, Maclachlan, and Karmel 2001; Booth, and Satchell 1995). While recent studies e.g. (Maluleka, and Ngoepe 2019; Henning 2018; Botha 2018; Gumbo 2018; Isike 2018, etc.) have adopted throughput as the contemporary term. Completion is thus regarded to be equivalent to throughput. Throughput studies often speak to **Graduation rate,** wherein graduation rate, refers to a total number of students who have successfully graduated in a particular academic year, "irrespective of the year of study, divided by the total number of students enrolled at the universities in that particular year" (South Africa, DHET 2017:102). **Success rate** is also likely to appear in throughput discourse and is regarded by the South Africa, DHET (2017:108) as "a proportion of Full-Time Equivalent (FTE) passes relative to FTE enrolments at a Post - School Education and Training institution".

It is worth noting that throughput discussion cannot be complete without touching on failure rate, dropout rate and/or attrition. **Failure rate** can be defined as the percentage of students who were admitted to the examination but did not pass it and had to repeat the following year (Amehoe 2013; Kamal, and Bener 2009) whereas **dropout rate** refers to the percentage of students who do not finish a particular grade/year level (Bonneau 2006) and **attrition** is the percentage of students who are enrolled in a programme in a particular year but discontinue their studies in that year at the same institution before graduation (Ungureanu 2017; Sondlo 2013). Use of these three terms in literature does not indicate significant distinctions amongst them. There is room, therefore, for argument that, failure rate, dropout rate and attrition are used interchangeably although the metrics to measure these terms may vary amongst scholars. For instance, Styger, van Vuuren, and Heymans (2015), identified dropouts as fitting into one of these criterions:

- Gone and the returning status is unknown;
- Moved to another district, other country, another institution without the knowledge of the previous institution of affiliation. It is therefore highly

important to make a distinction between dropouts and student transfers;

- Has moved out of higher education into a non-academic institution which do not offer equivalent higher academic programmes, for example, hospital instruction, residential special education, correctional institution, community or technical college where the program is classified as adult education, military and Job Corps, among others;
- Not within the schooling system but known to be ill or not verifiable; and
- Not in the schooling system for reasons like being suspended or expelled but may have options to return or not return.

Tremblay, Lalancette, and Roseveare (2012:30) argue that dropout does not capture students who finish a grade/year level but do not enroll in the next grade/year level the following academic year also it doesn't include students who successfully finish a level of study/year and decide not to enroll for the next level/year but the ones who simply go astray.

Attrition rate is usually associated with the quality of education (Borzovs, Niedrite, and Solodovnikova 2016). According to Amehoe (2013:30) attrition rate can be defined as the percentage of students who could not complete the programmes for which they registered. In other words, the students could be said to have discontinued or abandoned their academic programmes. In this study, a distinction is made between failure rate which is perceived as an active student/s who could not meet the examination requirements either through the inability to qualify to be examined or was permitted into an examination and performed poorly, dropout and/or attrition refer to a prolonged status of inactivity either within a term, semester, or annual period.

Another concept often found in throughput research is **student retention**. Student retention is viewed by Berger, Ramírez, and Lyons (2005:81) as the capacity of an institution in ensuring that the students are retained from admission to the institution through graduation or completion of candidature. Tinto (1975)

identifies measures for students' retention which are within the sphere of institutions control which are setting and managing expectations to providing social, academic, and financial support as well as ensuring academic quality in assessment, feedback, and engagement. According to the Higher Education Standards Panel (2018:61) support for students academically, socially, and financially increases students' retention and success rate or graduation rate.

Having delved into throughput related terms above, this reflects terminology evolvement over time. Conceptualizing throughput in any case is rather complicated since this concept is determined by various factors within a given period as explained above (DHET 2019; Barnard and Fourie 2013; Wilkinson 2013; Freeman 2007). Considering the above observations sample definitions follow. Botha (2018) defines throughput as a total number of students who either managed or failed to complete their studies within the given timelines. Bopape (2018) concurs with Botha, stating that throughput is the total number of students enrolled for various qualifications at a specific higher education institution, within a specific period versus the institutions' completion rate. Jeynes (2016) views throughput as a distinction between the quantity of students who register and start studying, students who complete studying within specific timelines and students who either remain in the system inactively or drop out of the system before graduation.

The difficulty in conceptualizing throughput has not deterred research. Notably, there is inconsistency on how to measure throughput performance. Botha (2018:342) identified two elements associated with postgraduates' throughput measurement: the first is the "length it takes for postgraduate students to complete and submit their research thesis for publication" and the second is "the success rate of postgraduate students". According to Cuseo (2007:1) student success may be defined as "a favorable or desirable students' outcome". Therefore, if the students' outcome is unfavorable, the students' success rate is low, conversely, if the students' outcome is favorable the students' success rate is deemed high. However, it is also pivotal to note that "Student success is facilitated by interpersonal interaction, collaboration, and formation of relationships between students and other members of the college community,

peers, faculty, staff, administrators, and alumni" (Cuseo n.d). Given the above divergent explanations of throughput, the current study adopts the definition of throughput by Botha (2018) as the total number of students who either managed or failed to complete their studies within the given timelines.

2.3 An international perspective to postgraduate throughput

The issue of postgraduate throughput is an area of concern for HEIs globally (Botha 2018; Massyn 2018; Bopape 2018; Zewotir, North, and Murray 2015; Zaaba *et al.* 2015; Amehoe 2013). HEIs around the world are struggling to master the strategies to increase throughput and minimise dropout rates of postgraduate students (Zewotir, North, and Murray 2015), as the intake of postgraduate students continues to increase dramatically in the most recent years leading to various challenges in the higher education sector (Massyn 2018; Alam, Alam, and Rasul 2013).

Globally, HEIs experience insufficient resources to keep up with the continuous increase in postgraduates' intake (Massyn 2018). Postgraduate throughput is a global phenomenon facing higher education that dates to the 1960s and currently remains a critical concern worldwide (Botha 2018; Costa 2018; Sheik Ismail 2014; Alam, Alam, and Rasul 2013). Tertiary institutions throughout the world are currently facing challenges and issues such as the quality of postgraduate training, the length of time it takes for postgraduate students to complete their studies, the success rate of postgraduate students, and the high percentage of postgraduate students who terminate their studies and give up their studies before graduation or remain in the system inactively (Nouri, Larsson, and Saqr 2019; Comley-White, and Potterton 2018; Keet 2015; Chetty and Pather 2015). In this regard, tertiary institutions across the universe attempt to increase the throughput of postgraduates (Botha 2018).

As already noted, challenges associated with postgraduate throughput are not confined solely to developing countries but are also noted and experienced in the developed countries (Hadi, and Muhammad 2019; Ekpoh 2016; Mzindle 2015; Mutula 2009). The common discourse on postgraduate throughput in South

Africa and other countries relates to the socio-economic issues and the academic under-preparedness of students accessing postgraduate studies (Mzindle 2015; Tinto 2012). Sondlo (2013) confirms and cites other several inter-related factors that contribute to postgraduate throughput including, lack of commitment among students, unsatisfactory academic experience, ineffective matching between students and courses by institutions, lack of social integration, financial issues and personal circumstances are some of the factors that contribute to this dilemma.

In view of these noted issues, studies on the duration of postgraduate studies and concerns about shortening the time students take to completion have become matters of consideration, not only to students and managers of higher education but also to governments, funders of postgraduate studies and other stakeholders in higher education since this dilemma affects these stakeholders as well (Botha 2018; Grimm 2018).

According to Botha (2018:54), “the United Kingdom (UK) and other parts of the First World”. “The Open University in the UK reports that among 29 countries sampled in 2015, the UK has the lowest dropout rate of 19% compared to that of Germany (28%), Australia (35%) and the US (37%)” (Botha 2018:54). Postgraduates are of demand in the market since the establishment of knowledge societies and economies require a pool of highly skilled individuals (Eggins 2008), it is therefore important for countries across the globe to consider serious measures to address the issue of postgraduate throughput.

2.4 A South African perspective to postgraduate throughput

While as was shown above, postgraduate throughput is a global discourse, postgraduate throughput is a recognised problem in South Africa, the country having one of the lowest global throughput rates (Bopape 2018; Costa 2018; Manyike 2017; Lewin, and Mawoyo 2014; Sondlo 2013; Letseka, and Maile 2008). South African universities “only produce 26 doctoral graduates per million citizens which is far below the leading countries (Brazil: 52 per million, Korea: 187 per million, Australia 264 per million, and Sweden: 427 per million)” (Zewotir,

North, and Murray 2015:1). Several studies (Aboo 2017; Gordon 2016; Sheik Ismail 2014; Sondlo 2013; Ganqa 2012; etc.) confirm that, in South African higher education, postgraduate students are remaining or 'piling up' in the system, research publication is on a decline concurrently there are low graduation rates compared to the number of new enrolments.

To understand the throughput trends in South Africa, it is important to comprehend the structure of the South African higher education system first. There are 26 public universities (South Africa, DHET 2017) in South Africa categorised by the CHET (2010) into three segments:

I. **Traditional universities** – that offer basic formative degrees such as Bachelor of Arts (take 3 years to complete), Bachelor of Sciences (take 3 years to complete) and professional undergraduate degrees (completed over a 4-year period). At postgraduate level they offer honours degrees and a range of master's and doctoral degrees. Universities labelled as traditional universities in South Africa are: University of Cape Town, University of Fort Hare, University of Free State, University of KwaZulu-Natal, University of Limpopo, North west University, University of Pretoria, Rhodes University, University of Stellenbosch, University of Western Cape, University of Witwatersrand, and Sefako Makgatho Health Science University.

II. **Universities of technology (UoTs)** (formerly known as Technikons) that offered mainly vocational or career-focused undergraduate diplomas, and a Bachelor of Technology (BTech) which served as a capping qualification for diploma graduates as well as a limited number of master's and doctoral programs. Universities recognised as the Universities of Technology in South Africa are: Cape Peninsula University of Technology, Central University of Technology, Durban University of Technology, Tshwane University of Technology, Vaal University of Technology, Sol Plaatje University, Nothern Cape, University of Mpumalanga and Mangosuthu University of Technology.

III. **Comprehensive universities** – that offer programs typical of a traditional university as well as programs typical of a university of technology. Universities regarded as Comprehensive Universities in South Africa are:

University of Johannesburg, Nelson Mandela Metropolitan University, University of South Africa, University of Venda, Walter Sisulu University and University of Zululand.

In most South African Public HEIs, the minimum duration for the Master's degree is one-year full time and two years' continuous part time; and no candidate should remain active in the system for a period of longer than four years enrolled for a Master's degree. For the Doctoral degree, the minimum duration is two years' full time and three years' continuous part time; no candidate should register for the doctoral degree for a period of longer than 5 years except with the special permission of the Senate (Motseke 2016; Cloete, and Mouton 2015; Mouton 2011; Academy of Science of South Africa 2010). South African public HEIs are, however, not in compliance with the above stipulated completion timeframes. This stagnation is a result of South Africa's apartheid and post-1994 history (Mzangwa 2019). South African higher education was previously alienated into institutions reserved for white South Africans and institutions tasked with providing limited tertiary education to those who were not classified as white (CHE 2010). This has direct and indirect implications for the delayed completion rates of postgraduate students in South African research status and other related issues. Not only was the resourcing of these institutions inequitable, but the range of programmes offered reflected assumptions about the kind of careers for which students of different races were being prepared, and research was not uniformly supported across the higher education sector (CHE 2010). As such, students are arriving at the postgraduate level with a diverse and complex set of domestic, cultural, linguistic, educational, and economic capital issues (Bitzer *et al.* 2014).

The history of the South African liberation struggle has received considerable attention by both South Africans and non-South Africans (Houston 2015), however, the country's overall spending on research and development has remained too low and is faltering (CHE 2016). As a result, there are still significant differences in the resourcing, skill levels and outputs of those institutions that were historically white (the Historically Advantaged Universities) and those that served other racial groups (the Historically Disadvantaged Universities) (CHE 2010). CHE (2010) states that, these distinctions have

become blurred in the past decade but continue to influence the culture of institutions and campuses. It is thus pivotal to note that the imprint of apartheid has profoundly shaped pathways to learning and work in South Africa.

An analysis of DHET Annual Reports over a five-year period 2013-2017 revealed that, Masters and Doctor of Philosophy Degree (PhD) graduations were dominated by traditional universities such as (Universities of Pretoria, Stellenbosch, Witwatersrand and Kwa-Zulu Natal) with the exception of the University of South Africa in 2014 and 2016 representing the comprehensive universities. The statistics from the UoTs were significantly lower in comparison to their counterparts as shown in the statistics presented in Table 2.1 below:

Table 2. 1 Number of postgraduate students who graduated from public HEIs in SA (2013-2017)

TRADITIONAL UNIVERSITIES	2013		2014		2015		2016		2017	
	Master's Degree	Doctoral Degree	Master's Degree	Doctoral Degree	Master's Degree	Doctoral Degree	Master's Degree	Doctoral Degree	Master's Degree	Doctoral Degree
University of Cape Town	1 209	205	1 214	204	1 202	223	1 332	233	1139	277
University of Fort Hare	154	30	286	66	1 98	60	246	109	226	117
University of Free State	258	91	582	104	547	97	585	106	493	127
University of KwaZulu-Natal	862	207	930	264	1 183	338	1 255	361	1125	388
University of Limpopo	320	14	287	25	237	25	206	25	238	29
North west University	781	168	746	171	742	222	744	238	813	235
University of Pretoria	1 476	242	1 621	237	1 897	333	1 811	302	1866	354
Rhodes University	282	70	287	76	242	69	301	84	235	87
University of Stellenbosch	1 284	225	1 274	234	1 358	267	1 435	278	1601	305
University of Western Cape	388	111	378	104	395	96	320	92	380	120
University of Witwatersrand	1 205	221	1 243	199	1 227	203	1 442	228	1714	283
Sefako Makgatho Health Science University	0	0	0	0	118	8	117	13	140	15
University of Johannesburg	514	78	527	106	501	105	682	119	679	126
Nelson Mandela Metropolitan University	430	74	488	72	401	80	430	95	422	92
University of South Africa	799	201	1 030	268	936	235	1033	296	931	289
University of Venda	37	3	42	1	86	8	132	28	173	42
Walter Sisulu University	49	3	38	8	49	15	35	12	36	9
University of Zululand	31	14	76	25	42	18	84	32	86	32

Cape Peninsula University of Technology	110	28	121	17	137	19	166	17	93	17
Central University of Technology	37	12	32	12	34	10	55	21	48	20
Durban University of Technology	83	18	104	18	138	29	153	40	147	33
Tshwane University of Technology	197	32	287	46	233	61	273	65	300	55
Vaal University of Technology	33	4	34	1	33	9	25	3	40	5
Sol Plaatje University, Northern Cape	0	0	0	0	0	0	0	0	0	0
University of Mpumalanga	0	0	0	0	0	0	0	0	0	0
Mangosuthu University of Technology	0	0	0	0	0	0	0	0	6	0

Adapted from (South Africa, DHET Annual Reports; 2013, 2014, 2015, 2016, 2017)

2.5 Awareness and adherence to completion timelines for postgraduate studies

The higher education literature indicates that students' inability to complete postgraduate programmes within set timelines is a complex issue as a result, the issue of postgraduate students' awareness of and adherence to the completion timelines should be handled with extensive care (Brodie, Butler, and McLeod 2020; Massyn 2018; Sverdlik *et al.* 2018) This is however a shared responsibility within the institution and could be achieved by ensuring that each role player, namely the institution, the supervisor and student plays their part in the process (McAlpine, Castello, and Pyhalto 2020; Hill, and Conceiçao 2020). The institution needs to ensure that there is awareness of the completion timelines meaning postgraduate students should be aware of their studies timeframes (Ahmad 2020; Mphekgwana 2020; Denis, Colet, and Lison 2019). As their level of awareness and knowledge of the completion timelines as well as the awareness and knowledge of consequences by virtue of the delayed completion predict their tenure at the university (Than, Htike, and Silverman 2020).

Postgraduate students' awareness and knowledge of postgraduate studies completion timelines will come from the advertising and marketing of the postgraduates' studies material. Students' awareness and knowledge of their studies completion timelines, combined with university marketing, will positively predict students' intentions to complete their studies timeously.

Given the importance of having postgraduate students aware of their completion timelines, it is also important for postgraduate students to adhere to an appropriate timeframe for the completion of research studies, therefore, it is also pivotal to create a culture of compliance in order to get students through the system (Than, Htike, and Silverman 2020). This could be achieved by ensuring that the institution puts its stipulated measures in the event of non-compliance in place. By implementing those actions, the institution will be creating a sense of awareness and adherence to students thus enhancing graduation rates.

2.6 Factors influencing postgraduate throughput for various stakeholders

Several stakeholders have an acute interest on postgraduate throughput including government, funders, employers, HEIs and students (Botha 2018; Bobape 2018; Massyn 2018; Zewotir, North, and Murray 2015; Amehoe 2013). Pouris and Inglesi-Lotz (2014:1) assert that "tertiary education contributes to social and economic development through four major missions: the formation of human capital, the building of knowledge bases (primarily through research and knowledge development), the dissemination and use of knowledge (primarily through interactions with knowledge users) and the maintenance of knowledge (inter-generational storage and transmission of knowledge)". The above stakeholders' interest on postgraduate throughput may be captured in Pouris and Inglesi-Lotz (2014) observations or they may arise from other issues. In addition, the stakeholders' interest at times differs, but there are instances when it may dovetail. Before discussing the factors influencing postgraduate throughput, this study briefly highlights why throughput is a matter of concern for the identified stakeholders.

2.5.1 A highlight of stakeholders in postgraduate throughput and their concerns

One of the stakeholders with vested interest on postgraduate throughput is **government**. In South Africa, the need for research has been recognised at the level of the country's vision document the National Development Plan (Alexander 2017) making throughput of particular interest to the government for its contribution to economic development and building of a knowledgeable workforce. Governments believe that there is a close link between the production of postgraduates and economic development therefore they are interested in investing in higher education (Bopape 2018). This investment by governments to HEIs results in increasing the supply of high-level skilled labour required to meet the employers' demands and stimulate an innovation-led, knowledge-based economy (Department for Business and Innovation Skills 2015:3). "Postgraduate study is integral to developing these types of high-level skills" and that is the reason why governments invest in HEIs particularly in postgraduate programmes (Bopape 2018; Department for Business and Innovation Skills 2015).

“Postgraduate programmes are considered conduits through which universities develop research capacity and generate the high-end skills required for a functional economy and to address complex issues such as the current global financial recession, climate change, poverty alleviation, etc.” (Mutula 2009:2).

Another stakeholder on the critical throughput matter are **funders**. Noting South Africa’s challenges in funding postgraduate studies the government intervened by creating the now prominent research funding scheme, the National Research Foundation (NRF) whose mandate is to “promote and support research through funding human capital development and knowledge creation thereby contributing to a transformed society” (National Research Foundation 2015:4). Besides the funding provided by government, there is also a pool of private funders mostly from the business sector that is facing great pressure in securing the right skilled labour. All these funders are concerned when postgraduate students do not complete their qualifications on schedule or when they do not complete their studies at all. For the NRF scheme, if the postgraduate students’ throughput declines then its mandate is not fulfilled, the funding provided is exploited, and the private funders would likely have similar concerns.

Employers are another stakeholder for whom throughput is important. As the labour market has become very competitive in recent years (Shivoro, Shalyefu, and Kadhila 2018), the demand for specialised, skilled, and innovative employees has increased drastically. Employers are therefore under increasing pressure of hiring employees who possess and demonstrate skills that are relevant and applicable to a competitive world of work (Alam, Alam, and Rasul 2013). Considering the 4th industrial revolution demands, employers are increasingly seeking those employees with postgraduate qualifications as proof of their ability to think, analyse, solve problems, communicate effectively, and improve outcomes (Ortlieb 2015).

HEIs as producers of postgraduates ideally have an interest in throughput. One motive for the vested interest is the need to build the next generation of academics. It is acknowledged that at some point aging academics have to be replaced by preparing and encouraging cohorts of postgraduates to have interest

in the field of academia which is hindered by insufficient efforts in postgraduate studies completion (Bazana, McLaren, and Kabungaidze 2018; Academy of Science of South Africa 2010).

Another motive for HEIs is to build and maintain the institutional reputation that is recognisably important in terms of students' recruitment and marketing purposes (Sondlo 2013). Postgraduate throughput and research output are amongst the key determinants used to measure the quality and reputation of an institution (Botha 2016; Styger 2014), therefore when throughput is high and both academic staff and students contribute to research, the quality and reputation of that institution is enhanced and vice versa. It is observed that when throughput is low, there may be no evidence that an institution provides quality programmes (Styger 2014). Sondlo (2013) is of the opinion that low throughput does not only tarnish the institutional reputation, it could also seriously risk increasing access in the long term for even attracting academically prepared students, and receiving subsidies from government (Sondlo 2013). Manyike (2017) also posits that government subsidies to institutions are also dependent on the institutions' research output.

HEIs are under pressure to attract and retain quality candidates that are able to complete their studies within the stipulated timeframes; attract funding and increase research output thereby raise the level and status of the institution's research profile at the same time, universities are attempting to do more with less in all areas of teaching and research as funding becomes more competitive and tied to key performance indicators and accountability measures (Massyn 2018; Zewotir, North, and Murray 2015; Abiddin and Ismail 2011).

The paramount stakeholder on issues relating to throughput has always been the **student**. Motives for pursuing postgraduate studies are diverse including enhancing one's career prospects, career development, fulfilling an academic requirement and self-actualization (Chhinzer and Russo 2017; Zaaba, Gunggut, Arapa, and Aning 2015). In South Africa, although throughput is a concern across the 11 National Qualifications Framework levels of teaching and learning, its visibility is most noticeable at matric, undergraduate, and postgraduate levels.

There is an annual hype that comes with matric results across the nation (Department of Basic Education 2020). At undergraduate level, there is an expectation that the cohort of students who enter higher education graduate in due time. Some of them further their studies to the postgraduate level, wherein there is expectation to complete to contribute to the knowledge economy. The demand for more knowledgeable individuals in an economy increases pressure for postgraduate students to complete. This is acknowledged by Abiddin and Ismail (2011) stating that, postgraduate students are under increasing pressure to complete their candidature within the stipulated timeframes as ordered by the universities for a diverse set of reasons. Some of these reasons are discussed below:

2.5.2 Factors hindering the completion of postgraduate studies

Reviewed below are the factors hindering the completion of postgraduate qualifications. Literature categorises the factors to throughput in several ways. For example, Shariff, Ramli, and Ahmad (2015) divide these factors into six broad categories: supervision arrangements, research skills, research work, institutional, motivational, and de-motivational. For Febles and Cisneros-Cohernour (2015) there are three categories namely, individual, university, and contextual. Park, Luo, and Kim (2015) group these factors into: individual-related characteristics, background and defining variables and precollege characteristics. Although certain sections of literature identify several categories of throughput factors, there are scholars who condense these factors into two broad categories of student-specific and/or institutional factors (Styger, van Vuuren and Heymans 2015; Murray 2014; Abiddin, and Ismail 2011; Mutula 2009; etc.).

