Cape Peninsula
University of Technology

ALTMETRIC ANALYSIS OF RESEARCH OUTPUTS IN A SELECTED FACULTY OF A UNIVERSITY IN THE WESTERN CAPE, SOUTH AFRICA

by

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Thesis submitted in fulfilment of the requirements for the degree

Master of Technology: Business Information Systems

in the Faculty of Business and Management Sciences

at the Cape Peninsula University of Technology

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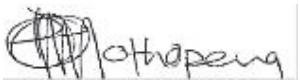
District Six, Cape Town
August 2020

DECLARATION

I, Ontebetse Patricia Mothopeng, declare that the contents of this thesis represent my own unaided work, and that the thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.



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ABSTRACT

This study investigated how alternative metrics might be used to supplement bibliometrics to review the research impact of the Department of Tourism and Events Management at Cape Peninsula University of Technology (CPUT). As is the case with other institutions in South Africa, CPUT's research output has grown rapidly of late in response to government incentives.

A case study design applying a quantitative research approach was used in this study. An altmetric analysis was performed on the research outputs of the identified department for the years 2005 to 2018. The study also investigated the online visibility and activities of researchers in the department in six academic social media networks.

Data was extracted from a variety of secondary sources, including academic social media platforms, the Scopus database, CPUT's Institutional Repository, the reports of the Centre for Tourism Research in Africa (CETRA) and CPUT's annual research reports. To achieve the research objectives, data was captured manually and plotted into the Excel matrix for analysis.

The results show that the content usage of research items was highest, with coverage of 91%. This was followed by saved (for later use) research items at 8.6%, and the online footprint of research items on social media platforms, with a representation of only 0.02%. It was also discovered that the most popular social media network among the departmental staff was LinkedIn, although most research outputs were shared on ResearchGate.

The findings also revealed that a researcher who scored the highest altmetric count, and therefore obtained the highest research impact, was more visible and active on the six social media platforms investigated.

Researchers and members of the public, who find altmetricis valuable, need to engage qualified scientometricians to guard against distortion in the use of these new metrics, since this can lead to doubt especially within the scientific community, about their significance.

ACKNOWLEDGEMENTS

I wish to thank:

- My supervisor Dr Elisha Chiware for his guidance, patience and coaxing me to think critically about research issues;
- Professor Gareth Cornwell for editing this thesis;
- My family, especially my brother, Peter Motimele and my sister, Matshidiso Motimele for their unwavering support;
- My friends and classmates for motivating me, and
- My colleagues at Cape Peninsula University of Technology for their encouragement and support.

DEDICATION

I dedicate this thesis to my father, Rankitseng Ramela, my late: mother, Tiny Ramela, husband, Simon Mothopeng and son, Rorisang Rethabile Mothopeng.

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LIST OF ABBREVIATIONS AND ACRONYMS

ASSAf	The Academy of Science of South Africa
CETRA	Centre for Tourism Research in Africa
CPUT	Cape Peninsula University of Technology
CREST	Centre for Research on Evaluation, Science and Technology
CWTS	Centre for Science and Technology Studies
DORA	Declaration on Research Assessment
DRUSSA	Development Research Uptake in Sub-Saharan Africa
DST	Department of Science and Technology (South African Government)
HEI	Higher Education Institution
JIF	Journal impact factor
NRF	National Research Foundation (South Africa)
ORCiD	Open Researcher and Contributor ID
OSIRIS	Oslo Institute for Research on the Impact of Science
PoP	Publish or Perish (sotware)
RISE	Research, Innovation and Science Policy Experts
SciSTIP	Scientometrics and Science, Technology and Innovation Policy

CHAPTER ONE

OVERVIEW

1.1 Background to the study

Globally, Higher Education Institutions (HEIs) have come under increasing pressure to provide evidence of their teaching, learning and research outputs, especially to funders. This has traditionally been relatively straightforward, achieved through the reporting of throughput rates, retention, and publications output. Yet currently, researchers are finding it more challenging to measure and report upon their research mandates (Neylon, Willmers and King, 2014).

In South Africa the output of research publications has increased tremendously over the years in response to government incentives. For example, while in 2004 about 6 660 publications were produced, this number rose to 15 542 in 2014, reflecting an average annual increase of 8.8% (Mouton et al., 2016). Tijssen (2014) argues that if there is a challenge associated with maintaining this rapid growth, it is the threat it presents to research quality. This, coupled with advances in the tools and techniques used in scholarly communication, suggested that bibliometrics be supplemented with new alternative metrics to measure research impact. Bibliometrics are defined by De Bellis (2009) as citation counts measurements which deal with the quantitative analysis of scientific literature.

University libraries have increased their efforts to create awareness among faculties about the presence and advantages of the modern online scholarly communication tools at their disposal. This included encouraging researchers to be active on academic social network platforms (as many as possible) so that they could connect with their colleagues and influence social media opinions for their own professional advantage (Cress, 2014). University libraries have also reassured researchers about the importance of using academic social media platforms to promote their research work and accelerate their research outputs' discoverability.

The scholarly usage of social media platforms has become increasingly common, making it more important than ever for institutions to be able to show and measure the online attention paid to their research (Liu and Adie, 2013). Researchers cannot afford to ignore online public feedback to their work because they are under pressure to provide funders with the evidence

of societal engagement integral to their research outputs (Williams and Padula, 2015; Thelwall et al., 2016; Botha and Muller, 2017).

Alternative metrics or altmetrics measures online impact in different ways and has the potential to fill the gaps in the 'impact challenge' (Liu and Adie, 2013). Altmetrics has already become an agenda item at European Union policy discussions (Fraumann, 2017), and was identified as one of the key elements in the European Open Science Agenda (European Commission, 2017. According to the European Commission (2017), altmetrics has become important in assessing the use of research by members of society and demonstrating how outputs are shared and discussed (European Commission, 2017).

The Academy of Science of South Africa (ASSAf), onfirmed at a Republic of South Africa Open Science Policy Workshop that altmetrics is a policy priority. It would be introduced to South African research institutes tasked with measuring the impact of open science on researchers and the general public (ASSAf, 2018).

In this study, the altmetric analysis of research outputs of the Department of Tourism and Events Management in the Faculty of Business and Management Sciences (FoBMS) at Cape Peninsula University of Technology was carried out to discover how alternative research impact indicators might function to supplement bibliometrics to measure the impact of research outputs. Such indicators would include reads, downloads, media mentions, tweets, views and likes, as found on social media platforms.

The social media platforms from which data was sourced were ResearchGate, Open Researcher and Contributor ID (ORCiD), Google Scholar, LinkedIn and Academia.edu. Additional data was sourced from the Mendeley (reference manager) and Scopus databases.

1.2 Objectives of the study

A rapid increase in the popularity of social media networking has been followed by demands for their adaptation for an academic audience (Boyd and Ellison, 2007). It is important to note that adaptations for scholars have considerable potential value. Their actions may determine whether they get research funding or not.

The benefits of social networking sites for academics have thus far constituted the main focus of research, rather than the ways in which academics use these sites in practice (Jordan, 2014).

This study therefore sought to investigate the popular academic social media platforms used by researchers in the Department of Tourism and Events Management with a view to exploring the nature of their activities on these platforms, while simultaneously conducting an altmetric analysis of their research outputs. The objectives of the study were formulated as follows:

- To establish which academic social media platforms are popular among researchers in the Department of Tourism and Events Management;
- To compile a bibliographic record of the research outputs of the Department of Tourism and Events Management from 2005 to 2018, and perform an altmetric analysis of these;
- To establish the extent to which researchers in the Department of Tourism and Events Management use academic social media platforms.

1.2.1 Research problem

The rapid growth of Web 2.0 and the extensive use of online social networks and digital scholarship tools have led to the rise of online scholarly communication (Liu and Adie, 2013). This has in turn created opportunities for the evaluation and measurement of scholarly online activities (Priem, Groth and Taraborelli, 2012).

Like other departments in the Faculty of Business and Management Sciences at CPUT, the Department of Tourism and Events Management does not have collated records of its research outputs (with impact metric indicators). This limits the ability of the Department (and the Faculty as a whole) to demonstrate the impact of its research outputs. The research problem addressed by this study was therefore:

How can altmetrics be used to supplement bibliometrics in the measurement of the research impact of researchers in the Department of Tourism and Events Management at CPUT?

1.2.2 Research questions

The following research questions emerged from the research problem:

- Which social media networks are preferred by researchers in the Department of Tourism and Events Management?
- How can altmetric indicators enhance measurement of the impact of their research outputs?

- To what extent is there utilisation of academic social media networks in the Department of Tourism and Events Management?

1.2.3 Theoretical framework

Altmetrics is a relatively new field with little theorisation thus far. The social sciences have only recently begun to pay attention to altmetrics (Haustein, Bowman and Costas, 2016), with authors applying existing citation and social theories. This makes sense, given the strong relationship between citation and altmetrics, on the one hand (Priem, 2014); and on the other, the extent to which social theories have been instrumental in clarifying various aspects of behaviour on the social media platforms from which altmetric indicators are collected (Haustein, Bowman and Costas, 2016).

This study's results were thus interpreted by making use of the following theories:

Citation theories	**Social theories**
Normative theory	Social capital
Social constructivist theory: • Matthew effect	Attention economics
	Impression management

Table 1.1: Citations and social theories

Normative theory's four norms of communism, disinterestedness, organised scepticism and universalism can all be applied to understand the system's techniques (method of performance) within Mendeley, for instance. Mendeley has an online platform offering a library, however, it cannot be used to explain researchers' behaviour since the norms cannot account for the behaviour of users when they manage their literature in libraries of online platforms (Haustein, Bowman and Costas, 2016).

Communism and universalism norms are applicable to academic discussions and debates on Twitter (Haustein, Bowman and Costas, 2016). The study's data revealed only two tweets, both about the same article. Interestingly, the publication was written in English but the tweets were in a foreign language. This confirmed Merton's (1973) idea that science is a global collaborative intervention.

The disinterestedness norm focuses on a scholar's contribution to science rather than his or her professional self-development (Haustein, Bowman and Costas, 2016). It was not possible to apply this norm in the study because it was essentially impossible to identify an act of

disinterestedness without engaging the researcher personally. Because disinterestedness is not tangible, the only way to determine such an act would be by posing a specific question to the scholars under investigation.

The norm of organised scepticism is concerned with the continuous challenging of the current state of a discipline in the academy (Macfarlane and Cheng, 2008). By virtue of undertaking new research and participating in conferences, scholars in the Department of Tourism and Events Management are pursuing the agenda of Merton's organised scepticism.

Merton's Matthew effect clarifies the inconsistencies between the recognition received by well- known scholars and the withholding of credit from lesser-known scholars who have produced similar work (Haustein, Bowman and Costas, 2016). In this study the Matthew effect was used for interpreting the events around publications that had the highest number of saves and link-out indicators.

The study's results showed that more often than not, the publications with more saves and link-out indicators acquired more read indicators in Mendeley than publications with fewer saves and link-outs. The same behaviour could not be described for Twitter, as the scope of this study did not extend to Twitter.

Social capital theory explains how engagement in social networks can benefit scientific communities by offering them new information resources. Of the six academic social media platforms under investigation, four enabled members to build networks, with the result that the Department of Tourism and Events Management has a network count of 2 590 (almost 100 times the size of its staff). This would imply that staff members are aware of the benefits of being participants in such networks.

Attention economy theory enables an examination of how the scientific community can use the social media to minimise the time spent on searching and finding information sources (Davenport and Beck, 2001). As much as 92.3% of staff in the department under study had membership in four of the 6 platforms investigated. They could easily access publications shared on these platforms as members of the networks.

Theory of impression management provides scholars with methods of actively maintaining their online presence on social media (Haustein, Bowman and Costas, 2016). Scholars have the choice of sharing information on social media networks to create the public impression that they want. On some platforms, staff in the Department of Tourism and Events Management chose to keep their accounts private, and on others not to upload any information at all. Their motive in opening an account on a platform and not uploading any information could be that they only want to benefit by accessing information from the

platform. This could be explained by the theory of attention economics, which highlights that scholars strive to use the minimum time necessary to access information that they need.

Citation theories were successfully used as a theoretical framework by Morril (2015) when investigating the research impact of European university publications. Abbasi (2018) also succeeded in using a combination of citation and social constructivist theories as a framework to study the visibility of a university department using altmetrics.

Citation and social theories are discussed in detail in Chapter 2.

1.3 Research methodology

This study's approach is quantitative since it is an altmetric investigation of the research outputs of the Department of Tourism and Events Management at CPUT. Creswell (2009) maintains that quantitative research tests objective theories by examining the relationships among quantifiable variables. The measurable variables in this study were researchers, publications and altmetric indicators.

First, a list of research items produced in the Department (from 2005 to 2018) being studied was compiled, while research impact indicators were obtained using the altmetric tool, plumX and recorded for altmetric analysis. The second part of the study was to investigate and quantify the current (2018) individual researchers' visibility in various scholarly social media platforms, including mendeley and ORCiD.

1.3.1 Research design

A case study was used to carry out the investigation into how alternative metrics can be used to supplement bibliometrics in a review of research impact. In Rule and John (2011), Yin defines a case study as an inquiry that investigates a phenomenon within its real-life context. It was envisaged that a case study involving a single academic department would produce the required amount of data for exploration and altmetric analysis.

1.3.2 Demarcation of study

The case study focused on the Department of Tourism and Events Management in CPUT's Faculty of Business and Management Sciences. An altmetric analysis was conducted on its research outputs published during the years 2005 to 2018.

1.3.3 Literature review

The literature review was based primarily on the objectives of the study. It covers:

- The use of the social media in academia
- Social media metrics and evaluating research impact
- The growing importance of altmetrics in research assessment

1.3.4 Research population

As indicated above, a case study design was used to explore the supplementary role that altmetrics can play in respect of bibliometrics in the evaluation of research impact. The study's findings do not permit generalisation to any other population, since the case study approach was used as an instrument to explore a particular phenomenon. Mills, Durepos and Wiebe 2010 (2010) nevertheless believe that in instances where generalisation is not applicable, themes and patterns can be identified that enable comparisons with other cases.

1.3.5 Data collection

Creswell (2009), Rule and John (2011) and Leedy and Ormrod (2014) suggest that case study data should be drawn from multiple sources of information, including physical artefacts, archival records and documents. In this study, data was accordingly obtained from a variety of secondary sources.

Data was extracted from the following secondary sources:

Description	Secondary Source
Academic social media networks	Mendeley, ResearchGate, Academia.edu, LinkedIn, Google Scholar, ORCiD
Citation Index Database	Scopus
Altmetric tool	PlumX
CPUT's platform	CPUT's Library Institutional Repository
CPUT's research reports	CPUT's annual research reports; Centre for Tourism Research in Africa (CETRA)'s reports

Table 1.2 Secondary sources of data

1.3.6 Data analysis techniques

Data was captured manually and uploaded to Excel for processing with detailed headings. Excel's functionality analysed captured data and generated graphs that produced a practical sequence, enabling interpretation that provided answers to the research questions and achieved the research objectives.

1.3.7 Limitations of the study

Altmetric analysis could not be conducted on all the research outputs itemised in the bibliographical list because the only accessible altmetric tool, PlumX, was embedded in Scopus, meaning that analysis could only be performed on research items that were indexed in Scopus.

1.4 Rationale for and significance of the study

This study demonstrated how altmetric indicators on social media can provide new ways of measuring the impact of research. According to Mouton and Tijssen (2016), South African universities have increased their research output substantially, and it therefore important that appropriate, uncomplicated measurements become accessible to all stakeholders.

The potential beneficiaries of this study include researchers, research funders and HEIs. Social media altmetric indicators help expose the impact of research that in many instances takes the form of the outcomes of a project with societal benefit and economic impact (Tijssen, 2016).