Some of the studies identifying throughput factors include a study conducted by Motseke (2016) on reasons for slow completion of Masters and Doctoral degrees by adult learners in a South African Township, listing a suite of factors frequently linked to completion time of postgraduate students, including the lack of computer skills, poor research skills, inadequate access to the internet, stress, as well as employer's workload. While another study by Febles and Cisneros-Cohemour (2015) identified challenges associated with lack of motivation, prerequisite

learning, and lack of research skills as key potential factors influencing timely completion.

In a study conducted by Maphosa and Wadesango (2016) on student-specific factors affecting PhD theses completion, critical factors associated with ultimate completion of research among others were noted, including motivation, commitment, diligence, autonomy, organizational and communication skills, research experience as well as ability to negotiate and foster working relationships with supervisors. The role and quality of supervision provided has also been examined by other authors (e.g. Styger, van Vuuren and Heymans 2015; Murray 2014; Sondlo 2013). The nature style, norms of interaction within the supervision relationship enhances postgraduate level research (Motseke 2016); the academic support provided by the thesis director and the thesis committee is also acknowledged as a contributory factor (Febles and Cisneros-Cohernour 2015). Other causative factors that emerging from the literature as linked to postgraduate throughput include library services available (Shariff, Ramli, and Ahmad 2015), limited resources available for research funding (Zewotir, North and Murray 2015) the level of academic integration (Murray 2014) and the students' enrolment status or attendance mode (Park, Luo, and Kim 2015). Some of the throughput factors as identified by the studies mentioned above were common such as motivation, poor research skills, and student's relationship with the supervisor.

In the section that follows, this study discusses throughput under two groupings namely: personal/individual and institutional attributes.

2.5.2.1 Personal/Individual attributes

Personal attributes can be described as the factors that are portrayed by an individual student or that occur because of an individual's behavior. Some of these attributes include motivation/demotivation factors; students' preparedness/readiness and writing skills; students' financial factors as well as awareness and adherence to completion timelines.

2.6.1.1 Motivation/demotivation factors

There are many definitions to motivation. Cook and Artino (2016) define motivation as the process whereby goal-directed activities are initiated and sustained. According to Walter (2014), motivation can be viewed into two different dimensions; intrinsic and extrinsic. Both dimensions can be utilized to build positive results in the classroom and beyond. Intrinsic motivation refers to that motivation which comes from within an individual (Walter 2014). Intrinsic motivation depends on the inborn need for competence and self-determination (Çetin 2015). Extrinsic motivation is external (Çetin 2015) and completely different as it focuses on a reward or punishment system (Walter 2014). Therefore, motivation in a nutshell is a drive that originates from either within (intrinsic) or that is attracted by external factors or physical incentives (extrinsic) that allow us to attain our goals in the face of trials and tribulations.

According to Igun, (2010) motivation gives people strength to overcome setbacks of any kind. Igun further states that, study motivation helps students to remain focused and psychologically empowered to overcome trials and tribulations during the course of study. Postgraduate studies are challenging and requires a lot of patience and enthusiasm that should not wane as the study advances and as problems are confronted (Igun 2010). It is therefore important that postgraduate students stay motivated because motivation plays a supreme role towards the completion of the research project (Hadi, and Muhammad 2019; Nouri, Larsson, and Saqr 2019). As found by (Kinsella, Fry, and Zecchin 2018; Sarani, and Shirzaei 2016 and Templeton 2016) in their research that motivation, especially intrinsic motivation has a significant impact in determining student's success in their studies.

2.6.1.2 Students' preparedness/ Readiness and writing skills

Student preparedness/readiness has been identified to be critical towards success in higher education (Motseke 2016; Agherdien 2014). Manik (2015) argues that, lack of readiness or preparedness in postgraduate studies is a predominant determinant of failure for a student seeking for a university credential. There is a need therefore to prepare postgraduate students with

research skills required throughout their research project at graduate level, more especially with the academic writing skills (Ekpoh 2016; Meeraha 2010). Many students are incapable to write in an academic manner (Krish, Salehuddin, and Razak 2017; Lim *et al.* 2016). Meerah (2010) is of the opinion that the incapability to write academically emerges from the assumption by the HEIs that postgraduate students are prepared for taking part in research however the situation on the ground differs. Postgraduate students are not ready to embark on research, they are unable to use library services at their disposal or seeking knowledge through the use of information technology, the writing of the dissertations or thesis is a major challenge, let alone the review of literature and the analysis or the method of processing data (Ankrah, and Atuase 2018; Krish, Salehuddin, and Razak 2017; Meerah 2010).

In South Africa, the Lack of academic readiness is most noticeable on African postgraduates (Fomunyam 2019). The prominently cited reasons underpinning African students under preparedness include challenges with the education system, language barrier, schooling background and prior education experiences, upbringing, and so on (Swartz *et al*. 2017; Motseke 2016). It is for the above stated reasons that African postgraduate students need clear guidance in attaining research skills especially academic writing without which they risk failure to complete their studies (Motseke 2016; Maasdorp and Holtzhausen 2015). In a study conducted by Sonn (2016), it was found that due to lack of language competency while students have the ideas of what to write they cannot express themselves properly; they have a problem with logical exposition; and do not know when and how to substantiate their arguments.

2.6.1.3 Students' financial factors

Financing postgraduate studies is a crucial issue to students and other stakeholders even though there are existing sources of funding targeting postgraduates, they tend to be insufficient, not every student gets to receive funding or bursary and that leads to financial strain (Ekpoh 2016). Although the Fees Must Fall (FMF) movement attempted to resolve the financial issues within HEIs; it appears some remained. It seems as if FMF mostly benefited

undergraduate students which means the financial struggles continue for postgraduate students contributing to the delayed completion of studies. Failure to complete studies within allocated timeframes may lead to increased debts given that most postgraduate students are dependent on loans and in some rare cases bursaries to pursue their studies (Botha 2018; Abiddin and Ismail 2011). It is also important to note that, contractual conditions set by funders (providing bursaries to postgraduate students) in the form of repayment stipulate that, if the student completes his/her studies within the prescribed timelines the bursary is not payable concurrently, if the student exceeds his/her candidature or drops out of the degree programme, the bursary is payable with interest (Zewotir, North and Murray 2015). The above noted concerns could be among the reasons cited for postgraduate students' inability to finance their studies resulting in low throughput (Botha 2018; Motseke 2016; Styger, van Vuuren, and Heymans 2015; Amehoe 2013).

The impact of financial related factors to throughput was a dominant theme from the reviewed literature. The study by Zewotir, North, and Murray (2015) on the time to degree or dropout amongst full-time master's students at the University of KwaZulu-Natal revealed that financial factors play a significant role. Similarly, Swartz, *et al.* (2017) conducted a qualitative study of agency and impasses to success amongst higher education students in a sample of South African universities and confirmed that financial barriers are the most common theme that postgraduates describe as a stumbling block in their postgraduate studies and are "out of students' realm of control and therefore more stressful". A Ghanaian study on postgraduate student throughput at the University of Ghana by Botha (2016) concluded that students have limited financial resources to finance their studies due to inadequate sponsorship opportunities or sources of funding to get financial support from. In the same vein Sonn (2016) reckons that, stress related to finances puts pressure on students to work while they study despite their attendance mode (full-time or part-time). It is further noted that having some form of financial assistance reduces the time it takes for postgraduate students to a successful degree completion or to drop out of the programme (Zewotir, North, and Murray 2015).

A close link between funding and research performance as indicated by literature has put a lot of pressure on HEIs to enhance their research capacity (Bai, Millwater, and Hudson 2009). However, the African HEIs are still failing to enhance their research capacity, as a huge percentage of government subsidy is spent towards undergraduate studies and a small percentage towards postgraduate studies and research (Lwakabamba 2011). There is a need therefore for HEIs to bridge this gap given that government subsidy to HEIs is a significant contribution, HEIs are the national centres of knowledge production, and the development of any country depends on higher education and research capacity (Owusu *et al.* 2017; Styger, van Vuuren, and Heymans 2015). The importance of enhancing research capacity has also been recognised by the continental bodies.

The Africa Union and New Economic Partnership for Africa Development have recommended that 1per cent of Gross Domestic Product by each African state should be spent on Research and Experimental Development in order to support peace, stability, better governance and economic growth (Lwakabamba 2011).

It is worth noting, however, that enhancing research is a shared responsibility. Governments and educational policy influencers need to pay strong attention too and devote adequate resources including funding for postgraduate education to ensure that the HEIs have all the required resources to enhance their research capacity (Amehoe 2013).

There are many reasons underpinning poor research capacity in HEIs. Cloete, and Mouton, (2015) observe that most HEIs do not have enough capacity in terms of professorial and doctoral holders to provide adequate academic and research leadership. According to Katunguka-Rwakishaya (2018: para. 2 line 2-7):

> “Research culture and capacity can be built by using simple techniques namely: Routine in house training workshops in research management including proposal development, grant writing, scientific writing and basic principles of budgeting and accountability; development of Masters and doctoral programmes as this will provide opportunities for supervision;

subscription to inexpensive research databases; improvement of the environment in support of research especially laboratory scientific equipment, Information and Communication Technology and library resources".

Lack of institutional infrastructure is an obstacle to postgraduate research (Ekpoh 2016). Due to the changing expectations and the wide skill set that is required from a modern-day supervisor, all the available resources and infrastructure of an institution must be mobilised to address the needs of individual students. Examples include counselling services, creating social groups in which students can support each other and regular communication on workshops presented by other entities of the institution, like postgraduate schools, language centres and library services (Massyn 2018). These mechanisms should be incorporated as a formal, structured part of the programme. According to Amehoe (2013) If all the issues pertaining to poor and inadequate system of funding can be seriously and collectively tackled, the rest of other threatening factors to postgraduate studies such as the institutional poor research capacity, postgraduate students taking up employment while studying, psychological and emotional problems can be manageable among postgraduate students.

2.6.1.4 Awareness and adherence to completion timelines

Amongst the factors that emerged from literature as critical to throughput were awareness and adherence to completion timelines, and research capacity for postgraduate studies. Awareness and adherence to rules and regulations regarding completion timelines is an important factor in postgraduate's throughput. Dictionary definition to awareness state that it is the state of knowing something and **adherence** means the fact of behaving according to a particular rule or of following a particular set of beliefs, or a fixed way of doing (Hornby *et al.* 2010). In this study, awareness refers to the knowledge of completion timelines by postgraduate students and adherence refers to postgraduate students and their supervisors' compliance with completion timelines as ordered by the university postgraduates' policy. Completion timelines are referred to as the timeframes stipulated by the university for the enrolled course of study.

Various factors influence postgraduates' awareness and compliance to the rules and regulations as such affecting completion timelines. According to Ndeto (2013) postgraduate's awareness and adherence to completion timelines is affected by the attitude that they have towards the completion rules and regulations. Attitude is the act of negativity or positivity towards a particular subject (Shaukat *et al*. 2014). Attitude is therefore deemed positive by high throughput rates vice versa; it is deemed negative through low throughput rates.

2.6.2 Institutional or academic related factors

The Institutional associated factors influencing throughput include supervision and increased workloads for academic staff as well as library services, internet access, and postgraduates' computer skills.

2.6.2.1 Supervision and increased workloads for academic staff

A substantial amount of supervisors' time is spent on supervision at the postgraduate level, making this task one of the core responsibilities of academics and a measure of academic output (van Rensburg, Mayers and Roets, 2016). Cloete, Mouton, and Sheppard (2015) notes the increasing burden of unrealistically high supervision loads that South African academics are facing owing to rapid postgraduate increases over the years whilst the number of permanent academics has not increased significantly, and the resultant pile-up effect places more demands on the supervisory capacity in the system.

Another prominent contributory factor to throughput is supervision skill. Sonn (2016) claims that some of the reasons underpinning students' struggle to complete their studies is because of inadequate, infrequent, or unskilled supervision. There is also a view that that some supervisors are not trained or lack the time to be trained on the methods that could help them in guiding their students which results in their inability to apply and transfer the appropriate skills and research expertise to their supervisees (Nothnagel 2016). Ngozi and Kayode (2013) attribute the lack of supervision skill to supervisors' lack of intrinsic motivation to develop skills and the inability by some university management to

organise seminars for supervisor research development. With government encouraging universities to increase throughput rates of postgraduate students, there is a need for supervisory guidance to produce quality researchers within the prescribed timeframes (Manyike 2017). In that regard, postgraduate education is given more attention as it enables the educational institution opportunities to enrich their research capabilities, enhance their academic reputation and financial benefit (Alam, Alam, and Rasul 2013). In a higher education system where research output is strongly correlated with the production of postgraduates, it is pivotal for HEIs to cultivate research and supervision areas (Zaaba *et al*. 2015) and knowledge transfer becomes an inevitable process (van Rensburg, Mayers and Roets 2016).

The contribution of supervision to throughput is regarded in certain sections of literature as the most influential institutional factor to postgraduate students' experiences in graduate school (Cekiso *et al*. 2019; Sverdlik *et al.* 2018; Meerah 2010; Rauf, 2016; Ngozi and Kayode 2013). According to Alam, Alam and Rasul (2013) the throughput rate and the quality of post graduate education depends on constructive and efficient supervision noting that its success and quality lies principally with positive, effective, and efficient supervision. Other scholars acknowledge that the nature, style, and norms of interaction within the student-supervisor relationship are the key factors determining the successful and timely completion of postgraduate studies (Nouri, Larsson, and Saqr 2019; Motseke 2016).

The role of a supervisor is broad and complex. Alam, Alam and Rasul (2013) state that as the notion of high-quality postgraduate supervision accelerates, the supervisory role is conversely becoming more of a concern and more challenging. The complexity of supervision is captured by van Rensburg, Mayers and Roets (2016) to include responsibilities in providing a supportive, constructive, and engaged supervision process.

The supervision relationship is a shared responsibility for both the supervisor and student. When both postgraduate students and supervisors disregard or neglect their roles and responsibilities problems may arise (Ganqa 2012). One of the key

supervision aspects is “clear and effective communication”. Manyike (2017) states that both experienced and novice supervisors have a responsibility to express effective communication in supervising postgraduate students. Manyike (2017) went further to argue that effective communication is characterised by the content and the quality of feedback. Motseke (2016) indicated that poor quality of feedback by supervisors contributed to delayed completion of postgraduates. Findings of the study conducted by Manyike (2017) indicates that more experienced supervisors appeared to be effective in setting clear communication and making students aware of their roles as postgraduates from the inception of the student-supervisor relationship and thus they did not encounter any challenges in the process of supervision. To fully appreciate the significance of the student-supervisor relationship in the postgraduate experience, it is essential to consider how students and their supervisors are matched, the types of relationship patterns they develop, and how aspects of these categories (i.e., match and relationship patterns) can hinder or facilitate student success (Sverdlik *et al.* 2018). In the same line of thought, van Rensburg, Mayers and Roets (2016) advocate that supervision does not only prepare postgraduate in engaging research and related skills, but it is also an intensive and interconnected form of educator-student engagement.

The cost of postgraduate student supervision represents a considerable investment for both the institution and the government and if only few of enrolled students graduate, both parties should be concerned about postgraduate graduation (Styger, van Vuuren, and Heymans 2015). Not completing postgraduate studies also wastes valuable time that could be spent on a new cohort of postgraduate students or even on supervisors’ own research (Styger 2014), creating an additional problem of overburdening the academic staff with more students to supervise than they can cope with (Ekpoh 2016).

2.6.2.2 Library services, internet access, and postgraduates’ computer skills

The provision of library services, adequate internet access and postgraduates’ computer skills are contributing determinants that enable postgraduate throughput. Abubakar, and Adetimirin (2015) opine that university libraries must

make provision for efficient and adequate resources for postgraduate research projects including writing articles and research papers. It is also recognised that locating and accessing electronic resources requires postgraduates to possess efficient computer skills (Amehoe 2013). Findings of the study by Motseke (2016) note that inadequate access to the internet, coupled with lack of computer skills may make the use of e-resources challenging and concurrently may make studying at postgraduate level very difficult. Given that postgraduate studies require information resources and increasingly information resources are available electronically, it has become critical that the library accordingly provides the electronic sources, the Internet access, and the students should be trained to search and retrieve the resources on their own.

2.7 Theoretical framework

Although the debate on whether to incorporate theories in research studies is ongoing, their inclusion has become common (Hadi, and Muhammad 2019; Bopape 2018; Aboo 2017). Proponents for theory driven research argue that a theory permeates every aspect of the study (Collins, and Stockton 2018; Grant, and Osanloo 2016). In this regard, a theoretical framework is one of the most important aspects of the research process albeit one that is misunderstood both in interpretation and application (Collins, and Stockton 2018; Grant, and Osanloo 2016). Some of the ambiguity in interpretation and application revolves around whether there is a distinct difference amongst the terms such as theory, model, theoretical, and conceptual framework, etc. (Kivunja 2018; Gavin 2016; Imenda 2014). This, however, does not undermine the significance of a theoretical framework which is to ensure that the findings of the study are valid and meaningful thus allows a room for generalization (Adom, Hussein, and Agyem 2018). A theoretical framework in a nutshell is the foundation from which all knowledge is constructed (metaphorically and literally) and without which the structure and vision for a study is unclear (Grant, and Osanloo 2016).

Throughput is contemporary and umbrella term for retention, student departure, drop-out, attrition, completion, time to degree, failure rate, success rate, graduation rate etc. Tinto's student integration model (1975) is the commonly

used model in throughput related studies. Tinto's student integration model (1975) explains the processes of interaction between the individual and the institution that lead differing individuals to drop out from institutions of higher education, and that also distinguishes between those processes that result in definably different forms of dropout behaviour (Tinto 1975).

To guide the present inquiry on the factors influencing the throughput of postgraduate students, Tinto's student integration model was adopted (1975). Tinto's original work has undergone several revisions over the years (Tinto 1975; Tinto 1982; Tinto 1987; Tinto 1993; Tinto 1997) but all revised models remain significant in conceptualising and addressing students' integration (Demetriou, and Schmitz-Sciborski 2011). Regardless of changes in Tinto's model names and constructs, a broad perspective of Tinto's theories remains the same, the students' ultimate decision to discontinue with their studies boils down to a combination of student's characteristics and experiences as well as the extent of their academic, environmental, and social integration within the institution (Reisinger 2016; Tinto 2014; McCubbin 2003). The latest version goes by the name of Tinto's Model of Student Attrition (Tinto 1997). Although Vincent Tinto maintains the core constructs of his model, and stands by how they relate to one another, he has updated his initial constructs to take account of elements which he now acknowledges as significant. This includes the importance of the classroom in the education and attrition process. He asserts that it is the interaction that occurs from the classroom to faculty wherein the processes of academic and social integration emerge (Tinto 1997). However, his initial model (Tinto's Model of Student Integration, 1975) remains relevant.

While the Student Integration Model is popular and has been adopted by several studies (e.g. Bengesai, and Paideya 2018; Aboo 2017; Aljohani 2016; Park, Luo, and Kim 2015; Nkontwana 2014; Amehoe 2013) it has also been critiqued. According to McCubbin (2003) it has been asserted that the Tinto model is globally flawed and fails to explain attrition behaviour holistically. Other critiques have argued that social and academic integration are not reliable indicators for students' persistence, Tinto's Student Integration Model does not generalise beyond traditional students such as small or private colleges, and it is not

adequate for students' attrition (Schreiber, Luescher-Mamashela, and Moja 2014; Zomer 2007; McCubbin 2003).

Despite the criticism mentioned above, the Student Integration Model is still profusely supported and widely applied in throughput studies. According to Kember (1995:35) Tinto's work is highly respected in academic student retention, drop-out and attrition. Sample studies that adopted Tinto's models in examining throughput at undergraduate, postgraduates or both levels include (Bengesai, and Paideya 2018; Aboo, 2017; Aljohani 2016; Park, Luo, and Kim 2015; Nkontwana 2014; Amehoe 2013). This study on the factors influencing the throughput of postgraduates is also guided by Tinto's Students' Integration Model (Tinto1975). This model is intended to offer a longitudinal framework which explains how each aspect of a student leads to their decision to leave college or university (McCubbin 2003). In Tinto's original model of 1975, personal attributes of students (e.g., family background, pre-college schooling) influence their initial commitment to both goal and institution. From there social, and academic experiences lead to greater or lesser social and academic integration, which then leads to a re-evaluation of institutional and goal commitment resulting in persistence or drop out. Figure 2.1 below is a diagrammatic representation of Tinto's Student Integration Model (1975).

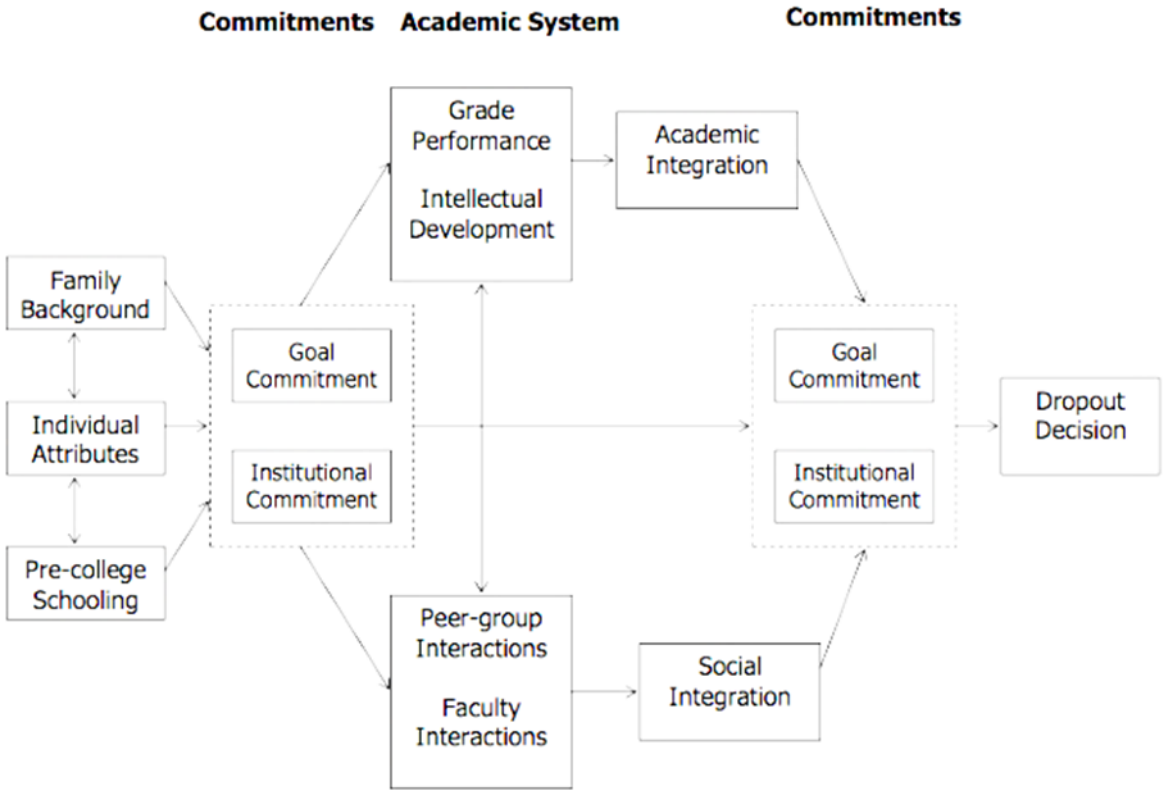

Figure 2. 1 Student Integration Model, (Tinto 1975)

In this study Tinto's Theory of Student Integration (1975) guided the formulation of research instruments and was also used to reflect on the findings of the study.