1.5 Definitions of terms

Altmetrics is the study and use of scholarly impact measures based on activity in online tools and environments (Priem and Hemminger, 2010).

Altmetric indicator is a measure of impact derived from the use of social media (Haustein et al., 2014)

Bibliometrics involves citation count measurement and is a sub-field of Information Science that deals with the quantitative analysis of scientific and technological literature (De Bellis, 2009).

Bibliometric indicator is a measure of the impact or quantity of publications as documentary products (Sen, 1999).

Citation count is the number of times a research work is cited by other works (Delasalle and Elsevier Library Connect, 2016).

Impact factor is a bibliometric indicator calculated by dividing the journal citation number in a given year by the total citable items published by the journal in the two previous years (Roemer and Borchardt, 2015).

Indicator is a measure used to determine the performance of functions, processes and outcomes, over time (Lundberg, 2006).

Link out is an out-bound link to a research item (Plum Analytics, 2018).

Mendeley is an academic network and reference manager that can be used to discover the latest research, organise it and collaborate with other scholars online (Elsevier, 2018).

Scholarly communication is the system through which research and other scholarly writings are created and evaluated for quality, disseminated to the scholarly community and preserved for future use (Konkiel et al., 2016).

Social media networks are online platforms that enable people to connect and maintain relationships with others independent of the individuals' physical location (Jurgens, 2013).

1.6 Structure of the thesis

The following is a brief overview of the contents of each chapter of this thesis:

Chapter 1 offers an overview of the study and covers the background of the study, its problem statement, research questions, objectives, theoretical framework, research methodology, rationale, and definition of key terms.

In Chapter 2 an in-depth literature review is presented.

Chapter 3 discusses the research methodology.

In Chapter 4 the data is presented and analysed.

Chapter 5 offers discussion and interpretation of the data.

Chapter 6 presents a summary of the study's research findings as well as conclusions drawn and recommendations for future research.

1.7 Conclusion

This study focuses on the changing measurement of the impact of research works due to advances in the tools and techniques used in scholarly communication. The study also explores how social media altmetric indicators can be used to introduce new ways of measuring the impact of research outputs.

A bibliographic record of research outputs of CPUT's Department of Tourism and Events Management from 2005 to 2018 was compiled and subjected to altmetric analysis.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This literature review is based on the objectives of this study which are:

- To establish which academic social media platforms are popular among researchers in the Department of Tourism and Events Management;
- To compile a bibliographic record of the research outputs of the Department of Tourism and Events Management from 2005 to 2018, and perform an altmetric analysis of these;
- To establish the extent to which researchers in the Department of Tourism and Events Management use academic social media platforms.

The subtopics of the literature review are based on the study's research questions as outlined in Chapter 1. Both the literature review and the study as a whole are grounded in citation and social theories contribute towards an understanding of how the impact of universities' research outputs can be assessed.

2.2 Theoretical framework

There are not many models for altmetrics in the literature because it is relatively a new field. Fraumann (2017) has proposed a model for the evaluation of altmetrics as a social construct in the field of research funding, while Haustein, Bowman and Costas (2016) provide a conceptual framework that can be applied to activities occurring in the context of social media, for example, saving to Mendeley or discussing on Twitter.

Haustein, Bowman and Costas (2016) apply citation and social theories to altmetrics, recommending that these theories be used to clarify the acts of altmetric indicators, viz. views, downloads, comments, mentions, collaborations, etc. As Priem and Hemminger (2010), Priem (2014) and Sud and Thelwall (2014) have shown, citations are related to altmetrics and measure similar aspects of research impact at the level of individual articles.

On the other hand, Morrill (2015) suggests the applicability of Robert K. Merton's works on the sociology of science to this thesis. Morrill's study would not be classified as altmetrics but is closely related since it investigated the alternatives to citation analysis in the measurement of scientific research. Both Morrill (2015) and Haustein, Bowman and Costas (2016) contribute towards the elaboration of models for interpreting the results gathered in the present study.

2.2.1 Citation theories

The citation theories that will be used to interpret the results of this study are normative theory (Merton's norms) and social constructivist theory. They are appropriate for interpreting altmetric data because of the strong similarity between citations and altmetrics (Priem, 2014).

2.2.1.1 Normative theory

This theory is based on the assumption that authors adhere to social norms that guide their citation behaviours (Moed, 2005). These norms are used to analyse patterns of citation so that research metrics can be easily comprehended. Normative theorists consider citations as reward tools and intellect indicators (Leydesdorff et al., 2016).

The four basic norms in the philosophy of science are, according to Merton (1973), communism, universalism, disinterestedness and organised scepticism.

Norm of communism

The norm of communism is based on the notion of the mutual ownership of scientific knowledge and the means for distributing it (Merton, 1973). Merton (1973) perceives science as a universal collaborative activity that allows scientists to stand on each other's shoulders building on existing ideas. It is through citing others that authors can build on existing ideas.

Norm of universalism

This norm discourages discrimination based on non-scientific specifications such as gender, race, culture and nationality, so that scholars assess the works of others without prejudice (Haustein, Bowman and Costas, 2016). All judgements made in projects whose mandate is to contribute to the body of knowledge should be free from all forms of injustice.

Disinterestedness norm

This norm seeks to prevent scholars from pursuing science with intentions of self-enrichment. Merton believed scientists should consciously distinguish between the institutional mandate and individual altruism, so as to opt for disinterestedness (Anderson et al., 2010). The principle of disinterestedness stands against the corrupt practices of scientists who are motivated by self-interest. Shaky research boundaries may lead to questionable research outcomes (Haustein, Bowman and Costas, 2016). This may be the result of unethical conduct or unconscious bias.

Norm of organised scepticism

Macfarlane and Cheng (2008) explain their understanding of the norm of organised scepticism as the belief that it is possible in academia to challenge the current state of a discipline, moreover, that this should in fact be done continuously.

2.2.1.2 Social constructivist theory

The social constructivist's opinion of citation behaviour is based on a sociological view of science, which questions reliance on citation analysis (White, 2004). It suggests that factors that influence citations can include the status of the author of the cited paper rather than the intellectual content of the document itself (White, 2004). This means that authors cite those who are ranked higher than them to impress readers (White, 2004) and feel validated by this process.

Social constructivists argue that it may not always be possible to separate scientific works from personal influences, and that such works should therefore be regarded as social constructs (Haustein, Bowman and Costas, 2016). This sense of social construct therefore extends to citations and to the social media and its metrics, viz. altmetrics.

The Matthew effect

According to Merton (1968), the Matthew effect is the withholding of recognition from new scientists, whilst well-known scientists obtain recognition more easily. It can be explained as:

> the phenomenon that in societies, the rich tend to get richer and the potent even more powerful. It is closely related to the concept of preferential attachment in network science, where the more connected nodes are destined to acquire many more links in the future than the auxiliary nodes. Cumulative advantage and success-breeds-success also both describe the fact that advantage tends to beget further advantage (Perc, 2014: 1; https//doiorg/10.1098/rsif.2014.0378).

In 1976 D. J. de Solla Price verified the Matthew effect using mathematical formulae for both publications and citations, calling it cumulative advantage or success-breeds-success (Perc, 2014). He illustrated that the probability of being cited escalates with the number of citations already gained (Glänzel and Schubert, 2016). Glänzel and Schubert (2016) demonstrate that both publication output and citation impact, as the measurable aspects of success, are cumulative.

Haustein, Bowman and Costas (2016) assert that the Matthew effect is a useful tool for explaining the distribution of events in the social media, given the networked nature of these

platforms. The research items with more events associated with them are more visible (Haustein, Bowman and Costas, 2016).

Mendeley, blogs and Twitter all demonstrate the applicability of the Matthew effect to cumulative advantage in measuring impact. According to Haustein, Bowman and Costas (2016) , the Matthew effect applies to Mendeley in the same way that it applies to citation. The principle of cumulative advantage means that there is a higher probability of documents being used by researchers if they have been saved to Mendeley and feature in Mendeley search results lists.