The theory of student integration is proven to be useful for addressing matters of student throughput and academic success (Schreiber, Luescher-Mamashela, and Moja 2014; McGhie 2012). The theory of student integration advocates for the integration of personal, institutional, and social attributes in student's academic life (Arnekrans 2014). It stresses that for students to persist in their studies they need to have these attributes integrated (Chrysikos, Ahmed, and Ward 2017). Its relevance to the phenomenon in question is proven as a result of being adopted by several studies examining students' throughput (Bengesai, and Paideya 2018; Aboo 2017; Aljohani 2016; Park, Luo, and Kim 2015; Nkontwana 2014; Amehoe 2013). Moreover, the theory of student integration explains the reasons why students drop-out of the institution before graduation (Tinto 1975). It is for the highlighted reasons above that the researcher adopted the theory of student integration to guide the present study. The study sought to examine

factors influencing the throughput of postgraduates in a South African university of technology.

2.5 Summary

This chapter reviewed literature on the factors influencing the throughput of postgraduate students from an international perspective to the South African context. In the process, the issues of concern for respective stakeholders around the phenomena of postgraduate throughput have been identified and discussed; amongst the stakeholders' concerned are governments, funders of postgraduate students, employers, HEIs and postgraduate students. Having reviewed the literature on the factors influencing postgraduate throughput, I deemed it necessary to explain in detail the theory of student integration by Tinto (1975) which guided this study; to ensure that the study was conducted properly. In doing so, this chapter presented Tinto's model of student integration and highlighted the framework for understanding student integration. The following chapter delved more into the research methods and methodology adopted in this study to address the critical research questions probed in the introductory chapter.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The chapter ending reviewed literature on postgraduate throughput. The present chapter provides a discussion on the research methods and methodology employed to achieve the study aim. It started off by attempting to provide an understanding of the concepts research methods and research methodology. The chapter thereafter presented and motivated for the adoption of the research paradigm, research approach and research design. The chapter moves on to an elaboration of the population targeted and the procedures for sampling. The research tools used to collect data and the procedures for pretesting the tools were explained. The chapter thereafter explained how reliability and validity concerns were addressed as well as the ethical issues considered for the study. Before the chapter was summarized, how data was going to be analysed was explained.

3.2 Understanding research methods and research methodology

Research methods and research methodology are contested terms in research literature. Contestations are on the definition and application of the two concepts which brings about ambiguity, confusion, and inconsistency for researchers. To circumvent these challenges in understanding what research methods and research methodologies are, scholars or researchers tend to adopt definitions of leading and popular scholars in their discipline. Sample definition of research methods and research methodology follow.

According to Kivunja and Kuyini (2017) the research methodology articulates the logic, sequence and flow of the systematic processes observed in conducting a research project, to attain knowledge about a research problem.

Rajasekar, Philominathan and Chinnathambi (2006:5) view research methods and research methodology as:

> *"*Research methods are the various procedures, schemes and algorithms used in research. All the methods used by a researcher during a research study are termed as research methods. They are essentially planned, scientific and value neutral. They include theoretical procedures, experimental studies, numerical schemes, statistical approaches, etc. Research methods help us collect samples, data and find a solution to a problem. Particularly, scientific research methods call for explanations based on collected facts, measurements, and observations and not on reasoning alone. They accept only those explanations which can be verified by experiments*".*

> *"*Research methodology is a systematic way to solve a problem. It is a science of studying how research is to be carried out. Essentially, the procedures by which researchers go about their work of describing, explaining, and predicting phenomena are called research methodology. It is also defined as the study of methods by which knowledge is gained. Its aim is to give the work plan of research*".*

Given that the research and research methodology concepts are ambiguous, confusing, and inconsistent, the researcher sought to create clarity in the research methods and research methodologies adopted by the study at hand and the justification for the methods. These methods are the systematic steps usually adopted by social science scholars.

3.3 Research paradigm

Research paradigm can be described as a researcher's 'worldview' (Mackenzie and Knipe 2006). "This worldview is the perspective, or thinking, or school of thought, or set of shared beliefs, that informs the meaning or interpretation of research data" (Kivunja and Kuyini 2017:26). Chilisa and Kawulich (2012:1) view a research paradigm as "a way of describing a world view that is informed by

philosophical assumptions about the nature of social reality"; and it comprises of three elements, namely, **ontology, epistemology, and axiology.** These elements are defined as:

3.3.1 Ontology

Ontology is an analysis based on one's logical standpoint of the nature of reality (Blackstone 2018). Ontology's concern is based on the presumptions built by people to believe something is logical (Kivunja, and Kuyini 2017). Some sociologists are of the opinion that reality is in the eye of the beholder, hence our job is to comprehend others' view of reality (Blackstone 2018) whereas other sociologists feel that, while people may not see eye to eye in their viewpoint of reality, there is only one true reality that exists (Blackstone 2018).

3.3.2 Epistemology

Epistemology embraces knowledge, necessarily, it stands for a certain comprehension of what benefits will that knowledge brings about (Al-Saadi 2014). It is a tool used to determine our knowledge of something; how we know the truth or reality (Kivunja, and Kuyini 2017:27). "Each method of data collection comes with its own set of epistemological assumptions about how to find things out" (Blackstone 2018:5). The importance of epistemology is that it helps you to establish the faith you put in your data (Kivunja, and Kuyini 2017:27).

3.3.3 Axiology

The function and place of values in the study or enquiry process, specifically the impact of values on the connection between paradigm, methodology and techniques, is known as axiology; that is, the study paradigm is axiological in that the researcher's values guide the selection of techniques (Zaidi and Larsen 2018). Axiology includes defining, assessing, and understanding concepts of correct and incorrect research-related behaviour (Kivunja and Kuyini 2017:28).

Furthermore, while many recognized research paradigms exist today (Kelly, Dowling, and Millar 2018; Creswell 2014; Denzin and Lincoln 2011), the

categorization of these paradigms remains hazy. In the early days the most recognized paradigms were **positivism** which is linked to quantitative studies and it involves testing of hypothesis to achieve "objective" reality, also used to predict what might happen in the future and **interpretivism** – which is linked to qualitative studies and uses individual's view to gain an understanding of the world (Blackstone 2018; Thompson 2015; Thanh, and Thanh 2015). Positivists prefer quantitative methods of science, while interpretivists prefer qualitative methods of humanism (Thompson 2015). Nowadays more paradigms have been incorporated. Denzin and Lincoln (2011:91) recognized six paradigms: constructivism, interpretivism, feminism, positivism, post-positivism, and critical theory. From a theoretical point of view, Creswell (2014) recognized four paradigms: post-positivism, participatory/advocacy, social constructivism, and pragmatism. Kelly, Dowling, and Millar (2018) recognized five types of paradigms, namely positivism, post-positivism, interpretivism, constructivism, and pragmatism.

This study adopted post-positivism as a guiding research paradigm. Post-positivism is an approach advocating methodological pluralism (Wildemuth 1993) It is pluralistic in its function, balancing positivist, and interpretivist approaches (Panhwar, Ansari, and Shah 2017). Creswell and Creswell, (2018:6) consider post-positivism as an expansion of positivism as it reflects thinking challenging the traditional concept of the absolute and objective truth of social sciences understanding. The above view concurs with the sentiments of Gratton and Jones (2010) who argue that it is impossible that understanding can be gained simply by measurement solely. The post-positivism perspective is flexible allowing the use of multiple methods to conduct research according to the nature of the research questions (Panhwar, Ansari, and Shah 2017; Wildemuth 1993) and it can be used for both physical sciences as well as social sciences (Grover 2015).

Post-positivism is selected because its emphasis is to investigate the phenomena objectively with the help of quantitative and qualitative data (Panhwar, Ansari, and Shah 2017; Ryan 2006). As was indicated by Panhwar, Ansari, and Shah (2017) the flexibility of post-positivism makes it appropriate for examining the study's research problem. Examining the factors influencing the throughput of

postgraduates required data to be collected from a large population while it also sought to obtain detailed information. In addition, qualitative data can be used to validate quantitative data and to create a solid foundation for drawing conclusions (Wisdom, and Creswell 2013).

Furthermore, post-positivist approach represents a greatest transparency to various methodological approaches, and usually accommodates both qualitative and quantitative methods (Panhwar, Ansari, and Shah 2017; Ryan 2006). This enables the opportunity for the development of alternative research strategies to explore information in the most wondrous and innovative ways (Glicken 2003:28). Moreover, scholars in this paradigm usually have a common belief in that they rely a lot more on multiple perspectives from participants instead of a single reality (Creswell 2009; Creswell 2007).

3.4 Research approach

Research approaches are usually guided by the research paradigm/s adopted for the study. Research approach refers to the “concept plans and the procedures for research that span the steps from broad assumptions to detailed methods of data collection, analysis, and interpretation” (Creswell and Creswell 2018). Research approach is a way of obtaining data from the sample (Grover 2015). The debate on research approaches started off as a dichotomy between quantitative and qualitative. At the later stage other approaches such as both quantitative and qualitative, as well as mixed were introduced. A brief explanation of the four approaches is given below.

3.4.1 Qualitative research approach

Qualitative approach is primarily exploratory research (Kabir 2016; Creswell 2014). Qualitative research is usually used to gain deep insight into the problem or helps to develop ideas or hypothesis for potential quantitative research (Kumar 2018; Creswell and Creswell 2018; Kabir 2016; DeFranzo 2011). It is used to uncover trends in thought and opinions and delve deeper into the phenomenon (DeFranzo 2011). Methods used to collect qualitative data usually ask “open-ended” questions, typically these questions are not worded in the same way with

each participant (Mack 2005:4). Some common methods used to collect qualitative data include focus groups (group discussions), individual interviews, and participation/observations (DeFranzo 2011). The sample size is typically small, and respondents are selected to fulfil a given quota (DeFranzo 2011).

3.4.2 Quantitative research approach

Quantitative research is a stimulating and highly educational technique to gather information from known and unknown population using sampling method, questionnaires, sending out online surveys, online polls and more (DeFranzo 2011). With these methods of collecting quantitative data, the response categories from which participants may select are usually closed-ended or fixed (Mack 2005). The benefit of this structured response pattern is that it allows for meaningful comparison of responses across participants and study sites (Mack 2005:3). However, “it requires a thorough understanding of the important questions to ask, the best way to ask them, and the range of possible responses” (Mack, 2005:3). Hence, quantitative research approach is used to quantify the problem by means of generating numerical data or data that can be transformed into usable statistics (Kumar 2018; Kabir 2016; DeFranzo 2011). The results of which can be analysed using statistical methods (Lutabingwa, and Auriacombe 2007). Additionally, “quantitative methods and procedures allow the researchers to obtain a broad and generalizable set of findings and present them briefly and cheaply” (Yilmaz 2013:313). McCusker, and Gunaydin (2015:540) concur and went further to assert that, the convenience of employing quantitative research is that it enables many factors to be investigated, some of which are inter-related.

3.4.3 Quantitative and qualitative research approach

The adoption of quantitative and qualitative research approaches in a single study is fraught with controversy. This because while some scholars (Creswell *et al.* 2019; Wisdom and Creswell, 2013; Arora, and Stoner, 2009) refer to such an integration of research approaches as a “mixed method” others are of the opinion that a mixed method demands a purposeful mixing of methods in data collection, data analysis and interpretation of the evidence either sequentially or concurrently (Mauldin, 2020; Mikalef *et al.* 2019; Shorten and Smith 2017;

Schoonenboom, and Johnson 2017; Hanson, and Grimmer 2007). The study adopts the view of the later scholars who assert that the incorporation of quantitative and qualitative research approaches is not a mixed method rather a standalone approach linked to an independent research paradigm namely post-positivism while mixed method is linked to pragmatism paradigm.

Research approaches can be applied concurrently or consecutively (Almalki 2016). Qualitative and quantitative approaches in this study were implemented concurrently during data collection and analysis. Different procedures suitable for each approach in collecting and analysing data were employed. For example, interviews were used to collect qualitative data and questionnaires to collect quantitative data. Quantitative data by means of descriptive statistics through Microsoft Excel was analysed and qualitative data through thematic content analysis. Also, the sample size appropriate for each approach was taken into consideration.

Considering the above, according to Dos Santos *et al*. 2017 “the use of mixed methods allows for a deeper understanding of a phenomenon of interest than the use of either a quantitative or qualitative approach alone, especially when the phenomenon is complex”. It is therefore pivotal to state boldly that both approaches were employed to collect data from different populations, data was not collected to provide validation for each other but rather to create a solid foundation for drawing conclusions about the phenomena under investigation.

3.4.3.1 Motivation for the adoption of quantitative and qualitative research approaches

Quantitative and qualitative research approaches are incompatible with each having its own unique ways of gathering and analysing data (Eyisi 2016). An inquiry that incorporates both approaches provide a more complete understanding of a research problem than either approach alone thus builds on the strengths of both (Creswell 2014; Schulze 2003). As was earlier pointed out that examining the factors influencing the throughput of postgraduates required data to be collected from a large population while it also sought to obtain detailed information.

3.4.4 Mixed method approach

“The term “mixed methods” refers to an emergent methodology of research that advances the systematic integration, or “mixing,” of quantitative and qualitative data within a single investigation or sustained program of inquiry” (Creswell and Creswell 2018; Kabir 2016; Wisdom, and Creswell 2013). Qualitative and quantitative research approaches to some extent fall on different ends of the mixed method design spectrum related to when the data is collected (Driscoll *et al.* 2007). The first is a relatively simple design in which qualitative and quantitative data are collected concurrently, whereby the data from one source inform the collection of data from another source (Peersman 2014). The other one is a complex design in which qualitative and quantitative data are collected sequentially, wherein the triangulation is used to compare information from different independent sources (Peersman 2014).

“The basic premise of this methodology is that such integration permits a more complete and synergistic utilization of data than do separate quantitative and qualitative data collection and analysis” (Wisdom, and Creswell 2013:1). As Kumar (2018) posits that, each method; qualitative and quantitative has its own advantages and limitations hence, the limitation of one method could be mended by the advantage of another method provided both methods are incorporated into a mixed method. Kabir (2016) concurs and went further to state that, using this approach to gather and evaluate data may assist to increase the validity and reliability of the research.

3.5 Research design

Research design is the “glue” that holds all the elements of research study together (Akhtar 2016). It is a systematic procedure for collecting, analysing, interpreting, and reporting data in research studies (Wehde *et al.* 2020; Schwartz-Shea, and Yanow 2012). Research design is a technique used to address a research question and different research questions require unique research designs, therefore, the researcher needs to be knowledgeable about different types of research designs before selecting the research design that best fits

his/her study enquiry (Nasser 2001). It is noteworthy that the research design is based more or less on research methodology chosen for a particular study and should be selected once the topic and the research problem have been identified and formulated, objectives have been properly outlined, concepts defined and hypothesis have been properly framed (Akhtar 2016; Collis, and Hussey 2013).

Research designs are types of inquiry within research approaches that map an appropriate framework for a study (Sileyew 2019; Grant, and Osanloo 2016.). The present enquiry employed both quantitative and qualitative approaches. Several research designs are applicable in both quantitative and qualitative approaches. The main types of quantitative research designs are described below:

Descriptive research is often the first step in most research projects and its primary objective is to understand what is in a specific situation with an identified population (Nardi 2018; Akhtar 2016). Descriptive research answers the questions, what, who, where, how, and when. It is used to study the current situation and it is commonly used more common in the social sciences (Akhtar 2016).

Correlational research's primary purpose is to determine relationships between variables, and if a relationship exists, using statistical data to make predictions to a population (Simon and Goes 2011; Birley, and Moreland 1998).

Causal comparative/quasi-experimental is a "research design that seeks to find relationships between independent and dependent variables after an action or event has already occurred" (Brewer, and Kubn 2012:2).

Experimental research designs include some type of intervention, meaning the participants are given exposure to something which they would not have been exposed to (Welman, Kruger and Mitchell 2005).

Survey research design is the collection of data attained by asking individuals questions either in person, on paper, by phone or online and otherwise (Rouse 2015). "Survey research involves acquiring information about one or more groups

of people", perhaps about their characteristics, opinions, attitudes, or previous experience by means of probing questions to them and tabulating their answers (Leedy and Ormrod 2005:187). Surveys can be large scale such as national census, opinion polls, or research projects that are conducted by institutions equipped with massive resources in terms of financial resources, staff and access to databases that are normally available at the disposal of an independent researcher or small scale when carried out by institutions such as schools, post-secondary institutions, hospitals, and other organizations and individuals with the vision of gathering facts about or learning more about the demographic characteristics, behaviors, and attitudes of their students, employees, patients, clients, or members (Ajayi *et al*. 2005).

Some of the research designs in qualitative research include narrative research, phenomenology, grounded theory, ethnography, and case study research (Creswell 2007). The research designs are each explained below:

Narrative research design is a form of research in which the narrative researcher collects stories from the real lived experiences, analyses and transcribe those stories narratively (Creswell *et al.* 2019).

Phenomenology is a research design that focuses on the meaning that certain lived experiences are a way of understanding the reality around us (Creswell *et al.* 2019).

Grounded theory focuses on developing a theory that is grounded in data systematically gathered and analysed (Creswell *et al.* 2019)

An **ethnography** research design focuses on studying a phenomenon within the context of its culture (Creswell *et al.* 2019).

Case study research is an "intensive longitudinal study of a phenomenon at one or more research sites for the purpose of deriving detailed, contextualized inferences and understanding the dynamic process underlying a phenomenon of interest" (Mauldin, 2020:316).

The survey research design was a perfect fit for the current study because using survey makes it possible to collect data from large or small populations (Odoh, and Chinedum 2014). Survey research design allows for a variety of methods to recruit participants, collect data, and utilize various methods of instrumentation (Ponto 2015). Survey research can use quantitative research strategies, qualitative research strategies, both strategies (i.e., quantitative, and qualitative) or mixed methods (Ponto 2015). This study on the factors influencing the throughput of postgraduate in a selected South African University of Technology required the researcher to collect data from a large and divergent populations, using different methods of instrumentation and adopted both quantitative and qualitative research approaches.

3.6 Target Population

A target population, also known as the theoretical population, is “the entire group of individuals or objects to which researchers are interested in generalizing the conclusions” (Blumberg, Cooper, and Schindler 2014:174). It is the complete group of objects or elements relevant to a research project because they possess the information the research project is designed to collect (Hair Jr *et al.* 2011). This group of proposed individuals or elements have specific characteristics under which the study takes place and is of interest to the researcher (Jha, 2014:183). They are also the group of people or elements to whom the results of the research will apply (Whitley and Kite, 2013).

There were three population groups targeted in this study. The first population from which the data was gathered are postgraduates (masters and doctoral candidates). The breakdown for this population is presented in Table 3.1 and categorized by faculty and level of study. All six faculties were targeted.

Table 3. 1 Number of Registered Postgraduate students

Faculty	Master's Degree	Doctoral Degree	Total Per Faculty
Accounting and Informatics	95	24	119
Applied Sciences	97	40	137
Art and Design	64	33	97
Engineering and the Built Environment	128	36	164
Health Sciences	243	33	276
Management Sciences	230	22	252
TOTALS	857	368	1225

(ITS Web Interface - Durban University of Technology, January 2019)

The second population was academic staff. It could not be determined prior to data collection who within the total complement of 623 academic staff were involved in supervision.

The third population was drawn from the three research librarians. The six faculty research coordinators did not respond and were excluded from the study.

The information regarding the target populations was obtained from the university's Management Information System (MIS) in 2019.

3.7 Sampling procedures

A sample is a "subset of a population that is used to represent the entire group as a whole" (Cherry 2018). Datta (2018) identifies two types of sampling techniques, namely "probability (representative) sampling and non-probability (non-representative) sampling". Etikan, and Bala (2017) further state that probability sampling uses randomization to select sample members. According to Sharma (2017) examples of probability sampling include "simple random sampling, systematic sampling, stratified sampling and cluster sampling" while non-probability sampling uses non-random techniques. Examples of non-probability sampling include "haphazard sampling, quota sampling, snowball sampling, deviant-case sampling, sequential sampling, theoretical sampling and purposive sampling" (Cherry 2018: para 1 line 1-2). It is necessary to select a sample that meets a particular need, depending on the nature of the research (Bacon-Shone 2013).

3.7.1 Non-probability sampling

In this study, non-probability sampling methods were adopted for each target population. Non-probability sampling was adopted because the aim was not to select different levels of students from different faculties. As the differences between postgraduate levels of study would not have had significant difference hence the decision to accommodate all postgraduate students from masters to PhD levels. Since the main goal was to absorb as many postgraduate students across DUT as possible given a definition of postgraduate student by Atibuni (2021) stating that “a postgraduate student is anyone who is studying a postgraduate course, including a masters course, an MPhil and a PhD, that requires an undergraduate degree as part of the entry requirements.” Postgraduates were therefore selected regardless of their level of studies. To ensure that all faculties were presented, the researcher visited all areas where postgraduate students are located, including research commons found in three different campuses (City, ML Sultan and Steve Biko), these research commons are usually occupied by different groups of students from different faculties. The sampling methods employed from the non-probability sampling method were purposive sampling, convenience or accidental sampling and snowball sampling.

3.7.1.1 Purposive sampling

In **purposive sampling**, the sample is selected with a specific purpose related to the kind of target population aimed for (Trochim, Donnelly, and Kanika 2016). In most cases, purposive sampling is used to sample based on the knowledge of the participants that are purposively selected to ensure appropriate inclusion in the sample (Ali, 2014). Purposive sampling can also be useful in situations where the researcher needs to reach a targeted sample quickly, cheaply, and where sampling for proportionality is not the primary concern (Trochim, Donnelly, and Kanika 2016).

3.7.1.2 Convenience or accidental sampling

Convenience samples are the unrestricted samples of non-probability sampling (Blumberg, Cooper, Schindler 2014). This type of sampling involves selecting participants haphazardly, such as the person who is randomly given a questionnaire to complete at the convenience of the researcher (Welman, Kruger, Mitchell 2011). The sample selection process is continued until the required sample size is met (Welman, Kruger, Mitchell 2011). This technique of sampling is prone to bias and influence that is beyond the researcher's control (Welman, Kruger, Mitchell 2011). In the early stages of exploratory research, when the researcher is seeking guidance, it might be appropriate to use convenience sampling. (Blumberg, Cooper, Schindler 2014). "The results may present evidence that is so overwhelming than a more sophisticated sampling procedure is unnecessary" (Blumberg, Cooper, and Schindler 2014:193). Convenience sampling is also appropriate to use when the researcher is short of money, time, and energy (Hays and Singh 2012).

3.7.1.3 Snowball sampling

Snowball sampling is also known as chain referral sampling (Mack 2005). It is "often a natural fit for a convenience sampling strategy" (Hays and Singh 2012:169). In the beginning of snowball sampling, individuals are discovered and may be either selected through probability methods or not (Blumberg, Cooper, Schindler 2014). Once the researcher finds a typical case for his/her study, he/she then asks if the individual knows other people who possess similar characteristics (Hays and Singh 2012). This type of sampling is therefore, often used to discover and recruit "hidden populations" that is, "population not easily accessible to researchers through other sampling strategies" because they are nowhere registered as a population (Mack 2005:4-5). Snowball can give you quick access to such population (Hays and Singh 2012).

Having described the types of sampling techniques adopted by the study at hand, it was noteworthy to tabulate how and why each of these sampling methods were adopted. Table 3.2 below demonstrates:

Table 3. 2 Sampling methods

Target Population	Total number of Population	Sample Size	Sampling Method	Justification of a chosen Sampling Method	Application of Sampling Method/s
1. Postgraduate students (on the system)	1729	314	➢ Accidental/ convenience Sampling ➢ Snowball sampling	➢ The researcher looked at the fact that postgraduate studies at DUT are research-based. Meaning there is no designated place where you can locate postgraduate students during specific times.	➢ Accidentally, the researcher located some of the postgraduate students from the places where they usually congregate such as research commons, laboratories (computer and scientific) and the library. ➢ The researcher asked the respondents to assist her to identify other potential respondents (snowball sampling method) ➢ Respondents' data was retained to avoid duplication
2. Academic staff	623	None	➢ Purposive sampling ➢ Snowball sampling	➢ The researcher sought to collect data from academic staff, who were currently supervising. Notably, it was difficult to identify this population, however, with the help from the departmental secretaries and the HODs the researcher was able to identify this population.	➢ Information about academic staff across the DUT's six faculties was obtained from the university's Management Information System (MIS). ➢ Most respondents were identified by titles (e.g. HODs, academic staff holding Doctorate and Professorships) ➢ Questionnaires were personally administered to the respondents. The respondents were located from their office spaces. ➢ The researcher asked the Secretaries and the HODs to assist her to identify other academic staff involved in supervision within their respective departments.
3. Library personnel	03	None	➢ Purposive sampling	➢ The study sought to find information from the library personnel since they are dealing or engaging with postgraduate students on regular basis.	➢ A census was employed because the total number of this population was small (they were thee in total) and manageable. ➢ The researcher personally interviewed the librarians.
4. Research Coordinators	06	None	➢ Purposive sampling	➢ The study sought to find information from the research coordinators as a research support structure	➢ The research coordinators were targeted by census and only one responded whose data was not usable.

The study at hand had no specific proportion of the sample for different faculties. Some postgraduates are studying part time and they hardly go to campus and others are full-time students but employed at the same time which made it difficult to locate them hence the reason for not having the proportion of the sample. The researcher aimed to collect data from as many postgraduate students as possible while ensuring that all faculties are presented. During the process of data collection, the researcher left no stone unturned in her search for postgraduate students from different faculties.

3.8 Data collection procedures

Data can be obtained from either or both primary and secondary sources (Sekaran and Bougie 2016). Data that is collected from firsthand experience is regarded as primary data **(**Kabir 2016). This type of data is used to answer research questions in a conclusive way (Surbhi 2016). It is noteworthy to highlight that primary data has not yet been published and is more valid, authentic, and objective **(**Kabir 2016). Primary data can be obtained through questionnaires or surveys, focus groups or in-depth interviews, or through experiments (Curtis 2008). Secondary data is obtained from second-hand experiences and is already documented somewhere for other purposes not relating to the current research problem (Surbhi 2016; Curtis 2008). Secondary data is usually obtained through company reports, public and private sectors such as “USDA’s Economic Research Service (USDA-ERS) and Agricultural Marketing Service (USDAAMS), newspaper articles, extension publications, etc.” (Curtis 2008:1).

According to Ajayi (2017:2) some of the fundamental differences between primary and secondary data are:

- Primary data is a real-time data whereas secondary data is one which relates to the past.
- Primary data is collected for addressing the problem at hand while secondary data is collected for purposes other than the problem at hand.
- Primary data collection is a very involved process. On the other hand, secondary data collection process is rapid and easy.

To answer the research questions for the present study, data was obtained from primary sources through questionnaires and interviews. Data collection was carried out concurrently. In the interest of time the researcher had to carry out the process of collecting data during the same period, however, each population group was given enough attention during the process.

3.8.1 Questionnaire/Survey

Questionnaire/Survey method is one of the most popular method of primary sources of data which is used to collect quantitative data (Ajayi 2017; Curtis 2008). It is a series of written questions a researcher supplies to respondents for the purpose of gathering information (Osang *et al.* 2013). Surveys include asking participants about their opinions and behaviours through a short questionnaire (Driscoll 2011). In this study questionnaire/survey was used to collect data from postgraduate students and academic supervisors.

3.8.2 Interviews

Interviewing is a method of data collection used specifically to obtain an understanding of the underlying factors and motives for the attitudes, interests, or behaviors of individuals. (Ajayi 2017). Interviews include asking participants questions and can be conducted on a personal one-on-one or in a small group setting (Driscoll 2011). This study adopted interviews to collect data from the research librarians. Interviews were also intended to collect data from the research coordinators; however, they were excluded as was earlier mentioned that they did not respond.

3.8.3 Motivation for data collection tools adopted.

To answer the research questions imposed by the study at hand, the researcher used questionnaires to collect data from postgraduate students and academic supervisors. The questionnaire was semi-structured composed of close-ended and open-ended questions. This data collection method was chosen because of its convenience. Questionnaires were developed and distributed cheaply and in less time. As stated by DeFranzo (2012) questionnaires are timesaving and cost-effective compared to other data collection tools. Furthermore, Quad (2016)

emphasis that, questionnaires allow the researcher to collect data from a large number of respondents. Face to face semi-structured interviews were used to collect data from the library personnel. Face to face interviewing is an encounter where the researcher and respondent are having a seat down conversation which leads to a more detailed outcome of the matter being discussed (Fox 2009). The inspiration behind the use of face-to-face interviews was the number of respondents. The targeted population in this regard was quite a manageable number. Over and above that, face to face interviews are perceived as the best way of collecting high quality data n (Fox 2009).

3.9 Data analysis

Data analysis is making sense of the collected data to draw conclusions (Grant 2020). The procedure to collect data is described as a messy, ambiguous, and time-consuming procedure, but also as a creative and fascinating process (Pinnegar and Hamilton 2009). Data analysis is defined as a process of cleaning, transforming, and modelling data to discover useful information (Grant 2020; Bergin 2018; Dillard 2017).

There are many different methods of analysing data, depending on the research approach adopted by the study. For this study, the researcher analysed the quantitative data by means of Descriptive statistics through Microsoft Excel. Quantitative data results were presented through descriptive statistics (frequency counts, tables, charts, and graphs). Qualitative data was analysed through thematic content analysis. This involves grouping and narrating on the themes emanating from the data.

3.10 Reliability and validity

Reliability and validity of the research instruments are important considerations when conducting research. Reliability refers to whether you get the same answer by using an instrument to measure something more than once or not (Benard 2012). To ascertain reliability in this inquiry, the researcher pre-tested the data collection instruments (questionnaires and interview questions) to gain a perspective of the interpretation of the questions (set for both questionnaires and interviews). The researcher personally pre-tested the instruments which afforded her the necessary opportunity to monitor responses by checking if the respondents were clear with the questions and answered them accordingly. In instances where the researcher was not satisfied with the responses given by the respondents she probed further and reconsidered rephrasing certain questions. While validity refers to the accuracy and trustworthiness of instruments, data, and findings in research (Benard 2012). A test is valid if it measures what it intends to measure and if the results correspond to real-world values (Middleton 2019; Mthembu 2018). Therefore, the researcher had to ensure that the study measured what it aimed to investigate by employing applicable instruments for collecting data and appropriate methods for analysing data. To confirm findings of the study, thereby improving the validity of the findings the quantitative data was analysed by means of descriptive statistics through Microsoft Excel and the qualitative data through thematic content analysis.

3.11 Pre-testing instruments

The purpose of pre-testing is to ascertain that the instrument is user-friendly, and it will collect accurate and comprehensible data that is free from errors (Nhari 2017). The instruments were pre-tested to identify any problems such as unclear wording, vague questions, incomprehensive questions, identifying any omitted options in the list of possible answers provided; any other comments that would add to the quality of the questionnaire and to prevent instruments taking too long to administer.

The instruments were pre-tested on a small group of five postgraduates and five academic supervisors from the Department of Information and Cooperate Management at DUT, one staff member from the research office and one librarian were included. The librarian that was included in the pre-test was also involved in the main study due to a limited population size. Usually when a participant was involved in the process of pre-testing instruments, they cannot be included in the actual data collection process, however, other researchers are of the view that the participants used for pilot testing can also be included in the main study (Thabane *et al.* 2010; Holloway 1997). The feedback obtained from pre-testing instruments was used to improve the instruments.

3.12 Ethical consideration

According to Fouka, and Mantzorou (2011) generally, ethics can be defined as the branch of philosophy which deals with the dynamics of decision-making concerning what is right and wrong. Research ethics involve requirements on daily work (Fouka and Mantzorou 2011). The research study that observes ethics often leads to the creation of social norms which focus on the behaviour that the researcher is expected to uphold throughout the research project or work (Akaranga and Makau 2016). According to Fouka and Mantzorou (2011). Some important ethical considerations that the researcher is expected to uphold are:

- The protection of the participants against injury or being ill-treated.
- The participants' right to informed consent before participating in research.
- The participants' right to privacy, confidentiality and/or anonymity.
- The participants' protection of dignity and the publication of information.

In this study the researcher adhered to confidentiality clauses as regulated by the institutions research office, this was done to ensure the protection of the respondents and the institution. The confidentiality clause was discussed by both the respondent and the researcher to reach a mutual understanding; the researcher and the respondent then duly signed the ethical guidelines as indemnity of compliance. An assurance to participants' right to privacy, confidentiality and anonymity was given in the letter of information and the letter

of informed consent was issued prior to participation including the right to withdraw at any given stage. The data collected in this study was stored and disposed in line with the institution's guidelines for research data management.

3.13 Summary

This chapter discussed the research methodology the research study adopted. The chapter also provided justifications for the adopted research methodology. The following chapter presents, interprets, and analysis the findings of the study.

CHAPTER FOUR

PRESENTATION, INTERPRETATION AND ANALYSIS OF RESULTS

4.1 Introduction

The previous chapter presented the research methodology that guided the study at hand. This chapter presents, interprets, and analyses the findings of the study. The arrangement of research findings is in the sequence described below. The chapter sets off by briefly explaining procedures followed for analysing quantitative data and qualitative data. The chapter went further to present the response rates for all the targeted populations and thereafter, presented the structure adopted in the formulation of research instruments. The chapter moved to the presentation of data collected from the targeted populations beginning with, postgraduate students; followed by academic supervisors, thereafter the research coordinators and closing off with the library personnel. The chapter ends with a summary.

4.2 Procedure followed for analysing quantitative data and qualitative data

Semi-structured questionnaires were used to collect both quantitative and qualitative data. To analyse quantitative data, the study adopted descriptive statistics limited to frequencies and percentages and presented in the form of graphs and tables (Cooksey 2020). The qualitative component of the study was analysed through content analysis by identifying the relationships amongst narratives, grouping themes, and making inferences (Vaismoradi *et al.* 2016; Hsieh and Shannon 2005).

4.3 Response rates for the targeted populations

4.3.1 Postgraduate students

Statistics for postgraduate students registered across the DUT faculties stood at 1729, as of the 29th of August 2019 (DUT, Management Information System 2019). The sample size calculator provided by Creative Research Systems

(2012) put the sample size at 314 with 95% confidence level and 5% margin of error. The sample size is in accordance with (Krejcie and Morgan 1970) and (Sekaran 2003) who state that the acceptable sample size for a population of 1729 is within the range of 313 to 317. Sampling approaches followed were**: Accidental/Convenience Sampling and Snowball Sampling**. The researcher accidentally located the postgraduates from the places where they usually congregate such as research commons, laboratories (computer and scientific) and the library. Upon the postgraduates' availability and convenience, the researcher asked them to participate in this study by completing a questionnaire. From each of the postgraduate student located, the researcher requested to be referred to either a friend, schoolmate; colleague; peer; or acquaintance pursuing postgraduate studies. By so doing the study adopted a snowball sampling. Following these leads, the researcher ended up with 146 questionnaires. Of the 146 questionnaires collected, 109 questionnaires were usable. The response rate achieved was 35%. Although this response rate is relatively low; it is acceptable because of the circumstances explained below among others:

- The researcher experienced a general apathy towards the completion of questionnaires.
- Respondents kept on losing the questionnaires
- It was difficult to locate these respondents
- Postgraduates felt that the researcher was inconveniencing them as they are always busy with their research work.

The above circumstances are also explained by the literature highlighting that the daunting process of collecting data through questionnaires. Questionnaire is annoying and it causes fatigue, before and during the distribution. Before the distribution, the fatigue could result from the less inclined respondents to participate in your study and another setback could arise during the distribution, wherein the respondents perceive the questionnaire as too long and irrelevant in some rare cases (Debois 2019; Steyn 2017). The issue of convenience during data collection is one of the major factors affecting the progress of data collection and as such resulting to low response rate (Russek *et al*.1997). This affirms the view of Bocar (2009) whose study findings revealed that the availability of the

respondents is the most difficult, patience testing factor contributing greatly to research study.

4.3.2 Academic supervisors

The total number of permanent academic staff as of the 29th of August 2019, stood at 623 inclusive of those who supervise at postgraduate level and those who do not (DUT, Management Information System 2019). In the absence of central database to provide a definite number of academic supervisors, the sampling approach taken was to purposively approach the Heads of Departments and/or programme coordinators or departmental secretaries to source the academic staff involved in supervision. From each of the respondents identified, the researcher asked to be referred to other colleagues involved in supervision. By so doing the study took the route of snowball sampling. Following these leads, 78 questionnaires were distributed. Of the questionnaires distributed, 61 responded and of this number, 50 questionnaires were usable yielding a 50 (64%) response rate.

4.3.3 The library as a research support structure

The academic library is a research support structure that contributes to throughput including that of postgraduate students. It is for the above reason that the study targeted library personnel for the collection of data in this study. Academic libraries segment the user-population to provide targeted services resulting in services earmarked for undergraduate and postgraduate students. The library personnel targeted for this study were those responsible for providing services targeting postgraduates. Services earmarked for postgraduates are within the research commons. The sampling approach adopted for this target population was purposive sampling. The two librarians situated in Durban campuses (ML Sultan and Steve Biko research commons) were interviewed and both responded achieving the response rate of 2 (100%) one librarian located in City campus could not be reached.

4.4 Presentation of the structure adopted in the formulation of research instruments

This section presents the structure adopted in formulating the research instruments. The same structure was adopted for all four instruments consisting of the following subsections: demographic data; awareness and adherence to completion timelines; research capacity available for the completion of postgraduate students; factors hindering the completion of postgraduate studies and general comments.

Provided below are introductions to each of the abovementioned subsections of the questionnaires. This was done for the purpose of avoiding having to repeat the introduction in presenting data for the four targeted population groups. However, four sets of questionnaires were presented separately, withstanding the differences of the questionnaires to some degree.

4.4.1 Demographic data

Demographic data is usually collected for the purpose of setting up the stage as well as to help the researchers to interpret the sample of people or organizations in their studies (Salkind 2010).

The following demographic variables were collected from postgraduate students: Gender; page; nationality; race; department; faculty; qualification enrolled for; registration; current registration status and employment status.

For academic supervisors, the demographic variables required included: Age; gender; race; marital status; department; faculty; highest qualification; level of supervision; completed postgraduate projects and current postgraduate projects.

The demographic variable sourced from the research coordinators were: Title; position; department and faculty.

Lastly, for library personnel the demographic variables required consisted of the following: Title; position; campus and faculty.

4.4.2 Awareness and adherence to completion timelines

Literature reveals that awareness of and adherence to completion timelines are crucial factors of postgraduate throughput (Massyn 2018; Amehoe 2013). In this regard, the study sought to determine the awareness of and adherence to completion timelines by the study's respective populations.

4.4.3 Research capacity available for the completion of postgraduate studies

The availability of research capacity is deemed to influence the successful completion of postgraduate studies (Greenwood *et al.* 2018; Owusu *et al.* 2017). The purpose of this section, therefore, was to understand the degree of support (research capacity) available for postgraduates' studies. With reference to this study, capacity referred to the availability of facilities, trained human personnel and programs for research.

4.4.4 Factors hindering the completion of postgraduate studies

Reviewing literature revealed that there are several factors influencing the throughput of postgraduate studies either negatively or positively. This section thus sought to identify the factors hindering the completion of postgraduate studies at DUT.

4.4.5 Section E: General comments

This section intended to solicit any other relevant information including recommendations and contributions in relation to postgraduate throughput.

4.5 Presentation of data collected from postgraduate students

Postgraduate students' data is presented below.

4.5.1 Demographic data

The distribution of the following demographic variables is presented below in tabular form: Gender and age; Nationality and ethnicity; Faculty; Qualification pursued; Year of registration and registration status; and Employment status.

Table 4. 1 Gender and age distribution

1. Gender distribution N =107	**Frequency**	**Percentage (%)**
Male	50	47%
Female	57	53 %
2. Age distribution N =107		
Under 20	-	-
20-30	47	44%
31-40	43	40%
41-50	15	14%
51-60	2	2%
61 and above	-	-

With respect to **gender**, there was almost an equal split at 57 (53%) females and 50 (47%) males.

In terms of the distribution by **age**, most of the respondents were between the age bracket of 20-30 at 47 (44%), closely followed by 31-40 at 43 (40%). There is a sizeable gap from the above two age brackets to the next age bracket, 41-50 at 15 (14%). The 51-60 age bracket recorded a negligible response of 2 (2%) while the age group of under 20 as well as 61 and above both recorded zero responses.

Table 4. 2 Nationality and ethnicity distribution

3. Nationality distribution N = 107	**Frequency**	**Percentage (%)**
South African Citizen	76	71%
Non-South African Citizen	31	29%
4. Ethnicity distribution N = 101		
Black/African	76	75%
Coloured	2	2%
Indian	23	23%
White	-	-

Regarding **nationality** as shown in Table 4.2 on the previous page, distribution stood at 76 (71%) South African citizens and 31 (29%) non-South-African citizens.

With respect to **ethnicity,** African postgraduates dominated by 76 (75%). Postgraduates of Indian ethnicity followed at 23 (23%) and Coloured postgraduates only at 2 (2%). There were no students of White ethnicity represented.

The above results of nationality and ethnicity reflect the demographic profile of the country, the city of Durban as well as DUT as an institution with attendant implications to the completion of postgraduate studies.

Table 4. 3 Faculty distribution

6.Faculty distribution N = 104	**Frequency**	**Percentage (%)**
Accounting and Informatics	17	16%
Applied Sciences	6	6%
Arts and Design	9	9%
Built Environment and Engineering	12	12%
Health Sciences	16	15%
Management Sciences	44	42%

As indicated in Table 4.3 above, the largest proportion of respondents were from the Faculty of Management Sciences at 44 (42%). This was followed by an almost similar number of respondents from the faculties of Accounting and Informatics at 17 (16%) and Health Sciences at16 (15%) respectively. The Built Environment and Engineering was represented at 12 (12%), Arts and Design at 9 (9%) and at the tail end the Applied Sciences Faculty at 6 (6%).

Table 4. 4 Qualification pursued

7. Qualification pursued N = 106	Frequency	Percentage (%)
Masters	49	46%
Doctorate	57	54%

For the **qualification pursued**, the majority at 57 (54%) were Doctoral Degree candidates and 49 (46%) were Master's Degree candidates.

Table 4. 5 Year of registration and registration status distribution

8.Year of registration N = 108	Frequency	Percentage (%)
1st year of registration	8	7%
2nd year of registration	45	42%
3rd year of registration	37	34%
More than 3 times	18	17%
9. Registration status N = 98	**Frequency**	**Percentage (%)**
Full-Time	68	69%
Part-Time	30	31%

In terms of the **year of registration**, most respondents were in their 2nd year at 45 (42%), followed by those in their 3rd year at 37 (34%). Those who were in their 1st year of registration stood at 8 (7%) and a significant number at 18 (17%) were those who have registered more than three times.

As for their **registration status**, most postgraduates were full-time at 68 (69%) and part-timers were at 30 (31%). The dominance of full-time postgraduates could be explained by that; full-time postgraduate studies are tuition free at the Durban University of Technology (DUT, Fees & Finance Rules 2020:20).

Table 4. 6 Employment status distribution

10. Employment status distribution, N = 107	Frequency	Percentage (%)
Unemployed	34	32%
Employed (Full-time)	58	54%
Employed (Part-Time)	15	14%

The **employment** aspect in Table 4.6 above revealed that more than half 58 (54%) of postgraduates who responded indicated that they were employed full-time while 34 (32%) indicated that they were unemployed and 15 (14%) said that

they were employed part-time. It is a requirement that one cannot work full-time and register to study full-time at DUT (Moyo, and Pratt 2019). The results in Tables 4.5 and 4.6 indicate some laxity with regards to adherence to this requirement with possible implications to throughput.