In Mendeley, the Matthew effect can also be driven by the tendency to save papers by distinguished scholars (Haustein, Bowman and Costas, 2016), as it is common practice in academia to encourage students to cite papers by well-known scholars. And when these already famous scholars are cited more widely due to their influence on students, their cumulative advantage is perpetuated.

Costas, Zahedi, and Wouters (2014) discovered that the reader counts of articles published in high-impact journals indicate that the Matthew effect applies when documents are saved to Mendeley. Mendeley and Twitter platforms confirm the processes associated with the Matthew effect, because documents or tweets with larger audiences get higher visibility on the platforms through the number of followers or re-tweets (Haustein, Bowman and Costas, 2016).

Mendeley reader counts have very high correlations with article citation counts, which implies a similarity between the two indicators (Mohammadi et al., 2014; Zahedi, Costas and Wouters, 2014). It also suggests that citation theories may provide reliable mechanisms for understanding the subtleties of Mendeley.

Regarding blog posts, Shema, Bar-Ilan and Thelwall (2012) discovered that bloggers and science journalists pay more attention to popular scholars too, confirming the applicability of the Matthew effect to blogs. Haustein, Bowman and Costas (2016) claim that, like other social media users, bloggers' wish to increase the number of followers of their blogs to the extent of embracing even negative responses to their blogs. Negative publicity is still publicity.

2.2.2 Social theories

Theories of social capital, attention economics and impression management are among the social sciences theories that have been used to interpret online scholarly communication and research output in computer-mediated environments (Haustein, Bowman and Costas, 2016).

These theories have simplified the understanding of online events from which altmetric indicators are harvested.

2.2.2.1 Social capital

Social capital can be described as the power that can be gained through connections in a social network. Members of social networks establish and maintain relationships with other actors in the hope that they might benefit in some way from these relationships (Haustein, Bowman and Costas, 2016).

Researchers who have successfully used social capital theory to discuss interaction on social network platforms include Hofer and Aubert (2013), Steinfield et al. (2009) and Valenzuela, Park and Kee (2008). In this study, social capital theory will help to explain saving on Mendeley and interpret statistical frequencies.

2.2.2.2 Attention economics

Simon's (1971) portrayal of the information overload problem as an economic issue led to adoption of the term "attention economy" (Davenport and Beck, 2001). Authors get the attention of readers when they publish their research, but what is of more (economic) importance to them is the number of citations that their works accrue (Klamer and Dalen, 2002).

Getting cited as a scholar brings with it valued prominence (Klamer and Dalen, 2002). The prominence of good work is appreciated because it contributes to the revenue of additional attention to authors and their outputs. Social media network platforms have given new meaning to attention economy (Huberman, 2013). Online platforms have accelerated the speed of scholarly communication and impacted the evaluation of research.

2.2.2.3 Impression management

Impression management theorists think people conform to social norms as they interact in public settings, in order to be able to manipulate others, exert social influence and enhance their self-conception (Goffman, 1959; Tedeschi and Riess, 1981; Manning, 2005). These days, social media platforms are used by individuals to enhance their self-conception while at the same time promoting their research works to accrue altmetric indicators that may include comments, likes, downloads, etc.

De Bellis (2009) argues that while it is assumed that referencing behaviour is guided by the norms of citation, this does not mean that authors always abide by these norms. Wouters and Costas (2015) believe that citation theories and social theories have the potential to

validate altmetrics' performance in assessing the impact of research outputs. These theories have furnished a useful framework for the research in this study.

2.3 Social media and academia

2.3.1 What is social media?

Kaplan and Haenlein (2010) define social media as a group of internet-based an application that build on the ideological and technical foundations of web 2.0, and facilitates the production and sharing of user-generated content. (Note that although "media" is a plural noun, it has come to be treated as singular in idiomatic English. The phrase "social media" is sometimes prefaced by the definite article and sometimes not.) This content can be generated or consumed. Social media tools, applications or platforms are designed to enable online interaction. Many of these tools have common key features that distinguish them from other online tools.

Neal (2012) suggests that there is no best way to define the phrase social media, and therefore simply describes it as comprising easy-to-use services that everyone can employ to interact online. Neal (2012) claims that social media is about connecting people rather than about technology. Maybe it is about both, because while people choose which social network they prefer to use or subscribe to, the task at hand and the tools they have access to also play an important role in what people do or cannot do on social media.

Social media platforms, applications and channels include Facebook, Twitter, WhatsApp, Vimeo, Snapchat, Blogs, Wikipedia, Instagram, YouTube, Open Researcher and Contributor Identifier (ORCiD), Figshare, Mendeley, ResearchGate, Academia.edu, LinkedIn, F1000Posters and Science Open Posters.This is to name the few, its not a comphrehensive list.

Social media tools are constantly evolving and this fluid characteristic makes some scholars disinclined to trust them for academic purposes. Haustein, Bowman and Costas' (2016) response to sceptics who are anxious about the liquidity of social media tools is that the data that is captured by social media aggregators will always be relevant in the future. If a tool like Mendeley disappears, the online reference manager would still be able to save documents in newly created platforms (Haustein, Bowman and Costas, 2016). This applies to social media tools in general.

2.3.2 Social media's use in academia

The growth of social media activities in the sharing of scholarly information leaves higher education communities and scholarly organisations around the world with no choice but to

start paying attention to online platforms (Hogan and Sweeney, 2013; Birkholz, Seeber. and Holmberg, 2015; Haustein; Sugimoto and Larivière, 2015; Gumpenberger; Glänzel and Gorraiz, 2016). It is estimated that 80% of academics have social media accounts (Tinti-Kane, Seaman and Levy, 2010), and Priem (2014) alleges that they have become important tools in scholars' workflows.

Neal (2012) maintains that academics are being forced by changes in the scholarly communication landscape to incorporate social media into student-faculty interaction for the sake of effective communication with students, since students are known to spend a lot of time on social media. Students have no problem with incorporating the social media into their learning experience (Rutherford, 2010; Subramanian, in Meyliana, Hidayanto and Budiardjo, 2015).

Universities use a variety of social media platforms for marketing their programmes, with Facebook topping the list (Constantinides and Zinck-Stagno, 2011; Nyangau and Bado, 2012; Thelwall et al., 2013). Past studies reveal a significant relationship between universities' applicants and those who logged onto the institutions' social media platforms (Hayes; Ruschman and Walke, 2009). This is entirely logical since universities tend to target young people and the youth dominate social media usage.

The use of social media in academia is embraced by many because it is perceived to be enhancing engagement with students (Tur and Marín, 2015; Valentine and Kurczek, 2016; Alshuaibi et al., 2018). Academics are taking good advantage of extending teaching and learning hours by using social media to support flip-classrooms (Tur and Marín, 2015; Alshuaibi et al., 2018). Social media use may be beneficial for both lecturers and students because it is accessible and adaptable to portable and affordable devices like cell phones.

Social media has changed the way that research and education are talked about, and has also provided pathways to connect experts and non-experts (Valentine and Kurczek, 2016). Valentine and Kurczek (2016) identified two prominent trends in education and social media as the provision of additional teaching activities and the provision of opportunities for public engagement. They argue that the skills needed in the 21st-century workforce comprise:

- social media management
- online presence curation
- digital communication.

The flipped-classroom method has to be used with caution because, operating virtually, lecturers might unwittingly overload students with work. Tensions may arise when university community members interact on social media (Hank et al., 2014), especially in the absence

of appropriate institutional social media policies (Pomerantz et al., 2015). Dyson et al. (2015) argue that the success of social media integration in academia may also depend on a student's perception or expectation regarding the use of these tools for the task at hand.

In addition to administrating bibliographies, many scholars find online reference management tools on social media platforms such as Zotero, CiteULike and Mendeley helpful for saving publications, bookmarking and tagging information sources (Haustein and Siebenlist, 2011; Mohammadi, Thelwall and Kousha 2015; Sugimoto et al., 2015; Wouters, Zahedi and Costas, 2018). Reference managers also enable researchers to track attention paid to their research outputs (Bar-Ilan et al., 2015; Haustein and Larivière, 2015; Zahedi, 2014; Wouters, Zahedi and Costas, 2018). This data is important for the researcher evaluating the impact of his or her work and its implications for their curriculum vitae, tenure promotion and applying for research funds.

Researchers use reference managers to enhance their visibility, which will in turn increase the probability of their work being cited. High visibility is associated with societal impact and research uptake. Academics may use reference managers for networking purposes, which may lead to new collaborators. Faculty members use Mendeley to publicise their work, whereas students find it useful for searching for scholarly publications (Mohammadi et al., 2014; Mohammadi et al., 2015).

Greenhow and Gleason (2014) assert that the social media promotes the handling of knowledge to render it decentralised, accessible and shaped by a broad base of users. Blogging is perceived to be one the social media tools that support authors with personal thinking space, enabling the creation of knowledge as a combination of scientific facts and other dynamics of human experience (Kjellberg, 2010; Greenhow and Gleason, 2014).

When a researcher places work on wikis for editing and collaborative authoring, in most cases the editing will be done by scholars who have deep knowledge of the subject (Rowlands et al. 2011). This can also help the author to identify future collaborators or scholars who have an interest in the subject. Wikis are also good for visibility since they have a broad audience.

ResearchGate and Academia.edu are two examples of social networking platforms that academics use to post professional information and research work for dissemination (Nentwich and König, 2014; Gumpenberger et al., 2016; Wouters, Zahedi and Costas, 2018). The benefits of these platforms include increased visibility, monitoring, measuring, and assessing research impact. Societal impact may be generated by public engagement, which may also lead to research uptake. In ResearchGate networking and collaboration activities happen on a large scale (Onyancha, 2015; Thelwall and Kousha 2017).

LinkedIn and Facebook are termed generalist platforms that scholars use to communicate, interact and connect with each other through liking, sharing, commenting, messaging, poking, etc. on each other's pages (Nentwich and König, 2014; Bowman, 2015; Fraumann, 2017; Wouters, Zahedi and Costas, 2018). Thelwall et al. (2013) claim that mentions on social media platforms have turned out to be a significant marketing tool because people hold in the highest regard personal recommendations from others.

Reed (2018) suggests that social media enthusiasts should have a strategy in place in terms of knowing what they want to achieve and who they want to partner with, as well as being aware of all stakeholders' expectations. Besides its acceptance by many, sceptics have heavily criticized the professional use of social media, describing it as a source of stress with zero credibility (Van Noorden, 2014) and a poor method for the dissemination of research outputs (Grande et al., 2014). yet there is no denying that the social media facilitates faster distribution and a greater level of access to formal research publications.

2.3.3 Social media use in South African universities

South African universities use social media for the communication, dissemination, consumption and marketing of their resources and services (Dunlop, 2015). Social media platforms are among the tools used by Higher Education Institutions in South Africa to recruit new students, as is the case in other countries (Nyangau and Bado, 2012; Constantinides and Zinck-Stagno, 2011; Greenwood, 2012).

Onyancha (2017) believes that the online presence of research in South Africa increases its impact in both scholarly and societal arenas. Studies show that most South African researchers use Twitter and Facebook, and that the effects of the dissemination and presence of South African research on online platforms are similar to global trends (Onyancha, 2017).

The research work dissemination behaviour of South African academics involves the use of a variety of social media tools (Wilkinson and Weitkamp, 2013; Enis, 2015; Cui et al., 2018). The benefits are numerous, especially from academic social networks, since these have capacity to automatically generate indicators that can be used in monitoring and assessing research outputs' impact (Greenhow and Gleason, 2014).

The South African government has announced through the office of the National Research Foundation (NRF) that all prospective fund applicants must have registered on ORCiD. ORCiD is integrated in the Scopus database, and therefore enabling it to unambiguously

connect individual researchers to their work through the lifecycle of publishing. This process improves the discoverability of authors and their work (National Research Foundation, 2017).

Social media products can be tailored specifically to suit the needs of libraries (Galligan and Dyas-Correia, 2013; Rodgers and Barbrow, 2013). CPUT Libraries liaised with Mendeley to have CPUT's referencing style incorporated in its system. Besides the creation of institutional accounts on social media platforms, CPUT Librarians facilitate trainings about the use of social media tools and metrics to researchers.

In 2015 Dunlop reported that at the University of Cape Town (UCT) it was uncommon for researchers to use the social media for research. UCT researchers expressed reservations about the usage of social media in research, saying that they did not have sufficient knowledge and time to explore its ever-changing tools. It is hard to believe now, during the fourth industrial revolution, that it is possible for the university researcher to avoid the use of social media tools at all stages of the research process.

Pietersen and Raju (2015) have explained that one of UCT's newly introduced clusters of institutional restructuring concerns the accessibility and visibility of resources and services. Perhaps social media tools trainining can be highlighted as part of the services. It will then tace care of the researchers' skills shortage revealed by Dunlop (2015).

At the Cape Peninsula of University of Technology (CPUT) lecturers and researchers use social media tools to teach, network, gather data and share information resources (Ivala and Gachago, 2012). Academics might not have enough time to try out social media tools, so CPUT Libraries offer guidance regarding their usage and benefits. Researchers and students often get support from CPUT Libraries through consultation and/or training sessions. The general aim is to enhance the online visibility of scholars and their research outputs. Moreover, social media metrics enable researchers to evaluate and assess their research impact.

Claassen (2018) suggests that South African scholars should use the social media to monitor and counter pseudoscience and quackery because it is their duty to communicate with the public. Scientists are responsible for driving the release of information about their discoveries and have to explain science in a simple manner without condescending (Classen, 2011). CPUT Libraries encourage the institution's researchers to subscribe to numerous social media platforms to facilitate scholarly dialogues and public engagement for increased societal impact. Carpenter et al. (2012) claim that the social media can be used to construct scholarship. The widespread use of social networking sites by university communities can lead to their integration into the pedagogics of higher education institutions (Sugimoto et al., 2016).

Meanwhile, Stellenbosch University has partnered with Leiden University in the Netherlands to use social media to capture and measure the social impact of the scientific activities of African scholars between 2014 and 2020 (SciSTIP, 2018). The two institutions aim to explore how a global audience responds to African publications. Early stages of analysis have already revealed that African scholars' research topics are receiving extensive attention on Twitter (SciSTIP, 2018).

Stellenbosch University academics value the importance of social media metrics, especially in the fields of science communication and scientific evaluation (Costas, 2018). Social media metrics measure the interactions and activities of scientists in the digital environment (Naderbeigi and Isfandyari-Moghaddam, 2018), thereby contributing to expansion of the scientific knowledge base as well as providing solutions to real-life problems. Costas (2018) points out that data from these metrics can be used to study other types of impact linked to scientific activity, scientific communication and dissemination.

Mouton and Tijssen (2016) maintain that the main outcome revealed by social media metrics pertains to the societal and economic benefits of scientific projects. This highlights the significance of social media in science communication, knowledge dissemination and its assessment.

In teaching, social media tools have been recognised as helping to improve the throughput rate in South African universities. African Higher Education Institutions generally are faced with the massification of student enrolment due to social and political pressures, which threatens to compromise the quality of education (Mohamedbhai, 2014). Murire and Cilliers (2017) propound the social constructivist view that knowledge is developed through students' interacting in academic social networks. This applies also to discussion that occurs on non-academic platforms like Whatsapp, Twitter and Facebook.

According to Bozalek, Ng'ambi and Gachago (2013) and Gachago et al. (2013), facilitation of the use of social media tools and the provision of Open Educational Resources (OER) are meeting the challenge of ensuring affordable and quality education is provided by universities in South Africa. The 2015 and 2016 countrywide student protests and subsequent closure of universities sparked the initial rush towards online learning off campus (Swartz, Gachago and Belford, 2018). There was huge interest in using both learning management systems (LMS) and the social media to recover lost teaching and learning time (Swartz, Gachago and Belford, 2018).