4.5.2 Section B: Awareness and adherence to completion timelines

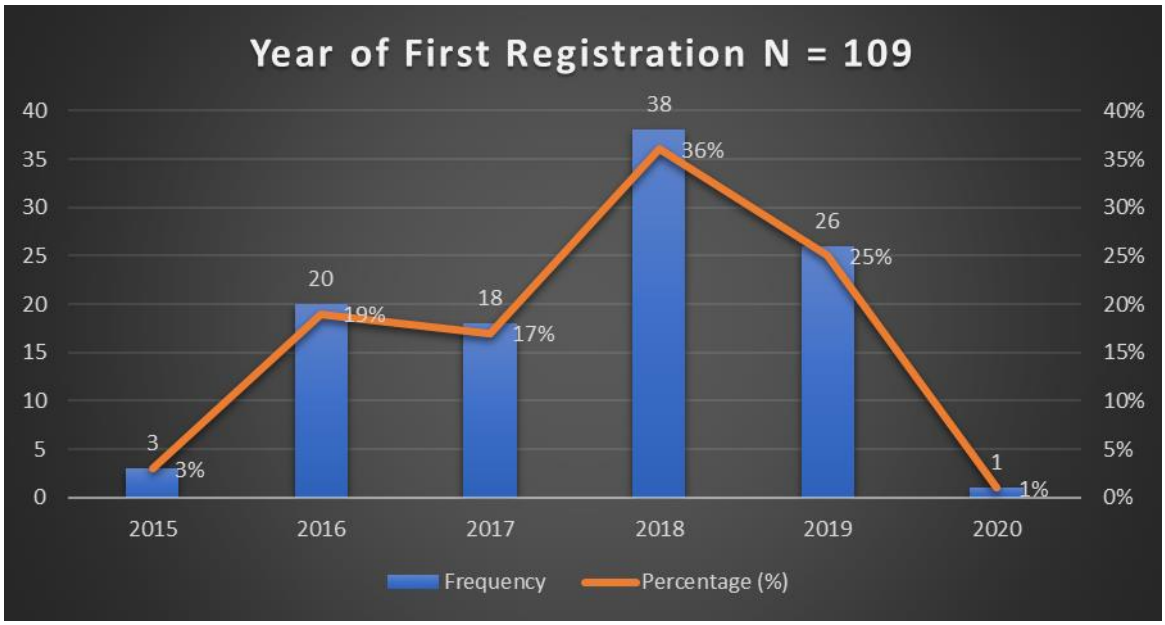

Figure 4.1 Year of first Registration

As shown in Figure 4.1 above, most postgraduates registered their studies for the first time in 2018 at 38 (36%), followed by a cohort of postgraduates whose first registration was in 2019 at 26 (25%). This was followed by those who registered for the first time in 2016 at 20 (19%) and thereafter, in 2017 new postgraduates were at 18 (17%). A small number of postgraduates registered their studies for the first time in 2015 at 3 (3%) and in 2020 at 1(1%).

The results in Figure 4.1 above reflect that, of the postgraduates who responded, a few have exceeded their candidature while the majority, are still within their candidature.

Field work commenced in 2019 extending to the early months of 2020 hence accounting for just one postgraduate who registered for the first time in 2020.

4.5.2.1 Compliance with Rule G24 (2) (a)

N =104

Postgraduate students in this study were asked if they were complying with the institution's (DUT) Rule G24 (2) (a) requiring them to register yearly. The options to choose from were yes, no, and other. A large margin of those who responded indicated that Yes, they were complying with this rule at 98 (94%) while an insignificant proportion of 6 (6%) indicated that No, they were not complying with this rule.

4.5.2.2 Consequences for non-compliance with Rule G24 (2) (a)

N = 6

A follow-up question requested those postgraduates who indicated that they were not complying with **Rule G24 (2) (a)** to provide the consequences they were aware of resulting from this non-compliance. They were all concerned with the possible delays this non-compliance might have on their graduation. Some of the responses were:

- *"My graduation might be delayed".*
- *"Delayed graduation".*
- *"That might affect your graduation".*

4.5.2.3 Awareness of minimum and maximum completion timeframes

N = 105

On the question of awareness to the minimum and maximum completion timeframes to their studies, postgraduates were given yes, no, and other options to affirm to. Those who claimed that Yes, they were aware led by a very wide margin of 94 (90%) compared to those who claimed that No, they were not aware at 11 (10%).

4.5.2.4 Verifying claims to awareness of the minimum and maximum completion timeframes

N = 93

A follow-up question sought to verify if indeed the postgraduates were aware of their completion timeframes by stating what they thought are the correct minimum and maximum completion timeframes for their studies.

According to Moyo, and Pratt (2019) “the minimum time to complete a Master’s Degree is one year of formal registered study and the maximum period allowed is three years and for a Doctoral degree, the minimum duration is two years of formal registered study and the maximum period allowed is four years”.

Findings indicated that of the 93 respondents, majority of the respondents at 65 (70%) did not know the minimum and maximum completion timeframes of their qualifications. Very few showed that they were aware of their completion timelines at 28 (30%). 16 postgraduates did not respond to this question. Hence, the lack of awareness was shown when postgraduates responded as shown in the few examples below as they were not provided with the list of options to choose from.

One Master’s Degree student stated that it takes 3 years minimum and 4 years maximum to complete a full-time Master’s programme; 4 years minimum and 5years maximum to complete a part-time Master’s programme while another one stated that there are no timelines prescribed for postgraduate studies. For doctoral studies, one student stated that, the completion timeframe for a full-time programme is 4 years minimum and 6 years maximum. Another one stated that a part-time Doctoral Degree is 5 years minimum and up to 7 years maximum.

4.5.2.5 Awareness of the consequences in the event of delayed completion of studies

N =104

On the question of awareness of the consequences in the event of the delayed completion of studies, the respondents were expected to choose one option between Yes or No. Those who indicated that Yes, they were aware stood at 72 (69%) and whose who said No, they were not aware amounted to 32 (31%).

Table 4. 7 Consequences resulting from the delayed completion of studies

Consequences resulting from the delayed completion of studies N = 54	Frequency	Percentage (%)
Qualification withheld/ you do not graduate	1	2%
Suspension of studies/system kicks you out	10	19%
Held liable for tuition fees and levies/ pay tuition	39	72%
Lose bursary/re-pay bursary	9	17%
Termination of proposal	1	2%
Might have to change supervisors	3	6%
G17/appeal	5	9%
stress and anxiety	1	2%
Delayed graduation	3	6%

NB: Although the N value stood at 54; the percentage exceeded 100% because the respondents were not limited to provide one option.

A follow-up question requested the postgraduates who indicated that Yes, they were aware of the consequences resulting from the delayed completion to provide those consequences.

In this regard, postgraduates were not provided with the options to choose from, hence they were expected to voice out the consequences they were either aware of from their own experience or the experience of others. If not, the consequences they were generally aware of.

The responses provided were categorised into themes as indicated in Table 4.7 above. Most postgraduates at 39 (72%) stated that in the event of delayed completion, the institution holds you liable for tuition fees and levies, followed by

the suspension of studies at 10 (19%) and the issue of losing bursary/repaying the bursary stood at 9 (17%).

A minority of postgraduates at 5 (9%) raised the issue of rule G17 **unsatisfactory academic progress** wherein the student is not given a permission to re-register at the institution due to unsatisfactory academic progress or the student has exceeded the maximum period of registered study, followed by the concerns of changing supervisor and delayed graduation both indicated by 3 (6%) postgraduates.

Some of the verbatim responses included:

- *"You do not graduate on time and that leads to you being liable for your tuition fees including levies".*
- *"If you have a scholarship, your failure to complete your studies on time will result in loss of that scholarship and in rare cases it may result in having to repay back the funds you've received during your candidature".*
- *"I know that you start paying some amount of money to the finance or your supervisor can terminate you".*
- *"The system blocks you, therefore you are required to appeal to your Faculty Research Committee (FRC) for an extension period for your studies"*

4.5.2.6 The enforcement of consequences in the event of delayed completion

N = 82

The question sought to determine if there was enforcement of the consequences in the event of delayed completion of postgraduate studies. The respondents were expected to either affirm to Yes or No options. Most of the respondents at 59 (72%) indicated that Yes; these consequences were enforced to their knowledge contrary, those who indicated that No these consequences to their knowledge were not enforced stood at 23 (28%).

4.5.2.7 Determining whether the lack of enforcement of consequences had an influence on the completion of postgraduate studies

N = 88

This question probed if the enforcement of consequences carried an influence towards the completion of postgraduate studies or not. Postgraduates had to either confirm to Yes or No options. There was almost an equal split between those who indicated that Yes, the lack of enforcement has an influence at 47 (53%) and those to whom it had no influence at 41 (47%).

4.5.2.8 Awareness of the support available in the event of delayed completion of studies

N =108

The question was aimed at finding out if students were aware of the support available for those who fail to complete their studies within the stipulated completion timeframes. Postgraduates had to affirm to Yes or No, options. The majority stated that they were not aware at 62 (57%) while a minority said Yes, they were aware at 46 (43%).

Table 4. 8 Indicating the support provided in the event of delayed completion of postgraduate studies

The support provided in the event of delayed completion of postgraduate studies N = 46	**Frequency**	**Percentage %**
Extended Candidature	43	93%
Counselling	17	37%
Change of Supervisors	28	61%
Other	1	2%

NB: from the provided list of options in Table 4.8 above, postgraduates had to choose all options applicable to them therefore, the total percentage in the table exceeded 100%.

In terms of the support provided in the event of delayed completion, the findings revealed that; extended candidature led at 43 (93%), followed by change of supervisor/s at 28 (61%) and counselling at 17 (37%). For the option of other, no support was indicated.

The fact that most of the postgraduates who responded to this question cited extended candidature as the support available to them in the event of delayed completion could be a significant contributory factor towards throughput.

Table 4. 9 Support needed in the event of delayed completion of studies

Support N=62	Frequency	Percentage (%)
Financial support	15	24%
Extended candidature	25	40%
Counselling/mental therapy	28	45%
Change of supervisor/s	22	35%
Workshops/training	16	26%
Change of research area/topic	4	13%
Proper guidance	4	13%
Motivation	3	5%
Research equipment	1	2%
Submission of reports by supervisors and students	1	2%

Students who indicated that they were not aware of the support available to them in the event of delayed studies completion were requested to state the support they thought was necessary. They were not provided with options to choose from. Their responses are categorised as shown in Table 4.9 above.

The most needed support cited by 28 (45%) was counselling, and mental therapy followed by extended candidature at 25 (40%) and change of supervisor/s at 22 (35%). Postgraduates who were concerned about the issue of workshops and training were 16 (26%) and those who raised the issue of financial support stood at 15 (24%). A similar cohort of postgraduates at 4 (13%) indicated that students should be given the opportunity to change their research topics or research areas and a proper guidance should be provided to students, respectively. Lastly, postgraduates who were of the view that students need to be motivated stood at 3 (5) and those who were of the opinion that there should be efficient and effective research equipment and implementation of reports submission by both the students and the supervisors were 1 (2%) respectively. Some of the responses included:

- *“Both students and the supervisor should be forced to submit quarterly reports to the faculty research office”.*
- *“Provision of research funding”*
- *“Personal background check alongside with the provision of counselling when required”*
- *” Assistant with research skills, writing skills and extra hours of supervision”.*
- *“The supervisors also need to be supervised”.*

4.5.3 Research capacity available for the completion of postgraduate studies

The table below presents the components of research capacity available at DUT.

Table 4. 10 Component/s of research capacity available at DUT in terms of facilities, trained human personnel and programs.

Component/s of research capacity available at DUT in terms of facilities, trained human personnel and programs. N = 109		
1. Facilities		
a. Library and research support programs	**Frequency**	**Percentage (%)**
Research commons	109	100%
Writing centre	100	92%
Internet access	109	100%
Computer facilities outside the library	77	71%
Library induction session for postgraduates	68	62%
Training on utilizing library databases	69	63%
Using the internet for research	78	72%
Advanced information retrieval skills	29	27%
Research management tools	51	47%
Turn it in	99	91%
Referencing software e.g. EndNote	102	94%
Academic writing skills	44	40%
b. Research administration servicing departments		
Department offering the qualification	95	87%
Faculty research office (FRO)	102	94%
Institutional research ethics committee (IREC)	99	91%
c. Laboratories		
Computer laboratory	87	80%
Scientific laboratory	51	47%
Design laboratory	41	39%
2.Trained human personnel		
Research administrators support	82	80%
Research support structures personnel e.g. librarian support	99	91%
Linguistic assistant e.g. language editor	67	61%
Data analysis including statisticians	74	68%
Writing services specialists	61	56%

NB: from the provided list of research components in Table 4.10 above, postgraduates were requested to indicate all the research components applicable to them therefore, the total percentage in the table exceeded 100%.

Under **library and research support programmes**, the two leading research components were research commons and internet access both at 109 (100%). This was closely followed by the referencing software at 102 (94%) and the writing centre at 100 (92%). The least available components indicated were academic writing skills at 44 (40%) and advanced information retrieval skills at 29 (27%).

The visibility of **research administration servicing departments,** as the response rates highlight is extremely strong. There was almost an equal split at 102 (94%) for faculty research office, 99 (91%) for IREC and 95 (87%) for the departments offering the qualifications.

The availability of research components in terms of the **laboratories** was led by the computer laboratory at 87 (80%), a sizeable gap to the component following namely; scientific laboratory at 51 (47%) and the component least available was said to be the design laboratory at 31 (49%).

With regards to trained human personnel, responses revealed that availability was relatively high with all five options recording above 50.

The most indicated component at 99 (91%) was the research support structures personnel, followed by the research administrators support at 82 (80%) and data analysis including statisticians at 74 (68%).

Table 4. 11 The role of research capacity in terms of facilities, trained personnel, and programs towards the successful completion of studies

Role of research capacity components N = 52	**Frequency**	**Percentage (%)**
Causes convenience	6	12%
Makes institution enabling, conducive and user-friendly	6	12%
Smoothens the research process	6	12%
Fast-tracks the completion of studies	19	37%
Provides access to research information and equipment	5	10%
Strengthens research skills	1	2%
The availability of research capacity at DUT is inadequate therefore plays no significant role	9	17%

The respondents were requested to state the role of research capacity towards the successful completion of studies. They were not provided with options to choose from. Their responses are categorised as shown in Table 4.11 above.

Most respondents at 19 (37%) emphasized that availability of research capacity fast-tracks the completion of studies, followed by 9 (17%) postgraduates who claimed that the availability of research capacity at DUT is inadequate therefore, plays no significant role to completion of studies

The respondents who stated that the availability of research capacity makes studying at DUT convenient; makes the institution an enabling environment for postgraduates to conduct research; and smoothens the research process all stood at 6 (12%) each. Those who claimed that it provides access to research information and equipment stood at 5 (10%). The least reported role was that research capacity strengthens research skills at 1 (2%).

Table 4. 12 Postgraduates satisfaction with the availability of facilities, trained human personnel and programs.

Availability of research capacity N = 108	**VD**		**D**		**N**		**S**		**VS**	
1. Facilities	**1**		**2**		**3**		**4**		**5**	
a. Library and network computer facilities	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**
Research commons	6	6%	12	11%	17	16%	54	50%	15	14%
Writing centre	6	6%	13	12%	40	37%	40	37%	9	8%
Internet access	1	1%	2	1%	24	22%	50	46%	28	26%
Computer facilities outside the library	5	5%	28	25%	48	44%	16	15%	8	7%
Library induction session for postgraduates	20	19%	19	18%	23	21%	34	31%	10	9%
Training on utilizing library databases	19	18%	21	19%	18	17%	36	33%	7	6%
Using the internet for research	19	18%	15	14%	19	18%	30	28%	19	18%
Advanced information retrieval skills	21	19%	20	19%	30	28%	25	23%	8	7%
Research management tools	23	21%	14	13%	31	29%	26	24%	9	8%
Turn it in	12	11%	6	6%	32	30%	35	32%	19	18%
Referencing software e.g. EndNote	0	0%	7	6%	20	19%	45	42%	30	28%
Academic writing skills	31	29%	11	10%	31	29%	15	13%	7	6%
Other (please specify)										
b. Research administration servicing departments										
Your department	14	13%	17	16%	48	44%	10	9%	12	11%
Faculty research office (FRO)	14	13%	13	12%	48	44%	16	14%	8	7%
Institutional research ethics committee (IREC)	14	13%	8	7%	53	49%	17	16%	9	8%
Other (please specify)										

c. Laboratories										
Computer laboratory	3	3%	3	3%	46	43%	35	32%	10	9%
Scientific laboratory	3	3%	4	4%	53	49%	11	10%	4	4%
Design laboratory	3	3%	4	4%	52	48%	9	8%	3	3%
Other (please specify)										
2.Trained personnel										
Research administrators support	18	17%	14	13%	38	35%	22	20%	6	6%
Research support structures personnel e.g. librarian support	3	3%	2	2%	24	22%	46	43%	31	29%
Linguistic assistant e.g. language editor	6	6%	15	15%	53	49%	11	10%	4	4%
Data analysis including Statisticians	8	7%	13	12%	50	46%	12	11%	3	3%
Writing services specialists	5	5%	13	12%	53	49%	16	15%	1	1%
Other (please specify)										

Postgraduate students' satisfaction with the available research capacity.

In terms of the **library and network computer facilities**, on a scale ranging from very dissatisfied to very satisfied, the scale of very satisfied posted a low response, with the highest scoring percentages of above 25% and below 30% (e.g. internet access at 28;26%, and Referencing software at 30; 28%). The scales of neutral and satisfied scored more responses compared to other rankings. Those who chose the satisfied scale scored the research commons as the highest component at 54 (50%) and other components mostly scoring above 20% and below 50%. The postings of very dissatisfied and dissatisfied were relatively low and in some instances insignificant. The specific components in which postgraduates were very dissatisfied with were academic writing skills scoring 31 (29%) and research management tools scoring 23 (21%).

With respect to **research administration servicing departments,** the scale of neither satisfied nor dissatisfied (neutral) **acquired a high response compared to other rankings, with all three components scoring above 40% (e.g. IREC at 53 (49%) and both FRO and the departments offering the programmes scoring 48 (44%) each.**

For **laboratories**, the scale of neither satisfied nor dissatisfied (neutral) posted a high response compared to other rankings, with all three laboratories scoring percentages of above 40% (e.g. scientific laboratory at 53;49%, design laboratory at 52;48%, and Computer laboratory at 46;43%). Although other rankings scored low responses, the scale of satisfied posted a little bit better at 35 (32%) for the availability of computer laboratories.

Under **trained personnel**, the scale of neither dissatisfied nor satisfied accounted for a high response with the highest scoring percentages of above 20% and below 50% (e.g. Research support structures personnel posting 22; 22% and both Linguistic assistant; and writing services specialists posting 53;49%). Notably, research support structures personnel posted a significant percentage at 46 (43%) under satisfied scale and 31 (29%) under very satisfied scale.

Table 4. 13 The Role of research capacity in terms of facilities, trained personnel, and programs towards the successful completion of studies

Role of research capacity components N = 52	Frequency	Percentage (%)
Causes convenience	6	12%
Makes institution enabling, conducive and user-friendly	6	12%
Smoothens the research process	6	12%
Fast-track the completion of studies	19	37%
Provides access to research information and equipment	5	10%
Strengthens research skills	1	2%
The availability of research capacity at DUT is inadequate therefore plays no significant role	9	17%

The respondents were requested to state the role of research capacity towards the successful completion of studies. They were not provided with options to choose from. Their responses are categorised as shown in Table 4.13 above.

Most respondents at 19 (37%) emphasized that availability of research capacity fast-tracks the completion of studies, followed by 9 (17%) postgraduates who claimed that the availability of research capacity at DUT is inadequate therefore, plays no significant role to completion of studies

The respondents who stated that the availability of research capacity makes studying at DUT convenient; makes the institution an enabling environment for postgraduates to conduct research; and smoothens the research process all stood at 6 (12%) each. Those who claimed that it provides access to research information and equipment stood at 5 (10%). The least reported role was that research capacity strengthens research skills at 1 (2%).

4.5.4 Factors hindering the throughput of postgraduates

Table 4. 14 Factors hindering the completion of postgraduates

Factors N = 108	Frequency	Percentage (%)
a. Demographic factors		
Age	10	9%
Gender	9	8%
Marital status	14	13%
Race	17	16%
b. Personal factors		
Cost of obtaining research materials	40	37%
ICT skills	25	23
lack of time to conduct research	48	44%
Challenges with data collection e.g. inaccessible population	45	41%
Lack of commitment to research	33	31%
Staying far from the university	40	37%
Household responsibilities e.g. home chores	22	20%
Health issues	22	20%
lack of family support	16	15%
Family responsibilities e.g. wife, husband, or guardian responsibilities etc.	25	23%
Lack of motivation/interest	30	27%
Slow feedback e.g. from the supervisor/s, from the FRC etc.	50	46%
Low personal worth	11	10%
Challenges with financial resources e.g. tuition fee, living expenses, etc.	50	46%
Lack of knowledge and mastery of research and its research methods	47	43%
c. Institutional factors		
Supervision e.g. lack of supervisory skills, inadequate consultation times, etc.	48	44%
Library services e.g. inadequate library facilities, availability of internet service	34	31%
Financial factors e.g. application process for funding, limited bursary opportunities etc.	44	41%
Accommodation e.g. postgraduate residences	38	35%
Lack of administration support e.g. registration process, proposal submission process etc.	56	52%

Postgraduates were requested to indicate the factors they deemed influential to their studies completion. The factors were categorised into three groups: demographic, personal, and institutional.

NB: from the provided list of factors in Table 4.14 above, postgraduates were requested to indicate all factors applicable to them therefore, the total percentage in the table exceeded 100%.

With respect to **demographic factors**, race was most indicated at 17 (16%); followed by marital status at 14 (13%); age at 10 (9%) and gender at 9 (8%). These results point to the limited influence of demographic factors to throughput with all recording percentages less than 20.

Under **personal factors**, the most indicated factors were slow feedback e.g. from the supervisor/s, from the FRC etc.; and challenges with financial resources e.g. tuition fee, living expenses, etc. at 50 (46%) respectively. The two factors that followed were almost equal namely: the lack of time to conduct research at 48 (44%) and lack of knowledge and mastery of research and its research methods at 47 (43%). Thereafter, challenges with data collection e.g. inaccessible population at 45 (41%); costs of obtaining research materials; and staying far from the university both at 40 (37%).

For **institutional factors**, most respondents indicated lack of administration support such as the registration and proposal submission process at 56 (52%); followed by supervision related issues like the lack of supervisory skills and inadequate consultation times at 48 (44%). Financial related factors including the application process for funding and limited bursary opportunities was cited by 44 (41%).

4.5.5 Identifying other matters that may have an influence towards the completion of postgraduates

4.5.5.1 Suggestions to improve the completion of postgraduate studies

The suggestions provided were that:

N=81

- **Workshops and training should commence at undergraduate level**
  - There is a need for broad level support for postgraduate students. One key issue was that research related support should be decentralized from the institutional level to the departmental level. The support needed was not solely on research resources and facilities but extended to students' wellbeing issues including accommodation and financial related support.
  -
- **Building supervisors capacity and research culture**
  - There was a belief that the throughput of postgraduate students could be enhanced if the supervisors were to be capacitated through workshops and training. The importance of monitoring supervisors was also highlighted.
- The importance to entrench a strong research culture **Effective research coordination and administration in terms of:**
  - Feedback turnaround time; accommodating special meetings in between the scheduled FRC and IREC meetings to expedite approvals of Pg2a's and other related documents. The need to promote uniformity in terms of research processes within the departments given that presently processes followed differ from one department to another.

- **The process of changing supervisors when necessary should be less of a hassle.**

- **Development of strong supervision relationship**
  - The student and the supervisor should have a relationship that stimulates the supervision.

- **Introduction of coursework-based research**
  - The suggestions were that the institution should introduce a coursework prior to theses or dissertation writing.

4.6 Presentation of data collected from academic supervisors

Data collected from the academic supervisors is presented below.

4.6.1 Demographic data

The distribution of academic supervisors' demographic variables is presented below in tabular form: **Age and Gender; Ethnicity and Marital Status; Faculty and Qualification Distribution; and Level of Supervision Distribution.**

Table 4. 15 Age and gender distribution

1. Age distribution, N = 50	Frequency	Percentage (%)
26-35	6	12%
36-45	21	42%
46-55	17	34%
56-65	6	12%
2. Gender distribution. N = 50	**Frequency**	**Percentage (%)**
Male	21	42%
Female	28	56%
Other	1	2%

Regarding the **age distribution,** most respondents accounted for the age bracket of 36 -45 at 21 (42%) followed by those in the age bracket of 46-55 at 17 (34%). The least cited age brackets were 26-35 and 56-65 both at 6 (12%). With respect to **gender**, there was almost an equal split at 28 (56%) females and 21 (42%) males.

Table 4. 16 Ethnicity and marital status distribution

3. Ethnicity distribution, N = 50	Frequency	Percentage (%)
African	17	34%
Coloured	7	14%
Indian	22	44%
White	3	6%
Other	1	2%
4. Marital Status distribution. N = 50	**Frequency**	**Percentage (%)**
Single	13	26%
Married	36	72%
Living together	1	2%
Separated	-	-

In terms of **ethnicity**, Indian academic supervisors were dominant by 22 (44%) followed by African academic supervisors at 17 (34%). Coloured academic supervisors were 7 (14%) and white academic supervisors were 3 (6%). For **marital status**, most of the respondents were married at 36 (72%) and those who were single stood at 13 (26%). The least cited category of marital status was living together at 1 (2%).

Table 4. 17 Faculty and qualification distribution

5. Faculty distribution, N = 50	**Frequency**	**Percentage (%)**
Applied Sciences (AS)	4	8%
Engineering and Built Environment	8	16%
Health Sciences (HS)	6	12%
Management Sciences (MS)	13	26%
Accounting and Informatics (A&I)	13	26%
Arts and Designs (A&D)	6	12%
6. Qualification distribution. N = 49	**Frequency**	**Percentage (%)**
Diploma	-	-
Degree/B-Tech	-	-
Masters	20	41%
PhD	29	59%

Table 4.17 above presents results on the distribution by faculty and qualification. The majority of respondents were from the faculties of Management Sciences; and Accounting and Informatics both at 13 (26%). This was followed by the Faculties of Engineering and Built Environment at 8 (16%); Health Sciences; and Arts and Designs at 6 (12%) respectively ending with Applied Sciences with 4 (8%) respondents.

With respect to the **qualification distribution**, most academic supervisors were PhD Degree holders at 29 (59%) and 20 (41%) academic supervisors were Master's Degree holders.

Table 4. 18 Level of supervision distribution

7. Level of current supervision distribution N = 50	**Frequency**	**Percentage (%)**
Masters	22	44%
Doctorate	0	0%
Both	28	56%

The results in Table 4.18 above revealed that most academic supervisors at 28 (56%) were currently supervising at both Master's and PhD level. Supervision at Master's Degree level only stood at 22 (44%).

4.6.1.1 Supervision experience determined through the number of completed candidates

In this study, the supervisors were requested to indicate the number of students they have supervised at the Master's and Doctorate level to completion as a means of determining supervision experience.

Table 4. 19 Supervisors' distribution against number of completed Master's students

Number of Master's students supervised to completion N=48	Supervisor Distribution	
	Frequency	Percentage (%)
0	8	17%
1	2	4%
2	7	15%
3	4	8%
4	10	21%
5	1	2%
6	6	13%
7	7	15%
8	2	4%
14	1	2%

Table 4.19 above presents supervision distribution as measured against the number of students supervised to completion. In terms of the number of students supervised to completion, one supervisor's experience stood out with 14 graduations followed by two (4%) supervisors who graduated 8 students. There were 7 (15%) supervisors who graduated seven students and 6 (13%) who graduated six students. Those who supervised four students posted the largest frequency at 10 (21%). Notably, supervisors who had not completed any projects thus far were 8 (17%) accounting for the second largest frequency.

Table 4. 20 Supervisors' distribution against number of completed Doctorate students

Doctorate students supervised to completion N=47	Supervisor distribution	
	Frequency	Percentage (%)
0	28	60%
1	2	4%
2	6	13%
3	4	9%
4	3	6%
5	2	4%
6	1	2%
8	1	2%

The results in Table 4.20 above portray the distribution of supervisors at Doctorate level against the number of students supervised to completion. With regards to the statistics of students supervised to completion, the supervisor whose experience was prominent had eight graduates followed by 1 (2%) supervisor with six graduations and 2 (4%) supervisors who graduated five students each. A significant proportion of 28 (60%) posting the largest frequency, were those who had not supervise any students to completion thus far.

Table 4. 21 Supervisors' distribution against number of completed Master's students

Number of Master's students currently supervising N=48	Supervisor distribution	
	Frequency	Percentage (%)
0	8	17%
1	2	4%
2	7	15%
3	4	8%
4	10	21%
5	1	2%
6	6	13%
7	7	15%
8	2	4%
14	1	2%

Table 4.21 above indicates supervision distribution as measured against the number of students they are currently supervising at Master's level. The largest frequency at 11 (23%) were supervising four students each followed by 9 (19%) supervisors who were supervising three students per supervisor. Regarding the number of students who were currently being supervised, one supervisor's

workload was leading by twelve students followed by 2 (4%) supervisors who were currently supervising 10 students each.

Table 4. 22 Supervisors distribution against number of current students at Doctorate level

Doctorate students currently supervising N=49	Supervisor's distribution	
	Frequency	Percentage (%)
0	26	53%
1	2	4%
2	8	16%
3	7	14%
4	2	4%
5	2	4%
6	2	4%

The findings in Table 4.22 above illustrate the supervision distribution as measured against the number of students they are currently supervising at Doctorate level. The largest proportion of supervisors at 26 (53%) indicated that they were not supervising any Doctoral students currently. This was followed by 8 (16%) supervisors who had two projects each and 7 (14%) supervisors with three supervisees per supervisor. Notably, the supervisors who had a high workload were 2 (4%) with 6 students followed by other 2 (4%) supervisors each supervising five students.

4.6.2 Section B: Awareness and adherence to completion timelines

4.6.2.1 Compliance with Rule G24 (2) (a)

N = 50

Academics supervisors in this study were asked if they have made the students, they were supervising aware of the DUT Rule G24 (2) (a) stipulating that they must register yearly. The academics supervisors had to affirm to Yes or No options. All academic supervisors at 50 (100%) claimed that they made their students aware of DUT Rule G24 (2) (a)

Table 4. 23 Determining the influence of the awareness of rule G24 (2) (a) by the postgraduates on throughput

Influence of the awareness of rule G24 (2) (a) on throughput N = 30	Frequency	Percentage (%)
Motivates postgraduates to work hard and complete their studies on time	18	60%
Improves postgraduates' work ethic	6	20%
Alerts postgraduates to register yearly	2	7%
It has no significant influence	6	20%

Although the N value for this question stood at 30; the percentage exceeded 100% because the respondents were not given options to choose from and they were not limited to provide one option. Their responses are categorised as shown in Table 4.24 above.

The results indicated that awareness of **G24 (2) (a)** influenced throughput in the following ways. The majority stated that it motivates postgraduates to work hard and complete their studies on time 18 (60%). There is a sizeable gap from the most cited response to the next responses; those who said that it improves postgraduates' work ethic and those who stated that it has no significant influence both standing at 6 (20%). Those who claimed that it warns postgraduates to register yearly were 2 (7%).

Some of the verbatim responses included:

- *"This ensures that students complete their studies within the maximum time allocated and can therefore graduate on time"*
- *"Awareness of the rule does improve students' work ethic"*
- *"It has no significant influence"*
- *"Alerts them to register early that is all"*

4.6.2.2 Postgraduate students' compliance with DUT Rule G24 (2) (a) requiring them to register yearly.

N = 46

In terms of postgraduates' compliance with DUT Rule G24 (2) (a) requirement to register yearly. Academic supervisors were asked to indicate if the students they were supervising were complying or not. They had to affirm to Yes or No options.

Most academic supervisors at 42 (84%) claimed that their supervisees were complying with the rule. Those who said their students were not complying with the rule stood at 4 (8%).

4.6.2.3 Awareness of the rule stipulating the postgraduates' minimum and maximum completion timeframes.

N = 46

On the question of awareness to postgraduates' minimum and maximum completion timeframes, academic supervisors were given Yes or No options to affirm to. Those who claimed that their students were aware led by a very wide margin of 44 (96%) compared to an insignificant proportion of those who claimed that their students were not aware at 2 (4%).

Table 4. 24 Consequences to the supervisor in the event of the student/s delayed completion of studies

Consequences to academic supervisors N = 31	Frequency	Percentage (%)
Increased supervisor's workload	17	55%
The supervisor/s is labelled as an incompetent supervisor	4	13%
Bad reputation	6	19%
Prospective students lose confidence in supervisor	4	13%
The supervisor is held accountable and becomes liable to motivate for a student to continue with his/her studies	4	13%
It becomes difficult for a supervisor to submit a progress report for a student	1	3%
The supervisor is regarded as incompliant to the institution's rules	1	3%
Negative impact on the supervisor's personal growth	1	3%
Not aware of the consequences	4	13%

NB: Although the N value stood at 31 for this question; the percentage exceeded 100% because the respondents were not limited to provide one consequence.

On the question of awareness of the consequences in the event of the delayed completion of studies by postgraduates, the academic supervisors were requested to state the consequences applicable to them as supervisors and to postgraduates.

Presented in Table 4.24 above, are the consequences applicable to academic supervisors. The most cited consequence by 17 (55%) was the increased

supervision workload followed by 6 (19%) concerned about their reputation. Several consequences were cited at 4 (13%) each. They included:

- The supervisor/s being labelled as incompetent supervisor/s,
- prospective students losing confidence in the supervisor/s,
- The supervisor/s being held accountable and being liable to motivate for a student to continue with his/her studies as well as,
- Those who were not aware of any consequences.

Insignificant postings of 1 (3%) each were for:

- Difficulties for the supervisor to submit a progress report for a student,
- Being regarded as incompliant to the institution's rules, and,
- The negative impact this may have on the supervisor/s personal growth

Some of the exact responses were:

- *"Future students lose confidence in the supervisor".*
- *"This is harmful to your image as the supervisor and more especially as a prospective supervisor. It creates doubts for your prospective supervisees"*
- *"Increased workload. Bad image. Perceived incompetent"*
- *"Workload: students are piling up. Bad image: The supervisor may be labelled as incompetent"*
- *"None that I am aware of, but for me it would reflect on my supervision career"*

Table 4. 25 Consequences to students in the event of delayed completion of their studies

Consequences to student who has delayed completion N = 34	Frequency	Percentage (%)
Suspension of studies resulting to possible exclusion from the institution	12	35%
Financial implications such as having to pay the tuition fees and losing bursaries	23	68%
Students become pressured, stressed, and frustrated	10	29%
Delayed graduation	7	21%
Motivation for the extension of studies	2	6%
Students loose interest and therefore they drop out of their studies	2	6%

NB: The N value for this question stood at 34, however, respondents were not limited to provide one consequence, and this has led to a total percentage exceeding 100%.

Concerning the consequences likely to be faced by postgraduates who have delayed completion, the results in table 4.26 above revealed that the majority at 23 (68%) were of the view it had financial implications for postgraduates, followed by the possibility of exclusion from the institution at 12 (35%). Issues related to pressure, stress, and frustration was cited at 10(29%) and delayed graduation at 7 (21%).

At the tail end was having to motivate for the extension of studies and the loss of interest leading to dropping out of their studies both at 2 (6%).

Their responses are exemplified in a few quotes below:

- "*Possibility of exclusion from the institution and therefore fail to complete the qualification"*
- *"Students run out of funding and support, also their topic can become outdated"*
- *"They can request an extension with reason provided"*
- *"Frustration, they end up not wanting to further their studies ever again"*
- *"Pay tuition fee. Lose bursaries. Become stressed"*

4.6.2.4 The enforcement of consequences in the event of delayed completion by postgraduate

N = 34

The question sought to determine if there was an enforcement of the consequences in the event of delayed completion of studies. The respondents were expected to either affirm to Yes or No options. Most academic supervisors

at 26 (76%) indicated that the consequences were enforced and those who claimed that the consequences were not enforced stood at 8 (24%).

4.6.2.5 Determining whether the lack of enforcement of consequences had an influence on the completion of postgraduate studies

N = 36

This question probed if the lack of enforcement of consequences had an influence towards the completion of postgraduate studies or not. The academic supervisors had to either affirm to Yes or No options. Most academic supervisors at 25 (69%) affirmed to Yes and those who affirmed to No stood at 11 (31%).

4.6.3 Research capacity available for the completion of postgraduate students

From the list of research capacity provided the supervisors were requested to indicate all applicable components in terms of facilities (including library and research support programs), this result to the total percentage in Table 4.26 below exceeding 100%.

Table 4. 26 Availability of library and research support programs

Facilities a. Library and research support programs, N = 49	Frequency	Percentage (%)
Research commons	44	90%
Writing centre	46	94%
Internet access	49	100%
Library induction session for postgraduates	41	84%
Training on utilizing library databases	41	84%
Using the internet for research	41	84%
Advanced information retrieval skills	36	73%
Research management tools	32	65%
Turn it in	47	96%
Referencing software e.g. EndNote	47	96%
Academic writing skills	30	61%

Table 4.26 revealed that the most identified **library and research support programmes**, was internet access at 49 (100%) closely followed by the

referencing software and Turn it in both at 47 (96%). The least available was research management tools at 32 (56%) and academic writing skills at 30 (61%)

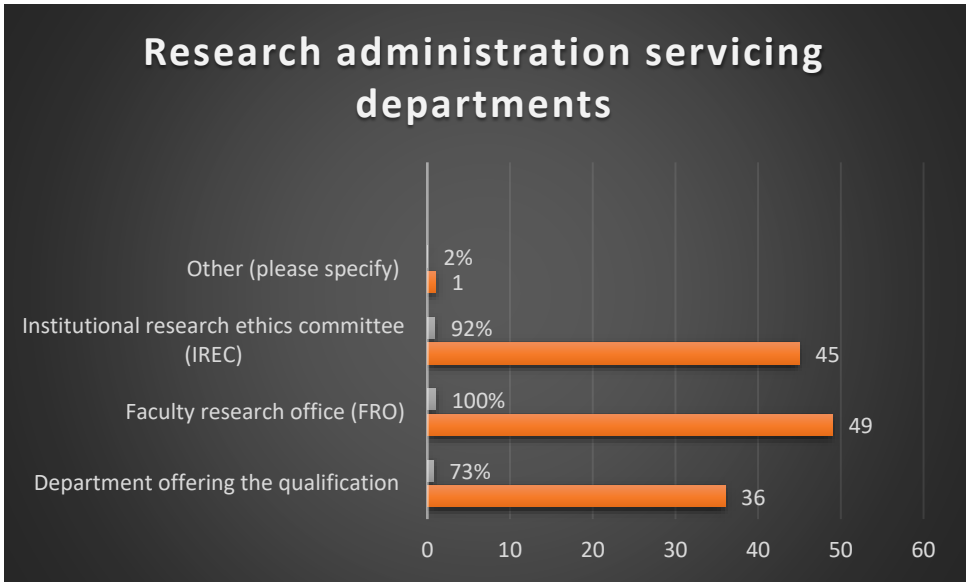

Figure 4.2 Availability of research administration servicing departments

The respondents were provided with a list of research administration servicing departments from which to choose. They had to choose all the option/s applicable to them, hence the total percentage for the results in Figure 4.2.

In terms of the available **research administration servicing departments out of the 50 respondents, the** FRO was indicated by 49 (100%) respondents followed by the IREC accounting for 45 (92%) respondents. The availability of the department offering the qualification was indicated by 36 (73%) supervisors.

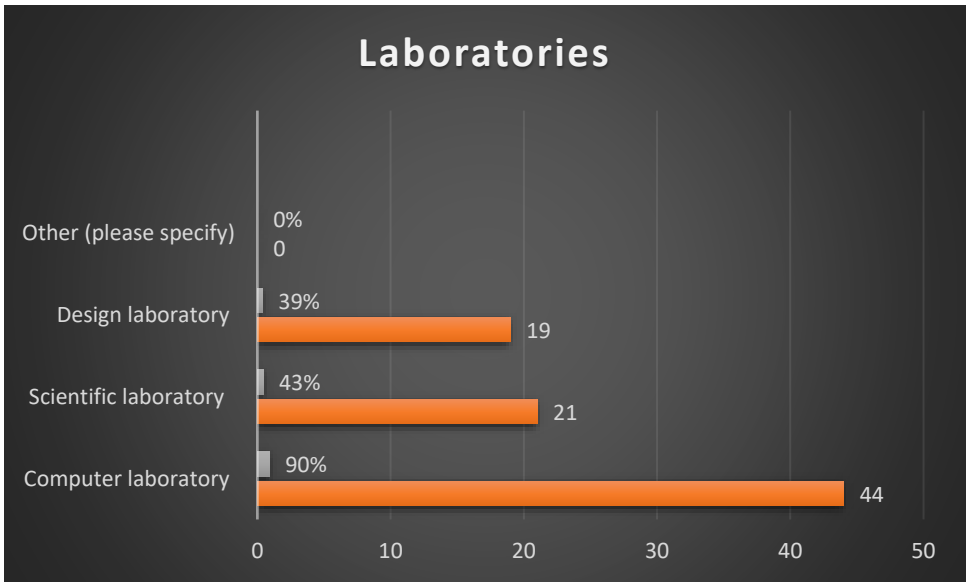

Figure 4.3 Availability of network computer laboratory and other scientific laboratories

The respondents were required to indicate the availability of all laboratories applicable to them this leads to the total percentage of the results in Figure 4.3 exceeding 100%.

The availability of research components in terms of the **laboratories** was led by the computer laboratory at 44 (90%), notably, there was a sizeable gap to the next indicated components namely; scientific laboratory at 21 (43%) and design laboratory at 19 (39%).

Table 4. 27 Availability of trained personnel

2.Trained personnel	**Frequency**	**Percentage (%)**
Research administrators support	34	69%
Research support structures personnel e.g. librarian support	46	94%
Linguistic assistant e.g. language editor	31	63%
Data analysis including statisticians	32	65%
Writing services specialists	31	63%
Other (please specify)	0	0%

The supervisors were requested to indicate all applicable trained personnel from the list provided in Table 4.27 this result to the total percentage for trained personnel exceeding 100%. With regards to trained human personnel, responses revealed that availability was relatively high with all five options recording above

50%, led by the research support structures personnel e.g. librarian support accounting for 46 (94%).

Table 4. 28 Role of research capacity component

Role of research capacity components N = 23	Frequency	Percentage (%)
Contributes to the successful completion of postgraduate studies.	12	52%
Assist in the student familiarization of important postgraduates' structures and programs	4	17%
Provides necessary support to postgraduates	6	26%

The respondents were requested to state the role of research capacity towards the successful completion of studies. They were not provided with options to choose from. Their responses are categorised as shown in Table 4.28 above.

Most respondents at 12 (52%) said the availability of research capacity contributes to the successful completion of postgraduate studies followed by 6 (26%) supervisors who claimed that it provides necessary support to postgraduate students. The least cited role was that it helps students to be familiar with the postgraduate structures and programs at their disposal at 4 (17%).

The exact responses included:

- *"The availability of these components plays an important role towards the successful completion of studies by postgraduate students."*
- *"The above assist in the student familiarization of important postgrad structures that can help them to effectively do research."*
- *"Facilities provide students with the necessary support that they require and trained personnel aid students in aspects such a writing-up."*

Table 4. 29 Academic supervisors' level of satisfaction with research capacity available at DUT

Availability of research capacity N = 49	VD	D		N			S		VS	
1. Facilities	**1**	**2**		**3**			**4**		**5**	
a. Library and network computer facilities	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**
Research commons	1	2%	4	8%	12	24%	19	39%	11	22%
Writing centre	1	2%	4	8%	20	41%	15	31%	6	12%
Internet access	1	2%	3	6%	12	24%	17	35%	12	24%
Computer facilities outside the library	3	6%	8	16%	29	59%	5	10%	0	0%
Library induction session for postgraduates	4	8%	6	12%	23	47%	7	14%	6	12%
Training on utilizing library databases	4	8%	6	12%	19	39%	8	16%	7	14%
Using the internet for research	4	8%	7	14%	17	35%	9	18%	8	16%
Advanced information retrieval skills	7	14%	5	10%	18	37%	7	14%	5	10%
Research management tools	5	10%	5	10%	24	49%	4	8%	2	4%
Turn it in	2	4%	3	6%	6	12%	28	57%	8	16%
Referencing software e.g. EndNote	1	2%	0	0%	7	14%	21	43%	16	33%
Academic writing skills	16	33%	7	14%	14	29%	3	6%	0	0%
Other (please specify)										
b. Research administration servicing departments										
Department offering the postgraduate qualifications	1	2%	3	6%	23	47%	15	31%	1	2%
Faculty research office (FRO)	5	10%	2	4%	22	45%	18	37%	-	-
Institutional research ethics committee (IREC)	5	10%	4	8%	19	39%	18	37%	-	-
Other (please specify)										
c. Laboratories										
Computer laboratory	4	8%	1	2%	25	51%	10	20%	2	4%
Scientific laboratory	1	2%	3	6%	20	41%	4	8%	-	-
Design laboratory	1	2%	2	4%	21	43%	4	8%	-	-

Other (please specify)										
2.Trained personnel										
Institutional Research administrators support	6	12%	9	18%	13	27%	14	29%	4	8%
Research support structures personnel e.g. librarian support	1	2%	0	0%	13	27%	18	37%	10	20%
Linguistic assistant e.g. language editor	6	12%	6	12%	17	35%	8	16%	2	4%
Data analysis including Statisticians	5	10%	7	14%	14	29%	12	24%	2	4%
Writing services specialists	5	10%	6	12%	16	33%	8	16%	3	6%
Other (please specify)										

NB: VD = Very Dissatisfied; D = Dissatisfied; N = Neutral; S = Satisfied; and VS = Very satisfied

Under **library and network computer facilities**, on a scale ranging from very dissatisfied to very satisfied, the scale of neither satisfied nor dissatisfied (neutral) scored a high response, with postings ranging from 6 (12%) to 29 (59%) (E.g. Turn it in at 6; 12%, and computer facilities outside the library 29; 59%). The scale of satisfied scored a reasonable response, with Turn it in recording the highest at 28 (57%) and academic writing skills recording the lowest at 3 (6%). The postings of very satisfied, dissatisfied and very dissatisfied were relatively low and to some extent insignificant, however, the specific component which stood out under very satisfied was the referencing software scoring 16 (33%) and under very dissatisfied was academic writing skills recording 16 (33%) as well.

With regard to **research administration servicing departments**, the scale of neither satisfied nor dissatisfied (neutral) obtained a relatively high response compared to other rankings, with all three components scoring between 39% and 47% (e.g. department offering the postgraduate qualifications at 23, 47%, Faculty research office (FRO) at 22,45%, and IREC at 19,39%).