Swartz, Gachago and Belford (2018) argue that the ethics of on-line or blended learning must focus on academic integrity and honesty. Questions were raised about the validity of

summative assessments off campus, as well as issues of unequal student access to electronic resources.

Digital literacy may be a problem too (Swartz, Gachago and Belford, 2018). Even if resources are distributed speedily, fairness may still not prevail because students may be lacking the skills to use unfamiliar tools. Africa's rate of growth in the use of mobile cellular phones is relatively high compared to other continents in the world (Anonymous, 2016), so the implementation of a cohesive strategy involving the use of mobile cellular phones to access teaching and learning material from the social media may be effective.

Ivala and Gachago (2012) investigated if the use of blogs and Facebook in three programmes at a South African University of Technology enhanced student learning or not. It was discovered that the students who embraced these tools as learning aids experienced increased engagement in learning both on and off campus (Ivala and Gachago, 2012). Twenty- first century learners, often referred to as the Digital Generation, will embrace the use of digital devices. If a lecturer has a good lesson plan, and the students are equipped with resources in terms of devices and the skills to operate them, they will embrace social media tools in their learning environments.

Ivala and Gachago (2012) conclude that Facebook and blogs are likely to impact positively on student levels of engagement. Since this engagement encompasses off-campus learning, Attwell (2014) and Tur and Marín (2015) suggest that a Personal Learning Environment approach can enhance the use of social media for active learning. It is important to include a reflexive learning component because this is essential to the Personal Learning Environment approach. According to Murire and Cilliers (2017), the stumbling blocks identified in social media integration processes in South African universities include:

- lack of clear strategy
- inadequate knowledge
- limited resources (both physical and in terms of skills)

They nonetheless describe how University of Fort Hare scholars view the social media as essential for academic activities, and suggest how it could be a useful tool to improve students' pass rates.

2.4 Social Media metrics and evaluating research impact

2.4.1 Research impact evaluation and social media metrics

The San Francisco Declaration on Research Assessment (DORA, 2012) recommended the use of article-level metrics to judge the individual articles or authors (DORA, 2012). Social media metrics measure only at article level, and have the additional advantages of diversity,

openness and speed (Wouters & Costas, 2015). But for these metrics to be used realistically for research evaluation, they have to be consistent and transparent (Wouters, Zahedi and Costas, 2018). Social media metrics are not limited to interactions with research outputs but include interactions with various entities within the scholarly community, referred to as scholarly agents (Haustein, Bowman and Costas, 2016).

However, social media indicators (from, for example, Twitter and Facebook) pose difficulties in the context of concepts of scientific impact and scholarly activities, since they measure types of interaction that are not directly related to research performance (Wouters, Zahedi and Costas, 2018). This interaction nevertheless contributes to the evidence of public engagement that is sought by research funding bodies.

According to Wouters, Zahedi and Costas (2018), research evaluation does not currently concentrate on communication in the social media but on the scholarly dimensions of research activities. This is why the inclusion of social media metrics has been proposed. A distinction is drawn between social media metrics with a stronger social media focus and those with a stronger scholarly focus (Wouters, Zahedi and Costas, 2018).

Social media-orientated tools or platforms capture the interactions of diverse users and are not restricted to scholarly users, whereas scholarly-orientated tools and platforms are more concerned with the evaluation of scholarly entities and activities (Wouters, Zahedi and Costas, 2018). For example, Facebook and Twitter have a social media focus only, while academic social network platforms like Mendeley, ResearchGate and Academia.edu have a scholarly focus, generating both social media indicators and scholarly indicators (for example, number of followers and number of citations, respectively).

Wouters, Zahedi and Costas (2018) contend that it is more difficult to incorporate social media metrics, which have a strong social media focus, into traditional research evaluations. Nevertheless, the reception and coverage of scholarly outputs on social media clearly play a role in research evaluation. It is not so much scholarly impact that is being assessed, but the social media response to the outputs posted on the social media platform (Wouters, et al., 2018). This appears to confirm Thelwall and Kousha's (2015) claim that a social media metric should be viewed as only measuring something about the social media platform.The social media monitoring process may reveal the following as feedback (Thelwall and Kousha, 2015):

- knowledge gaps
- research outputs' visibility
- research relevance to the targeted community
- stakeholders' activity on social media etc.

- public engagement.

Table 2.1 presents the social media indicators that can be used to evaluate research.

Social media dimension	Example indicators
Coverage and presence on social media of scholarly objects	publications mentioned on Twitter, Facebook etc. scholars with a Twitter account
Reception and attention on social media	- tweets to a given publication with some degree of engagement
Engagement of social media users with scholarly objects	- tweets to a given publication containing comments, hashtags or remarks from the users
Communities of attention around scholarly objects	- of tweeters tweeting the publications of the unit

Table 2.1 Social media indicators (Reproduced from Wouters, Zahedi and Costas, 2018)

Wouters, Zahedi and Costas (2018) warn that social media metrics fail to fulfil some of the principles of responsible metrics (Wilsdon et al. 2015, particularly the requirements of transparency, openness and manipulability. On the other hand, several authors report that social media metrics correlate significantly with bibliometric indicators for individual articles, indicating that social media metrics relate to scholarly activity in one way or another (Thelwall et al., 2013); Costas, Zahedi and Wouters, 2014; Haustein, Sugimoto and Larivière 2015).

2.5 Bibliometrics vs altmetrics

2.5.1 What is bibliometrics?

Bibliometrics is the quantitative analysis of scholarly and scientific literature (Waltman and Noyons, 2018). Scholars may use bibliometrics to get an overview of their research field, to establish connections with other research areas, and for research evaluation purposes (Waltman and Noyons, 2018).

Bibliometrics' three main filters are peer-review, citation counting, and journal impact factor (JIF) (Priem and Hemminger, 2010). According to Booth (2016), these filters may operate at the following levels:

- individual researcher's performance assessment
- research teams' evaluation performance
- acknowledgement of journals' contribution.

Fraumann (2017) argues that the role of bibliometrics is to study the impact of scholarly work, not to measure quality. But is a widely-cited journal with a high JIF also of high quality? Another pertinent question is whether quantity of publications may be used as the main criterion for quality, since one researcher may have one article with many citations while another may have published many that are not cited (and MacRoberts, 2010; Mas-Bleda et al., 2014).

Holmberg (2014) believes that citations indicate the value of research and therefore citation counts are appropriate for measuring its impact. But Jamali and Sangari (in Naderbeigi and Isfandyari-Moghaddam, 2018) qualify this by pointing out that citations can be positive, negative or neutral, so not all citations confirm the value of the work. Weingart (2005) claims that a bibliometric measure of quality is authentic if the combination of bibliometric indicators includes peer reviews, but most scholars maintain that all metrics have flaws (Andrés, 2009; Dimitrov; Kaveri, and Bayry 2010; Goldfinch and Yamamoto, 2012; Furner, 2014; Haustein, 2014; Lane, Largent and Rosen, 2014; Moustafa, 2015 Priem, 2014; Booth, 2016; Small, 2016). This perspective would appear to confirm the need to apply complementary sets of metrics.

Moreover, in recent years researchers have been using the social media to engage in conversations about research and to exchange electronic copies of research results, yet bibliometrics has not demonstrated its capacity to quantify impact using online environment activity and tools (Hammarfelt, 2014; Roemer and Borchardt, 2015; Williams, 2017). This too points to the need for alternative metrics (altmetrics) to supplement bibliometrics.

2.5.2 What is altmetrics?

Altmetrics is defined by Priem et al. (2010) as "…the study and use of scholarly impact measures based on activity in online tools and environments."

Fraumann (2017) says the term used to mean article-level alternative metrics but now encompasses webometrics, which measures the relationship between online items like websites (the two are similar but bot the same). Altmetric indicators are derived from social websites, such as Academia.edu, Mendeley, ResearchGate and Twitter, which yield data that can be collected by computer programs (Bornmann, 2014a; Wilsdon et al., 2015).