In terms of laboratories, the scale of neither satisfied nor dissatisfied (neutral) recorded a high response compared to other rankings, with all three laboratories scoring percentages of above 40% (e.g. computer laboratory at 25;51%, design laboratory at 21;43%, scientific laboratory at 20;41%).

With respect to trained personnel the scale of neither dissatisfied nor satisfied (neutral) scored a high response with the highest scoring percentages between 27% and 35% (e.g. Linguistic assistant e.g. language editor at 17; 35%, writing services specialists at 16; 33%, Data analysis statisticians at 14; 29%, and both Institutional research administrators support and research support structures personnel at 13; 27%). It is worth noting, however, that the availability of research support structures personnel posted a significant percentage at 18 (37%) under the scale of satisfied.

4.6.4 Factors hindering the throughput of postgraduates

Table 4. 30 Factors hindering the completion of postgraduate studies

Factors hindering the completion of postgraduate studies N = 49		
Demographic factors	**Frequency**	**Percentage (%)**
Age	21	42%
Gender	4	8%
Marital status	17	35%
Race	4	8%
Other (please specify)		
Supervision related factors		
Interest in supervising postgraduate students	16	33%
Motivation to supervise	19	38%
Workload and Time/involvement in other academic key performance areas (KPAs) e.g. teaching, community engagement and administration	44	90%
Health issues	16	33%
Family and responsibilities e.g. home chores, having dependents, wife, husband or guardian responsibilities etc.	27	55%
Knowledge and mastery of research and its research methods	16	33%
Understanding of research requirements	18	38%
Research skills	18	38%
Other (please specify)		
Students related factors		
Compliance and adherence	37	76%
Attitude	38	76%
Commitment to research	39	80%
Motivation/interest	38	76%
Knowledge and mastery of research and its research methods	30	61%
Readiness to conduct research	40	82%
Understanding of the research requirements	33	67%
Time	30	61%
Communication skills	24	49%
Writing skills	37	76%
Research skills	39	80%
Information and Communication Technology (ICT) skills	23	47%
Institutional related factors		
Supervisors workshop	25	51%
Sound training in research methodologies and methods	42	86%
Availability of technical support	36	73%
Other (Please specify)	0	0%

From the list of factors provided in Table 4.30 above, supervisors were requested to indicate **all factors** they considered influential to the completion of postgraduate studies, hence the total percentage in the table exceeded 100%.

In terms of demographic factors, age was most indicated at 21 (47%); followed by marital status at 17 (35%). The least cited demographics were gender and race both at 4 (8%).

With respect to supervision related factors, the most cited factor was the supervisors' workload at 44 (90%) followed by family and related responsibilities at 27 (55%) and the least cited factors were lack of interest in supervising and health issues each at 16 (33%).

Under students related factors, the majority of the respondents at 40 (82%) claimed that postgraduates lack readiness to conduct research; closely followed by those who were of the opinion that postgraduates lack research skills and commitment to research both at 39 (80%). The least cited were the lack of ICT skills at 23 (47%).

Regarding the institutional factors, lack of sound training in research methodologies and methods was mostly cited by 42 (86%) supervisors followed by lack of availability of technical support at 36 (73%). Lack of supervisors' workshop stood at 25 (51%).

4.7 Presentation of data collected from research coordinators

This section was meant to present data collected from the faculties' research coordinators. Countless efforts were made to reach out to this population. An email requesting for interviews was circulated to all the faculties' research coordinators. The research coordinators did not respond to that email leading to an attempt to locate them from their office spaces. The researcher tried several times to get hold of this target population without any luck until the entire country was officially on the lockdown period due to the corona virus pandemic. Follow up e-mails were sent to this population during the lockdown period without success even when their line managers were copied. Only one respondent reacted upon that email and availed himself for an interview which was interrupted due to technical hitches thus had about 60% of the questions unanswered. It is because of the abovementioned reasons that there is no data reported from this population.

4.8 Presentation of data collected from library personnel

4.8.1 Library personnel response rate

As was mentioned in chapter 3, the population targeted consisted of three librarians (based in the research commons) in DUT's Durban libraries. The two librarians responded resulting in achieving 100% response rate as one librarian could not be reached

4.8.2 Library contribution in ensuring the optimal use of library services by postgraduates to enhance the completion of studies

The question sought to gain insight on what was done by the library for the optimal use of library services by postgraduates to enhance the completion of studies.
The identified contribution by the library included:

- Personalised assistance and training
- Regular research seminars and workshops
- Research space for postgraduates to work

The verbatim responses from interviewees are listed below:

- "*I offer one-on-one assistance, run regular workshops on relevant aspects of research e.g. searching for information, referencing, software, and formatting a thesis, provide research software and research spaces for postgraduate students."*
- *"I teach students to access the relevant information, build competency in finding information and critically analyse what they found. Build capacity."*

4.8.3 Research capacity available at DUT in terms of library and network computer facilities to enhance the completion of postgraduate studies

The library personnel were asked to indicate the available research capacity to enhance postgraduates' throughput in terms of library and network computer facilities:
Interviewees were able to identity research commons; writing centre; internet access and computer facilities in the library.

4.8.4 Research capacity available at DUT in terms of research programs to enhance the completion of postgraduate studies

The library personnel were asked to indicate the available research capacity to enhance postgraduates' throughput in terms of research programs.
Interviewees were able to identify the library induction sessions for postgraduates; training on utilizing library databases; using the internet for research; advanced information

retrieval skills; research management tools; turn it in; referencing software e.g. Endnote; and academic writing skills.

4.8.5 Identifying other matters that may have an influence towards the completion of postgraduates

Interviewees were asked to indicate any other influential matters towards the completion of postgraduates.

One interviewee responded, stating the following:

- *"More grounding on research methodology is required".*
- *"More training sessions on writing skills and data analysis, this should be done frequently not occasionally to accommodate all postgraduate students because they are sometimes unable to match their availability with the proposed dates".*

4.9 Summary

This chapter presented, interpreted, and analysed data collected from the postgraduate students, academic supervisors, and library personnel (librarians) at a selected South African University of Technology. The findings emerging from the analysed data revealed that, the factors hindering the throughput of postgraduates are manifold, however, in this study these factors were categorised into 3 main groupings namely, student/personal, supervisors, and institutional related factors. Moreover, the availability of research capacity; adherence to postgraduates' guidelines and awareness of postgraduate completion timelines were identified as significant factors to postgraduates' throughput. The following chapter discusses the findings of the study.

CHAPTER FIVE

DISCUSSION OF FINDINGS

5.1 Introduction

In the previous chapter, the research findings were presented, interpreted, and analysed. This chapter discussed the findings of the study by relating them to the research objectives alongside with the literature to create a correlation between the study and the previous studies or research. The aim of this study was to examine the factors influencing the throughput of postgraduate students at a selected South African University of Technology. The research objectives in relation to the discussion of findings are:

- To establish awareness of and adherence to completion timelines for postgraduate studies.
- To determine the research capacity available for the completion of postgraduate qualification.
- To identify the factors facilitating or hindering the completion of postgraduates' throughput.

5.2 Discussion of findings by research objectives

The discussion points below are arranged by the objectives of the study.

5.2.1 Research objective 1 set out to establish awareness of and adherence to completion timelines for postgraduate studies

The issues derived from the research objective for discussion below were: compliance with the requirement to register yearly; awareness to completion timelines; verification of claims to awareness of completion timeframes; and awareness of consequences in the event of delayed completion.

The decision to enrol in a postgraduate degree is influenced by a variety of factors (Zhu, and Reeves 2019; Tsilenko, and Tsilenko 2017). Students' awareness and knowledge about the studies' rules and regulations guiding completion is identified as critical (Jepsen and Varhegyi 2011). Postgraduate throughput literature indicates that the inability to complete programmes within set timelines is a complex issue that affects the higher

education landscape (Ajjawi *et al.* 2020; Massyn 2018). It is crucial therefore for postgraduates to be made aware of and assisted to adhere to rules and regulations propelling them to the completion of their studies.

The current findings uniquely contribute to literature in that no other study could be identified that places a stellar focus on awareness and adherence to registration rules and regulations as a critical throughput contributory factor. The findings point to high levels of awareness of rules and regulations but to little or no tangible evidence of adherence or enforcement. For instance, on the matter of compliance with the requirement to register yearly for the duration of studies, postgraduate students were compliant with very large self-affirming responses of 98 (94%) and the affirmation of 50 (100%) by academic supervisors. One of the available mechanisms with which progress can be tracked at DUT is compliance with DUT Rule G24 (2) (a) but in this study such claims were not verified. Equally awareness to completion timelines, was very high for both postgraduates and supervisors with postings of 94 (90%) and 44 (88%) respectively yet upon verification of claims to awareness of completion timeframes by asking postgraduates to state the actual minimum and maximum required times for their qualifications the findings were contradictory as 65 (70%) were unable to correctly state the timeframes. Postgraduates were further asked to indicate their awareness of consequences in the event of delayed completion and 72 (69%) claimed they were aware. When asked if the enforcement of consequences in the event of delayed completion does take place; both postgraduates and academic supervisors said there was at 59 (72%) and 26 (76%) respectively. Such claims were not verified in this study, however, the anecdotal evidence contradicts the above claim.

5.2.2 Research objective 2 aimed at determining the research capacity available for the completion of postgraduate qualifications

For the successful completion of postgraduate studies, the academic institutions need to have optimum core research capacity. Research capacity in this study was delineated into the following: library and research support programs; research administration servicing departments; network computer laboratory and other scientific laboratories; and trained personnel.

In terms of the library and research support programs, the results revealed that the fundamental tools for supporting research were available. This is evidenced by the responses from a list of twelve library and research support programs in which postgraduates, academic supervisors and library personnel had to indicate the availability of each. Of the twelve components listed; postgraduates had only two components posting below 50%; academic supervisors had all components posting above 60% and library personnel with all components posting 100%.

With respect to the level of satisfaction with the library and research support programs, the results indicated that postgraduates and academic supervisors were either neutral or satisfied, however, the dissatisfaction with academic writing was noted. Both postgraduates and academic supervisors indicated that they were very dissatisfied with the availability of academic writing skills at 31 (29%) and 16 (33%) respectively.

The findings concerning the general dissatisfaction with the academic writing skills are consistent with those of Cele and Lekhanya (2014) whose study found that lack of research writing skills is amongst the main factors limiting research activities at DUT. This was also observed in the report on academic writing skills at the graduate level by Bair and Mader (2013) noting that “students become too stressed and anxious when confronted with the prospect of writing the literature-review chapter of the project”.

The findings concerning the availability of research administration servicing departments illustrated a clear visibility of the Faculty Research Office; Institutional Research Ethics Committee and the department offering the qualification all posting above 70% for both postgraduates and academic supervisors. However, regarding the level of satisfaction, the majority were neutral. As it was revealed above, regarding the availability of research

administration servicing, the high visibility was also reflected on trained personnel with all five portfolios recording above 50% by both postgraduates and academic supervisors. The findings of this study contradict the previous research that reported the absence of research administration and support staff in the process of thesis submission (Heide *et al.* 2019; Amehoe 2013; Olakulehin, and Ojo 2008).

As for the availability of laboratories, the results revealed that computer laboratory was more visible with both postgraduates and academic supervisors posting above 70%. The availability of scientific and design laboratories was moderate as both laboratories scored below 50% by both postgraduates and academic supervisors. In terms of the level of satisfaction, the scale of neither satisfied nor dissatisfied (neutral) posted a high response compared to other rankings, with all three laboratories scoring percentages of above 40% and below 50% by postgraduates and academic supervisors, respectively. These results were consistent with a study conducted by Saadon, and Liong (2012) whose results suggested that the facilities in laboratories should be upgraded and that there should be proper management of the laboratories in order to facilitate the quality of teaching and learning as well as research. A different point of view was noted in a study conducted by De Zoysa (2007) revealing that students were satisfied with the measures taken by the institution in ensuring improvement to the laboratories and to cater for their needs.

5.2.3 Research objective 3 sought to identify the factors hindering the completion of postgraduates' throughput

This study examined the factors influencing the throughput of postgraduates. A wide range of factors were identified from the literature (De Villiers 2019; Hadi, and Muhammad 2019; Bopape 2018; Botha 2018; Aboo 2017; Botha 2016) and categorised into demographic; personal/postgraduates related; academic supervisors related and institutional related factors. The findings indicated by the postgraduate students and academic supervisors revealed the factors discussed below:

With respect to demographic factors, the findings suggest that overall demographic related factors are of minimal significance. Postgraduates scored all four factors below 20% and as little as 8% for gender and 9% for age. Similarly, supervisors scored all factors below 50% and as little as 8% for gender and race each. These findings are in line with

a study conducted by Mohamed 2018 whose findings showed no significant association of demographic factors with the throughput of postgraduates (Mohamed 2018).

The results on the factors indicated by the postgraduates under personal factors by the postgraduate students, included slow feedback; challenges with financial resources; lack of time to conduct research; Lack of knowledge and mastery of research and its research methods and; challenges associated with data collection as factors hindering the throughput of postgraduates with all posting above 40%. For institutional factors, the findings revealed that the lack of administration support; supervision related issues; and financial related factors were influential.

In section 4.5.4 listing the personal factors, there were no factors that stood out as especially influential with five of the 15 factors scoring between 40% and below 50%. The most influential factors were the feedback and challenges with financial resources both achieving 46%.

The literature on the factors related to postgraduate personal issues highlight the significance of feedback. For instance, in a study conducted by Havenga and Sengane (2018:6) it was found that “challenges associated with supervision included late allocation of academic supervisor to postgraduate students, lack of structure regarding supervision feedback as well as perceived lengthy process for approval of research protocols”. Sosibo (2013) also emphasised the importance of feedback stating that for postgraduate students “to remain motivated and to stay on-task, “feedback had to be given at various stages of thesis writing since timely feedback is likely to provide students with an opportunity to reflect on their work while it is fresh in their minds”.

The significance of financial resources to postgraduate throughput is reported in several studies (Havenga and Sengane 2018; Zewotir, North, and Murray 2015; Cele and Lekhanya 2014; De Zoysa 2007). The results of these studies reveal that most postgraduate students experienced challenges with financial resources related to travelling expenses including travelling to data collection sites, accommodation, research material costs etc. these studies stressed that factors related to financial constrains may have had influence on postgraduate students’ completion.

In section 4.6.4 on students' throughput related factors, most of them were regarded as highly influential. The high visibility was noted in; lack of readiness to conduct research at 82%; lack of commitment to conduct research and lack of research skills both at 80%.

Research on sustaining the research-ready capabilities of postgraduate students confirms that recognising and overcoming motivation and commitment, managerial and academic-writing research-readiness deficiencies could lead to improved throughput (Bopape 2018; Maasdorp, and Holtzhausen 2015). While the lack of readiness to conduct research was noted in this study, previous research painted a different picture of an acceptable degree of readiness by postgraduates to embark on their research journeys (Vafadar, Vanaki, and Ebadi 2015) and that there is a remarkable difference to their preparedness enhanced by coursework (O'Clair 2013).

The importance of research skills in postgraduate studies has been emphasized by many researchers (Gyuris 2018; Akuegwu, and Nwi-ue 2018; Garg, and Passey 2018; Willison, and Buisman-Pijlman 2016; Mafenya 2014; Meerah *et al.* 2012; and Meerah 2010 etc.). The findings of these studies vary; some studies found that postgraduate students were capacitated in terms of research skills, others found that postgraduate students do not have research skills. For example, in a study conducted by Meerah *et al.* (2012) the results suggested that "the graduates in general have moderate knowledge and competencies to conduct research". While another research conducted by (Akuegwu, and Nwi-ue 2018) the findings revealed that "graduate students have low research skills acquisition". Similarly, a research by Garg, and Passey (2018) reported that "graduates are very weak in their self-reported abilities with research skills". The findings of this study confirm earlier research that found that postgraduate students' research skills in thesis or dissertation writing were inadequate (Hoon *et al.* 2019; Akuegwu, and Nwi-ue 2018; Garg, and Passey 2018).

In section 4.6.4 listing throughput influencing factors from the supervisor's standpoint, the general influence of the factors was relatively low with four of the eight identified ranked 38% each. The workload of supervisors at 90%, however, stood out. Another factor that was regarded as significant was family and responsibilities at 55%.

Academic performance has long been crucial to the productivity of HEIs; however, it cannot be measured without considering workload; particularly with regard to research and teaching (Kenny and Fluck 2017). As such, many academics overwork themselves because they value the quality of their work which reflects their professional identity and accreditation (Lewin 2019), however, that may lead to lower level of their well-being and automatically to lower levels of institutional research excellence (Franco-Santos, Rivera, and Bourne 2014). In a study conducted by Ali, and Farooqi, (2014) on the workload of employees in a public university, the study discovered that work-overload leads to poor performance of the employees and ultimately to employees' job dissatisfaction. Another study by Yousefi, Bazrafkan and Yamani (2015) revealed that the workload of the supervisors is one of the challenges that lead to poor completion of postgraduate studies, especially as a result of time constraints, academic supervisors do not have enough time to guide students effectively.

The essence of balancing work and family/personal responsibilities has long been discussed. These conflicting domains are equally critical in academia, particularly for female academic staff members who often find themselves "performing a balancing act in order to fulfil the expectations attached to both family and academic roles" (Cole, and Curtis 2004:1). A research conducted by Baker (2010) argues that although academic career progression is typically influenced by research productivity and career endurance, likelihood to have a long, productive, and successful career is shaped by finding a balance between work and personal priorities including family. Furthermore, Adebayo (2016) indicates that institutions need to ensure that their staff have a level of balance between work and personal life to achieve desirable academic outcomes.

With respect to institutional factors influencing throughout from the postgraduates' perspective, reported in section 4.5.4 four of the five factors were moderate within the bracket of 30% to 45%. The only factor that reached 50% was the lack of administration support at 56 (52%). From the standpoint of the academic supervisors reported in section 4.6.4 all three factors had significant influence to throughput between 50% and 90%. The most significant factors were lack of sound training in research methodologies and methods at 42 (86%) and lack of technical support at 36 (73%). The influence of the library services was confirmed by the librarians.

The present study findings concur with the previous studies suggesting that there are challenges associated with administration support within the institutions offering postgraduate programmes (Havenga, and Sengane 2018; Ngibe 2015; Mutula 2009). The results of the above studies indicated poor administration in research protocols including lengthy processes for proposal submission and approval; frustration in the admission and registration process; slow thesis examination process; inconsistent postgraduate research rules and regulations and research services provided by research administrators/coordinators in general.

The literature acknowledges the need to implement training in educational research methods and methodologies (Ross, Dennis, Zhao, and Li 2017; Matin, and Khan 2017; Komba 2016 Ismail, Abiddin, and Hassan 2011). The findings of the above studies revealed that the challenges associated with postgraduate throughput include postgraduates' inability to present different chapters of the thesis or dissertation; lack of interpretation and presentation of research results; as well as lack of knowledge and understanding in terms of research methods and methodology.

There was a **lack of technical support in this study,** contradicting earlier findings by Mawere, and Sai (2018) that noted it was not a question of technical support that hindered the throughput of postgraduates but rather a lack of awareness of facilities available to postgraduates.

5.3 Noted gaps

The following were gaps noted from the previous research:

- Several studies on postgraduates' throughput focused on online or distance learning programs Shariff, Ramli, and Ahmad 2015; Styger, van Vuuren and Heymans 2015; Marioulas 2017; Sondlo 2013 etc.).
- Other studies emphasized dropout and attrition rather than completion and throughput (Park, Luo and Kim 2015; Zewotir, North and Murray 2015)
- The study at hand examined the factors influencing the throughput of postgraduates comprehensively. This study probed into postgraduates/personal; academic supervisors; and institutional related factors including adherence to postgraduates'

rules and regulations and awareness of completion timelines as well as the research capacity available for postgraduates. Most studies solely focused on institutional factor, student' personal factor, and supervisor-related factor. (Hadi, and Muhammad 2019; Nouri, Larsson, and Saqr 2019; Sverdlik, Hall, McAlpine, and Hubbard 2018; Ekpoh 2016)

- The current study targeted all institutional stakeholders involved in research, while most studies only targeted postgraduates and in rare cases, postgraduates, and academic supervisors (for example Nouri, Larsson, and Saqr 2019; Bopape 2018; Pitchforth *et al.* 2012).

5.4 Summary

This chapter discussed the findings of the study on the factors influencing the throughput of postgraduates in a South African University of Technology. The findings suggested that while the level of adherence to postgraduates' rules and regulations was high, there was laxity on the awareness of completion timelines. High visibility of research capacity was also revealed alongside with the high influence of students/personal, supervisory, and institutional related factors to throughput. Moreover, the gaps from the previous research were noted. The next chapter provides the summary and conclusions of the study, recommendations for improvement, and suggestions for future research.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

The previous chapter discussed the findings of the study. This final chapter summarizes the findings, provides conclusions and recommendations. The aim of the study was to examine the factors influencing the throughput of postgraduate students at a selected South African University of Technology. The findings are summarised in accordance with the research objectives below:

- To establish awareness of and adherence to completion timelines for postgraduate studies.
- To determine the research capacity available for the completion of postgraduate qualification.
- To identify the factors hindering the throughput of postgraduates' throughput.

6.2 Summary and conclusions by research objectives

The summary and conclusions by research objectives are drawn below.

6.2.1 To establish awareness of and adherence to completion timelines for postgraduate studies

The study findings revealed a broad claim of awareness to registration rules and regulations as well as the completion timelines for their studies. In the verification of the self-claim of completion timelines awareness, a large proportion could not state the correct completion timelines. While postgraduates claimed to comply with the registration rules and regulations as well as awareness of completion timelines, the enforcement of the consequences in the event of breach seemed to be relaxed. The general observations of the researcher were that:

- The system is relatively accommodative e.g. a quick round robin can be done to approve any outstanding requirements to facilitate completion of studies. This usually means that the rules can get overlooked to accommodate the completion.

- Other contributory issues may arise from the misinterpretation of the students' centeredness vision of the institution and succumbing to the influence of the students' political bodies.

Summarily, the findings of the study, the general observations of the researcher and the literature reviewed reveal awareness and adherence as a critical factor to postgraduates' throughput.

6.2.2 To determine the research capacity available for the completion of postgraduate qualifications

Holistically the research capacity available was highly satisfactory. When measuring the satisfaction of the research capacity claimed to be available, the results were moderate. Although the findings concerning the availability of the overall research capacity were highly satisfying, dissatisfaction with the lack of academics writing skills was reported to have influence on the throughput of postgraduates. This study concludes that all aspects of research capacity should be reinforced to ensure successful completion of postgraduate studies.

6.2.3 To identify the factors hindering the throughput of postgraduates

The influence of students/personal; supervisory and institutional related factors to throughput was revealed in the study findings. The most influential factors were slow feedback; challenges associated with financial resources; lack of readiness to conduct research; lack of commitment to conduct research and lack of research skills; supervisors' workload and commitments associated with family responsibilities; lack of sound training in research methodologies and methods and lack of technical support. The study concludes that more attention should be given to the throughput hindering factors above.