According to Stuart (2014), the term altmetrics was created by Priem and Hemminger (2010) to refer to the use of Web 2.0 technologies to establish alternative metrics to measure the

research impact of non-traditional forms of communication that form part of researchers' outputs. However, lately the primary attention of altmetrics is directed toward the impact of traditional scientific outputs online (Stuart, 2014).

This means that altmetrics can measure different types of impact and thereby fulfil a complementary role. Brown (2014), Moed (2016) and Kerchhoff (2017) agree that the new metrics are complementary rather than alternative. In another sense, altmetrics is not alternative anymore since various digital interactions, including reference tracking and personal library saving performed through reference management tools, are now providing mainstream approaches to the assessment of scientific research impact (Carpenter and Wilsdon, 2015).

Rousseau and Ye (2013) and Haustein et al. (2014) are inclined to suggest that the term altmetrics should be replaced by social media metrics or "influmetrics". But the diversity of metrics and sources that are classified under altmetrics makes it hard to reach consensus regarding what ought to resort under the label of altmetrics (Haustein, Bowman and Costas, 2016).

Although altmetrics does not yet have a widely-agreed definition, the fact that altmetric indicators do indeed demonstrate research impact (Bar-Ilan et al., 2012; Mohammadi, Thelwall and Kousha, 2015) should encourage research stakeholders to make use of altmetrics (Arau´jo et al., 2015).

2.5.3 Growing importance of altmetrics in research assessment

Commentators agree that social media and altmetric tools are popular as researchers benefit from retrieving additional evidence of research impact generated through altmetric indicators (Nicholas et al., 2015; Roemer and Borchardt, 2015; Gumpenberger; Glänzel and Gorraiz, 2016; Aharony et al., 2017; Orduna-Malea et al., 2017; Robinson-Garcia et al., 2017).

According to Costas (2017), there is increasing use of social media tools for scholarly communication purposes, with younger scholars taking the lead (Sugimoto et al., 2017). For instance, ResearchGate was launched in 2008 and by 2016 it had 11 million users and housed 100 million publications (Orduna-Malea et al., 2017). In 2015 on average 10,000 people joined the site daily and two million publications were added per month (Jamali in Naderbeigi and Isfandyari-Moghaddam, 2018).

Wikipedia, Facebook and Twitter are not classified as scholarly social network sites but their scholarly usage statistics are interesting. Articles mentioned in Wikipedia have higher citation counts than those on other sites (Evans and Krauthammer, 2011). Facebook and Twitter

promote information sharing (Forkosh-Baruch and Hershkovitz, 2011). Social media tools have become indispensable for millions of users around the world (Costas, 2017).

Social media altmetric indicators reveal how scholars participate in debates as well as how they disseminate scientific information (Robinson-Garcia et al., 2017). Altmetrics produces significant research impact data that can be used for evaluation purposes, but also contains data that can be used for measuring societal engagement (Piwowar, 2013; Bornman, 2014a).

Even in the contemporary media, though, published research reports and patents will always be the core of any evaluation exercise. Perfectly objective opinion may not exist, however, which is why quantitative data is necessary. Rousseau and Ye (2013) suggest that a combination of data from multi-metrics and peer review validates academic evaluations. Moed (2016) believes altmetrics is promoted by:

- the demand for a framework for research evaluation which regards science as a multi- dimensional activity with multi-dimensional impacts (with growing interest in assessing societal impact measures particularly)
- the repeat of the digitisation of scholarly communication (cf. Sugimoto et al., 2016)
- the movement of open science, which promotes accessibility and transparency in research practices.

Altmetrics complements traditional metrics and does not replace them (Priem, Groth and Taraborelli, 2012; Crotty, 2014; Morrill, 2015; Konkiel, Madjarevic and Rees, 2016; Moed, 2016; Kerchhoff, 2017). There is uncertainty about the exact extent of their complementary aspects of impact, but blog mentions, Mendeley reads, tweets and media mentions are among the indicators proven to be most relevant (Haustein et al., 2013; Costas, Zahedi and Wouters, 2014).

Other indicators such as downloads, shares, saves and views are perceived to have less potential, but they cannot be dismissed as irrelevant because each indicator is unique and must be applied appropriately to yield useful results. Gingras (2014) contends that an indicator must measure what it is meant to measure; if it does not, the researcher has made a bad choice. An indicator is a proxy that should measure the changing reality behind the concept over time and/or place. There has to be a strong correlation between the indicator and the concept if it is to be regarded as accurate (Gingras, 2014).

The heterogeneity of altmetric data is seen by some as a sign of weak correlations, or problems of excessive complexity; but on the other hand, it creates prospects for multi-faceted measurements of impact (Sugimoto et al., 2017). Adie (2014) views this as providing evidence of the overall validity of altmetrics. It resonates with the concept of a basket of metrics, which emphasises the importance of several metrics complementing each other to

strengthen the impact of the research. Crotty (2014) stresses that during these processes bibliometric indicators are not replaced by altmetric ones as the latter respond to different questions within different approaches.

Citations can be classified as altmetrics when they take the form of data generated by non-traditional research objects (Piwowar, 2013). Citations in blogs' offer an example. According to Haustein, Bowman and Costas (2016) and Priem and Hemminger (2010), this example illustrates the utility of multi- faceted measurements of scholarly impact.

Mendeley and Twitter seem to have more potential for determining the type of impact their altmetric data can provide, due to the relatively high density they possess (Robinson-García et al., 2014). This large quantity of data elements invites further exploration and analysis; it also increases the metrics' level of reliability since a lot can be extracted from them (Robinson- García et al., 2014). Reliability goes hand-in-glove with reproducibility, and there has always been a concern that social media data is not secured. Wouters and Costas (2015) affirm, however, that altmetric data is recorded and stored permanently and is therefore reproducible.

Carpenter and Wilsdon (2015) and Fraumann (2017) report that information that is gathered at a granular level from various indicators can be useful for uncovering various aspects of interaction and whether these translate into an impact. Konkiel, Madjarevic and Rees (2016) warn that qualitative data is still needed for a thorough understanding of the impact of research, and Kousha and Thelwall (2014) have cautioned researchers about the lack of generic quality control associated with impact indicators. The task at hand should determine what ethical procedures the researcher needs to follow to obtain reliable and valid results. But gaming occurs in biblometrics too (Andrés, 2009).

Altmetrics give early indications of impact (Holmberg, 2014; Stuart, 2014; Holmberg, 2016; Rowlands et al., 2011) by measuring impact in real time. Since they are produced at a greater speed than citations, they are quicker to accumulate evidence of impact and consequently spell the end of the monopoly of citation indexes (Robinson-García et al., 2014).

Buschman and Michalek (2013) clarify the importance of real-time metrics through the example of researchers who may have to depend on citation analysis to demonstrate the impact of work that is many years old, whilst it may be their latest work that is more relevant to the grant application at hand. Using this to support their application may be problematic because the recent work may yet to attain sufficient citations.

In order to improve research impact assessment processes, it has been proposed that altmetrics should be integrated into a plan to remove the delay associated with impact assessments conducted through reviews and citation analysis (Mazov and Gureev, 2015). Although the problem associated with the lack of adequate theoretical support for altmetics remains, reckoning with altmetric indicators definitely serves to accelerate the production of evidence of research impact.

Research has revealed strong correlations between the statistics of tweets about research articles on Twitter and the amounts of citations the same articles later receive (Eysenbach, 2011; Shuai, Pepe and Bollen, 2012). Once again, Holmberg (2014) warns that research has also shown that evidence of scholarly activity and the attention it attracts in the social media do not always demonstrate the quality or impact of that research. Yet, as Gingras (2014) points out, an indicator is just a proxy, measuring the changing evidence of a concept over time or place. A researcher has to understand the type of impact that is being assessed at a particular point, and respond to it accordingly.