6.3 Recommendations from the study findings

The recommendations below were derived from the findings of the study:

6.3.1 Against objective one, it was found that there is laxity regarding the enforcement of postgraduates' rules and regulations leading to poor adherence to completion timelines.

- The study therefore recommends that the enforcement of postgraduates' rules and regulations impacting the completion should be tightened.

6.3.2 The lack of academic writing skills was noted from the 2nd objective.

- It is recommended that the institution diagnose the reason/s underlying the lack of academic writing skills amongst the postgraduate students and address it accordingly.

6.2.3 From the 3rd objective, the factors found to be influential were manifold, however, those that were most visible included:

- Slow feedback.
- Challenges associated with financial resources.
- Lack of readiness to conduct research.
- Lack of commitment to conduct research.
- Lack of research skills.
- Supervisors' workload.
- Supervisors' commitments associated with family responsibilities.
- Lack of sound training in research methodologies and methods and.
- Lack of technical support.

In light of the above factors, the study suggests that the institution improves and monitors the feedback turnaround time; assists postgraduate students to meet their financial needs and finds strategies to prepare postgraduates for their studies prior to thesis/dissertation writing. Moreover, the institution needs to ensure that it takes the responsibility to get the postgraduate students on board in order to improve commitment to their studies. The study further suggests that the institution needs to strengthen the research programs in place e.g. writing retreats and research methods workshops/trainings. The supervisors' workload should be allocated in accordance with the supervisor's capacity. Also, the supervisors' well-being; personal commitments and responsibilities should be considered

during the workload allocation. Finally, the institution should consider investing in ICT and scientific infrastructure to strengthen its technical support.

6.3 Recommendations for future research

The challenges associated with postgraduates and its impact on HEIs are yet to be discovered. The verification of self-claims by stakeholders involved in research to be one of the motivations for future research. In this study, the respondents were given options to affirm to and such claims were not verified of which it would be interesting for future research to make verifications. This study focused on the factors influencing the throughput of postgraduates in a South African University of Technology. Further research could broaden the study concept and make a comparison amongst the UOTs or expand the comparison to other typologies of universities. The population of the study could also include postgraduates' dropouts to explore the factors hindering the throughput from the horse's mouth.

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Appendix A: Ethical clearance letter

Faculty Research Office
Durban University of Technology
16 April 2019

Ms S. P. Dlamini
Student Number: **21855824**
Degree: Master of Management Sciences in Administration and Information Management

Email: dlamssp@gmail.com

Dear Ms Dlamini
ETHICAL APPROVAL: LEVEL 2

Your email correspondence in respect of the above refers.
I am pleased to inform you that the Faculty Research Committee (FRC) at its meeting on 24 January 2019, has granted preliminary permission for you to conduct your research **"Factors Influencing the throughput rate of research-based postgraduates at a South African University".**

You are required to present this letter to the central DUT Research Office to obtain full permission to conduct the research at DUT. Please also note that each of your questionnaires must be accompanied by a letter of information and a letter of consent for each participant, as per your research proposal.

A summary of your key research findings may be submitted to the FRC on completion of your studies.

Kindest regards.

Yours sincerely

Dr Delene Heukelman
Faculty Research Coordinator (Acting)

Appendix B: Gate keeper letter

Directorate for Research and Postgraduate Support
Durban University of Technology
Tromso Annexe, Steve Biko Campus
P.O. Box 1334, Durban 4000
Tel.: 031-3732576/7
Fax: 031-3732946

23rd October 2019

Ms Sanelisiwe Dlamini
c/o Department of Business Information Management
Faculty of Accounting and Informatics
Durban University of Technology

Dear Ms Dlamini

PERMISSION TO CONDUCT RESEARCH AT THE DUT

Your email correspondence in respect of the above refers. I am pleased to inform you that the Institutional Research and Innovation Committee (IRIC) has granted Full Permission for you to conduct your research "Factors influencing the throughput rate of research-based postgraduates at a South African University" at the Durban University of Technology.

The DUT may impose any other condition it deems appropriate in the circumstances having regard to nature and extent of access to and use of information requested.

We would be grateful if a summary of your key research findings can be submitted to the IRIC on completion of your studies.

Kindest regards.
Yours sincerely

PRÓF KÉVIN DUFFY
ACTING DIRECTOR: RESEARCH AND POSTGRADUATE SUPPORT DIRECTORATE

Appendix C: Letter of information

Dear Participant

My name is Sanelisiwe Dlamini (Student Number 21855824), a master's student in the Department of Information and Corporate Management at the Durban University of Technology. I am conducting a research that seeks to examine the factors that influence the throughput of postgraduate students at a South African University. I kindly request you to participate in this study. Be assured that by taking part in this study, your responses will be treated with confidentiality and anonymity.

Details of the study at hand are provided below:

Title of the Research Study: The factors influencing the postgraduate's throughput at a selected South African University of Technology.

Principal Investigator/researcher: Sanelisiwe Dlamini, Advanced Diploma in Office Management and Technology

Co-Investigator/s/supervisor/s: Supervisor: Dr S.P. Moyane, Co-supervisor: Mr N. Nkomo

Brief Introduction and Purpose of the Study: Postgraduate throughput (completion) is a matter of concern in Higher Education Institutions (HEIs) worldwide including those in South Africa (Botha, 2017 Febles and Cisneros-Cohernour, 2015; Styger, Van Vuuren and Heymans 2015; Abiddin and Ismail 2011; Mutula 2009 etc.). Some of the critical issues relating to throughput include, the length it takes for research-based postgraduate students to graduate (Zewotir, North and Murray, 2015), the low success rates (Schulze, 2016), the termination of studies and breaching the arrangement with the university before graduation or remaining in the system inactively (Styger, Van Vuuren and Heymans 2015).

In view of the above issues, studies on the factors influencing throughput at postgraduate level have become widespread globally. In the South African context, several studies have also been conducted on this topical issue (Murray 2014:2, Styger et al. 2015, Sondlo, 2014) however, the issue of low throughput rate remains and South Africa is still unable to produce enough research-based postgraduate students who can at best, devote their innovative skills by engaging into the development of the 'knowledge base' of the country's economy (Zewotir, North and Murray 2015:1). It is also observed that while postgraduates' throughput is a matter of major concern in all public universities; traditional and comprehensive, this issue is a lot more pronounced in UoTs given that they are only just assuming a stellar focus on research (the former mandate was vocational and skills attainment). It is thus pivotal to examine the factors contributing to the completion (throughput rate) of research-based postgraduates' studies in a University of Technology.

Risk or Discomfort to the Participant: There will be no risks or discomfort to participants.

Benefits: This study has potential benefits to several stakeholders ranging from postgraduate candidates, to Higher Education Institutions (HEIs) (Sondlo 2013:11) [e.g. supervisors, university administrators, etc.], governments (Botha, 2017), funders of postgraduate studies (Tshitake, 2016) and others. As this research may draw recommendations and conclusions based on what the inhabitants perceive as the major factors contributing to postgraduates' low throughput rates at the Durban University of Technology. Such recommendations and conclusions will address the consequences resulting from postgraduate low throughput rates as stated below:

- Increased workloads for academics (Styger et al. 2015:2)
- Loss of Government subsidies by HEIs (financial) (Botha, 2017:346, and Tshitake, 2016)
- A blockage in the Higher Education system as the students who fail to complete their studies do not free up spaces for others (Van Der Merwe, 2017)
- Institutions reputational damage (rankings) (Nkontwana, 2014 and Sondlo, 2014)
- Shortage of innovation and productivity that postgraduates contribute to the economy (Valero, and Van Reenen, 2016)

Reason/s why the Participant May Be Withdrawn from the Study: Participation in this study is voluntary. The participant may withdraw from this study at any given time without having to provide a reason.

Remuneration: There is no monetary remuneration or any other form of remuneration for participating in this study.

Costs of the Study: You are not expected to cover any costs for this study.

Confidentiality: You will remain anonymous and any information provided will only be used for the purpose of the study.

Research-related Injury: You will sustain no injuries.

Persons to Contact in the Event of Any Problems or Queries:

Student:	Ms Sanelisiwe Dlamini	Tel: 031-373 5652
Supervisor:	Dr SP Moyane	Tel: 031-373 6879
Co-supervisor:	Mr N Nkomo	Tel: 031-373 6779

Institutional Research Ethics Administrator: on 031 373 2375

Complaints can be reported to the DVC: Research, Innovation and Engagement Prof S Moyo on 031 373 2577 or moyos@dut.ac.za.

CONSENT

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, S.P Dlamini, about the nature, conduct, benefits, and risks of this study - Research Ethics Clearance Number: _____,
- 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.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerized 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	Date	Time	Signature/Right

I, Sanelisiwe Dlamini herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

Sanelisiwe Dlamini	10 Oct 2019	_____
	Date	Signature
_____	_____	_____
Full Name of Witness (If applicable)	Date	Signature
_____	_____	_____
Full Name of Legal Guardian (If applicable)	Date	Signature

Appendix D: Questionnaire for collecting data from postgraduate students on factors influencing the throughput of postgraduate studies in a South African University of Technology

INSTRUCTION FOR FILLING IN THE QUESTIONNAIRE:

1. Please put a cross (X) where appropriate and use the spaces provided to write your answers.

SECTION A: Demographic data

1.	**Gender**	Male	
		Female	
		Other	
2.	**Age**	Under 20	
		20-30	
		31-40	
		41-50	
		51-60	
		61 and above	
3.	**Nationality**	South African Citizen	
		Non-South African Citizen	
10.	**Employment Status**	Unemployed	
		Employed (Full-Time)	
		Employed (Part-Time)	
		Other (Please specify)	

4.	**Race**	African	
		Colored	
		Indian	
		White	
		Other (Please specify) ……	
5.	**Department:**……..		
6.	**Faculty**……		
7.	**Qualification enrolled for:**		
	Masters		
	Doctorate		
8.	**Registration:**		
	1st year of registration		
	2nd year of registration		
	3rd year of registration		
	Other (Please specify)		
9.	**Current Registration status:**		
	Part-time		
	Full-time		

SECTION B: Awareness of and adherence to completion timelines.
• Awareness refers to the knowledge of completion timelines.
• Adherence refers to compliance with completion timelines.

11. In what year was your 1st registration? E.g. 2019

……

12. Are you complying with the DUT Rule G24 (2) (a) requiring you to register yearly?

Yes ◯ No ◯ Other (Please specify) ……

13. If your answer in question 12 is *No,* what consequences are you aware of for not complying with Rule G24 (2) (a)?

……

……

……

14. Are you aware that there are minimum and maximum timeframes for postgraduate studies completion?

Yes ◯ No ◯ Other (Please specify) ……

15. Please indicate from the table provided below, ***only*** the minimum and maximum completion timeframes applicable to the qualification you are pursuing.

Types of Registration status	Minimum Timeframes	Maximum Timeframes
Master's Full-time		
Master's Part-time		
Doctorate Full-time		
Doctorate Part-time		

16. Are you aware of the consequences should you not be able to complete within the stipulated maximum timeframes?

Yes ◯ No ◯ Other (Please specify) ……..

17. If your answer in question 16 is *Yes,* please indicate those consequences.

……

……

……

18. Are the consequences stated in question 17, to your knowledge enforced?

Yes ◯ No ◯ Other (Please specify) ……

19. In your view, does the lack of enforcement influence the completion of your studies? Yes ◯ No ◯ Other (Please specify) …….

20. Please justify your answer provided in question 19.

……

……

……

21. Are you aware of the support available for those who fail to complete within the stipulated timeframes?

Yes ◯ No ◯ Other (Please specify) ……...

22. If your answer in question 21 is *Yes,* please indicate the support provided. Please put a cross against all applicable.

Support provided	
Extended candidature	
Counselling	
Change of supervisor/s	
Other (Please specify)	

23. If your answer in question 21 is *No,* please indicate the support you think is needed.

……

……

……

SECTION C: Research capacity available for the completion of postgraduate studies.
• Research capacity refers to the availability of facilities and trained human personnel and programs for research.

Availability of research capacity

24. Which component/s of research capacity is available in your institution in terms of **facilities, trained human personnel and programs**? Please mark all that apply with a cross (X).	
1. Facilities	
a. Library and research support programs	
Research commons	
Writing center	
Internet access	
Computer facilities outside the library	
Library induction session for postgraduates	
Training on utilizing library databases	
Using the internet for research	
Advanced information retrieval skills	
Research management tools	
Turn it in	
Referencing software e.g. EndNote	
Academic writing skills	
Other (please specify)	
b. Research administration servicing departments	
Department offering the qualification	
Faculty research office (FRO)	
Institutional research ethics committee (IREC)	
Other (please specify)	
c. Laboratories	
Computer laboratory	
Scientific laboratory	
Design laboratory	
Other (please specify)	
2.Trained human personnel	
Research administrators support	
Research support structures personnel e.g. librarian support	
Linguistic assistant e.g. language editor	
Data analysis including statisticians	
Writing services specialists	
Other (Please specify)	

25. What role does the research capacity components in terms of facilities, trained personnel and programs you have indicated in question 24, play towards the successful completion of your studies?

……

……

……

26. Using a scale of: Very Unsatisfied, Unsatisfied, Neutral, Satisfied and Very Satisfied; please rate your level of satisfaction with the availability of research capacity in terms of facilities and trained personnel and programs. Please mark all that apply with a cross (X).

Availability of research capacity	Level of satisfaction with availability of research capacity				
	Very unsatisfied	Unsatisfied	Neutral	Satisfied	Very satisfied
	1	2	3	4	5
1. Facilities					
a. Library and network computer facilities					
Research commons					
Writing center					
Internet access					
Computer facilities outside the library					
Library induction session for postgraduates					
Training on utilizing library databases					
Using the internet for research					
Advanced information retrieval skills					
Research management tools					
Turn it in					
Referencing software e.g. EndNote					
Academic writing skills					
Other (please specify)					
b. Research administration servicing departments					
Your department					
Faculty research office (FRO)					
Institutional research ethics committee (IREC)					
Other (please specify)					
c. Laboratories					
Computer laboratory					
Scientific laboratory					
Design laboratory					

Other (please specify)					
2.Trained personnel					
Research administrators support					
Research support structures personnel e.g. librarian support					
Linguistic assistant e.g. language editor					
Data analysis including Statisticians					
Writing services specialists					
Other (please specify)					

SECTION D: Factors hindering the completion of postgraduate studies.

The following factors have been identified from literature to influence the successful completion of postgraduate studies.

27. Which of these factors hinder the completion of your studies? Please mark all that apply with a cross (X).	
a. Demographic factors	
Age	
Gender	
Marital status	
Race	
Other (please specify)	
b. PERSONAL FACTORS	
Cost of obtaining research materials	
Inadequate ICT skills	
lack of time to conduct research	
Challenges with data collection e.g. inaccessible population	
Lack of commitment to research	
Staying far from the university	
Household responsibilities e.g. home chores	
Health issues	
lack of family support	
Family responsibilities e.g. wife, husband, or guardian responsibilities etc.	
Lack of motivation/interest	
Feedback e.g. from the supervisor/s, from the FRC, etc.	
Low personal worth Challenges with financial resources e.g. tuition fee, living expenses, etc.	
Lack of knowledge and mastery of research and its research methods	
Other (please specify)	
c. INSTITUTIONAL FACTORS	
Supervision e.g. lack of supervisory skills, inadequate consultation times, etc.	
Library services e.g. inadequate library facilities, availability of internet service	
Financial factors e.g. application process for funding, limited bursary opportunities etc.	
Accommodation e.g. postgraduate residences	
Lack of administration support e.g. registration process, proposal submission process etc.	
Other (please specify	

28. Please state how the factors you have indicated in question 26, above affect you towards the completion of your studies.

Demographic Factor

……
……
……
……
……

Personal Factors

……
……
……
……
……

Institutional Factors

……
……
……
……
……

SECTION E: General

29. Please indicate any other views you may have in relation to postgraduate completion.

……
……
……
……
……

30. Please suggest what should be done to improve the completion of postgraduate studies.

……
……
……
……
……

Thank you for your participation.

Appendix E: Questionnaire for collecting data from academic supervisors on factors influencing the throughput of postgraduate studies in a South African University of Technology

Instructions for filling in the questionnaire

2. Please put a cross (X) where appropriate

3. Please use the spaces provided to write your answers

SECTION A: DEMOGRAPHIC DATA										
1. Age	-25		**2. Gender**	Male		**3. Race**	Black		**4. Marital Status**	Single	
	26-35			Female			Coloured			Married	
	36-45			Other			Indian			Living together	
	46-55						White			Separated	
	56-65									Divorced	
	66+									Widow	
5. Department:											
6. Faculty:											

7. Highest Qualification		**8. At which level are you supervising?**		**9. How many postgraduate students have you supervised to completion or graduation?**		**10. How many postgraduate students are you currently supervising?**	
Diploma		Masters		Masters		Masters	
Degree/BTech		Doctorate		Doctorate		Doctorate	
Honours		Both					
Masters							
PhD							

SECTION B: Awareness of and adherence to completion timelines.
• Awareness refers to the knowledge of completion timelines
• Adherence refers to compliance with completion timelines

11. Have you made the students aware of the DUT Rule G24 (2) (a) stipulating that postgraduate students must register yearly?

Yes ◯ No ◯ Other (Please specify) ……

12. What influence does the awareness of Rule G24 (2) (a) by the postgraduate students have on postgraduate studies' completion?

……
……
……

13. In your view are the students you are supervising in compliance with the DUT Rule G24 (2) (a) requirement to register yearly?

Yes ◯ No ◯ Other (Please specify) ……

14. Are you aware of the rule stipulating the postgraduate students' minimum and maximum completion timeframes for their studies?

15. Yes ◯ No ◯ Other (Please specify) ……

16. In the event the student/s could not complete his/her studies within the stipulated timeframes; what are the consequences to:

Academic supervisor/s

……
……
……

Postgraduate student/s

……
……
……

17. Are these consequences to your knowledge enforced by your institution?

Yes ◯ No ◯ Other (Please specify) ……

18. In your view, does the lack of enforcement influence the completion of postgraduate studies?

Yes ◯ No ◯ Other (Please specify) ……

19. Please justify your answer

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SECTION C: Availability of research capacity for the completion of postgraduate studies.
• Research capacity refers to the availability of facilities, trained personnel, and programs for research.

Availability of research capacity

20. Which component/s of research capacity is available in your department in terms of **facilities (including library and research support programs and trained personnel**? Please mark all that apply with a cross (X).	
1. Facilities	
c. Library and research support programs	
Research commons	
Writing center	
Internet access	
Library induction session for postgraduates	
Training on utilizing library databases	
Using the internet for research	
Advanced information retrieval skills	
Research management tools	
Turn it in	
Referencing software e.g. endnote	
Academic writing skills	
Other (please specify)	
d. Research administration servicing departments	
Departments offering the postgraduate qualifications	
Faculty research office (FRO)	
Institutional research ethics committee (IREC)	
Other (please specify)	
c. Network computer laboratory and other scientific laboratories	
Computer laboratory	
Scientific laboratory	
Design laboratory	
Other (please specify)	
2.Trained personnel	
Institutional research administrators support	
Research support structures personnel e.g. librarian support	
Linguistic assistant e.g. language editor	
Data analysis including Statisticians	
Writing services specialists	
Other (please specify)	

21. What role does the research capacity components in terms of **facilities and trained personnel** you have indicated in question 20 play towards the successful completion of studies by postgraduate students?

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22. Using a scale of: Very Unsatisfied, Unsatisfied, Neutral, Satisfied and Very Satisfied; please rate your level of satisfaction with the availability of research capacity in terms of facilities and trained personnel. Please mark all that apply with a cross (X).

Availability of research capacity	Level of satisfaction with availability of research capacity				
	Very Unsatisfied	Unsatisfied	Neutral	Satisfied	Very Satisfied
	1	2	3	4	5
1. Facilities					
a. Library and network computer facilities					
Research commons					
Writing center					
Internet access					
Computer facilities outside the library					
Library induction session for Postgraduates					
Training on utilizing library databases					
Using the internet for research					
Advanced information retrieval skills					
Research management tools					
Turn it in					
Referencing software e.g. endnote					
Academic writing skills					
Design laboratory					
Other (please specify)					
b. Research administration servicing departments					
Departments offering the postgraduate qualifications					
Faculty research office (FRO)					
Institutional research ethics committee (IREC)					
Other (please specify)					
c. Network computer laboratory and other					

scientific laboratories					
Computer laboratory					
Scientific laboratory					
Design laboratory					
Other (please specify)					
2.Trained human personnel					
Institutional research administrators support					
Research support structures personnel e.g. librarian support					
Linguistic assistant e.g. language editor					
Data analysis including Statisticians					
Writing services specialists					
Other (please specify)					

SECTION D: **Factors hindering the completion of postgraduate studies**

The following factors have been identified from literature to influence the successful completion of postgraduate studies.

23. From a supervisors' perspective, which of the below factors hinder the completion of postgraduate studies? Please mark all that apply with a cross (X).	
Supervision related factors	
Lack of interest in supervising postgraduate students	
Lack of motivation to supervise	
Workload and Time/involvement in other academic key performance areas (KPAs) e.g. teaching, community engagement and administration	
Health issues	
Family and responsibilities e.g. home chores, having dependents, wife, husband, or guardian responsibilities etc.	
Lack of knowledge and mastery of research and its research methods	
Lack of understanding the research requirements	
Lack of research skills	
Other (please specify)	
Students related factors	
Lack of compliance and adherence	
Negative attitude	
Lack of commitment to research	
Lack of motivation/interest	
Lack of knowledge and mastery of research and its research methods	
Lack of readiness to conduct research	
Understanding of the research requirements	
Inadequate time dedicated to research	
Lack of communication skills	
Poor writing skills	
Poor research skills	
Inadequate ICT skills	
Other (Please specify)	
Institutional related factors	
Lack of supervisors' research related workshop	
Lack of sound training in research methodologies and methods	
Unavailability of technical support	
Other (Please specify)	

24. Please state how the factors you indicated in question 23 influence the completion of postgraduate studies:

Supervisor's related Factors

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Students related Factors

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Institutional related Factors

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SECTION E: General

25. Please indicate any other views you may have in relation to postgraduate completion.

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26. Please suggest what should be done to improve the completion of postgraduate studies.

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Thank you for your participation.

Appendix F: Semi-structured interview schedule for collecting data from the library personnel as a research support structure on factors influencing the throughput of postgraduate studies at a selected South African University of Technology.

INTERVIEW QUESTIONS

1. Given that the provision of library services contributes to the completion of postgraduate studies what do you do for the optimal use of library services by postgraduates?
2. In terms of library and network computer facilities for optimising the completion of postgraduate studies, what research capacity do you have?
3. In terms of research programs for optimizing the completion of postgraduate studies, what research capacity do you have?
4. Are there any other matters you may be aware of that may have an influence towards the completion of postgraduate studies?