Researchers in the early stages of their careers are the ones who bear the brunt of the slow nature of citation accumulation (Matthews, 2016). They can limit the severity of this problem by subscribing to social media networks whose altmetric indicators will produce data in real time. Concern has been expressed about the ease with which altmetric indicators can be gamed (Mounce, 2013), though social media platforms like Google are constantly improving their algorithms to combat gaming (López-Cózar, Robinson-Garcia and Torres-Salinas, 2012). It can be expected that all reputable platforms will follow suit because they want their data to be classified as reliable.

Altmetric data can also produce impact evidence for research works that may not have been cited but have been used. Outputs can be referenced in formats that are not citable but are covered by artefacts altmetrics, which tracks influence on all media platforms and covers a diversity of information sources (Dhiman, 2015).

2.6 Research funding, societal impact and altmetrics

2.6.1 Societal impact

Research funding institutions and governments around the globe want societal impact to be included in the evaluation of scholars' research outputs (Bornmann, 2012; Kamenetzky, 2013; Nadkarni and Stasch, 2013; Cress, 2014; Joly et al., 2016; Bornmann and Haunschild, 2016; Thelwall et al., 2016). The organisations and governments see evidence of societal impact as a demonstration of scientific excellence (Piwowar, 2013; Viney, 2013; Hicks et al., 2015; Wilsdon et al., 2015).

Many funding bodies have called for the inclusion of altmetrics in research assessment (European Commission, 2017). Altmetrics is viewed as supporting the open science system. Open science drives the free sharing of knowledge by all, using digital technologies and collaborative online tools (European Commission, 2017), while altmetrics is also mainly generated by online platforms that are subscription free.

Open science can improve the quality of science and increase its impact, as well as drive the advancement of reliable, efficient and accurate knowledge that will be understood by society (European Commission, 2017). This knowledge will help meet the challenges faced by society and enable development, empowering all stakeholders at every level of society to reuse scientific findings to contribute towards competitiveness and growth (European Commission, 2017).

Research institutions and universities have taken seriously calls for the inclusion of societal impact and altmetrics in the research assessment process. On the international front, for example, institutions that are exploring the dynamics of societal impact include:

- the Oslo Institute for Research on the Impact of Science (OSIRIS), whose team partnered with Spain's INGENIO Research Institute and the United Kingdom's Manchester Institute for Innovation (OSIRIS, 2017)
- the International Network Assessment and Evaluation of the Societal Impact of Science (AESIS) based in the Netherlands (AESIS, 2015).

Universities in the United Kingdom are now required to publish their societal impact assessments, while research impact is part of the Finnish University Act (Fraumann, 2017). British universities have held conferences to promote societal impact, and the Irish Research Council has contributed funds to the impact-focused United Nations' Sustainable Development Goals project (Fraumann, 2017). Universities in the United States have also started campaigns to raise awareness about the importance of impact for example, University of California at Berkeley, and University of Chicago (University of California at Berkeley, 2015; University of Chicago, 2015).

In response to the country's socio-political challenges, the South African Government's Department of Science and Technology (DST) has partnered with the NRF to establish a Centres of Excellence Programme, hosted by several universities in South Africa and Leiden University in the Netherlands (SciSTIP, 2018). The Centre of Excellence in Scientometrics and Science, Technology and Innovation Policy (SciSTIP) is housed in Stellenbosch University's Centre for Research on Evaluation, Science and Technology (CREST).

Other co-hosts include the Centre for Higher Education Trust (CHET), based in Cape Town, the Institute for Economic Research on Innovation (IERI) at Tshwane University of Technology, and the Centre for Science and Technology Studies (CWTS) research institute at Leiden University. SciSTIP has paid attention to issues of scientific research across the continent of Africa, and reacted to increasing worldwide interest in the impact of this research (University of Stellenbosch, 2018).

Fraumann (2017) notes that research impact is also discussed in international policy meetings; for instance, the meetings of the Small Advanced Economies, in which Denmark, Finland, Ireland, Israel, Singapore, Switzerland and New Zealand are members (Science Foundation Ireland [SFI], 2016; Small Advanced Economies Initiative, 2016). Additionally, research institutions use the press to inform stakeholders about the social impact of their research (Fraumann, 2017).

Sub-Saharan African countries have formed an organisation called Development Research Uptake in Sub-Saharan Africa (DRUSSA), which has assisted twenty-four member universities to build their capacity to gear their research output s to societal needs. CPUT is one of these universities. CPUT has committed to optimising its research uptake by engaging with communities in its vicinity and investigating the social and natural challenges that citizens face daily (Cape Peninsula University of Technology, 2012). Initiatives such as this illustrate that countries, institutions and individual researchers are making efforts to ensure that their research outputs are relevant and make an impact on their societies.

In South Africa, ASSAf has been founded with the mission of using science to uplift society. This academy is mandated to get rid of barriers between scientific knowledge and laypersons, by driving science education and the creation of a culture of science in the South African population. ASSAf fully embraces and support open science, facilitating the engagement of members of the general public in matters of scientific research and assessing the impact of such research on society (ASSAf, 2018).

2.6.1.1 Public engagement

It is challenging to measure the societal impacts of public science communication since it takes a long time to predict these impacts and also to trace them afterwards (Joubert, 2018). Joubert (2018) says that research ethics make the logistics of public engagement time consuming. However, if researchers make public engagement part of the procedural strategy right from the beginning it should not be too demanding. An impact evidence plan should be embedded in the core research process and the necessary resources allocated accordingly.

Reed (2018) believes that researchers can trace societal impact through their public engagement on the social media, reaching their targeted audience and communities that are otherwise hard to reach. In the process, they can build relationships capable of enlarging the societal impact of their work. That is, researchers can use feedback from members of the public to evaluate the impact of their work (Reed, 2018).

It is not easy to motivate academics to engage with the public in scientific debate by including societal impact assessment in their research evaluation processes (Spaapen and Van Drooge, 2011; Grand et al., 2015; Terämä et al., 2016; Holliman and Warren, 2017). Nevertheless, the potential of the requirement to stimulate engaged scholarship is acknowledged (Priem and Hemminger 2012; Bornmann, 2014a).

Robinson-García et al. (2017) suggest that societal impact assessment should be based on qualitative methodologies and focus on mapping the contexts of engagement among researchers and stakeholders. It is important that government policymakers should be aware of public scientific debates because science contributes towards the solution of societal problems. Donovan (2011) explains that measurement of societal impact encompasses social, economic, cultural and environmental aspects, and these are mutually inextricable. It is also important to bear in mind that these aspects will vary in different geographical areas, as well as by culture, hence comparison should be considered before generalisation.

In South Africa, universities are disseminating their research findings to the broader public by various means; for instance, the University of the Witwatersrand has its yebogogga webpage (https://www.wits.ac.za/yebogogga/; University of the Witwatersrand, 2018), which displays the latest research updates in a basic way that can be understood by members of the general public. Van Zuydam (2018) emphasises the importance of journalists' reporting high-quality science news, and the University of Stellenbosch offers a programme in Science Journalism.

Scientists are expected to engage with the public for the sake of benefiting from the potential attention they may attract, as well as the funds (Weingart and Guenther, 2016). The social media makes this process easier. There is nevertheless a need for scientists and journalists to advance their skills and expertise to be able to communicate science to the public and clarify the role of science in society (Classen, 2011).

An informed communication strategy will help to curb the problem of sensationalism regarding scientific matters as reported in the media. In some instances, there is a perception that journalists and scientists compete to report new scientific discoveries. Journalists may feel that they are best positioned to communicate with the public, while scientists may be

anxious about distortion of scientific facts by journalists since their knowledge of a particular discipline may not be very deep.

Weingart in Joubert (2018) perceives the participation of popular media in science debates to be a solution to the fact that journal articles are actually read by so few. Popular media that are accessible to larger numbers of people have the potential to increase public awareness of trends in science, as well as escalating research impact (Joubert, 2018). If we can get to the stage where members of the public discuss the scientific findings reported on public platforms, it will be a triumph for all stakeholders because empowerment and capacity building would have taken place.

2.6.2 Altmetrics: funders' choice

The European Commission requires research experts to understand altmetrics and be able to use them. This is to ensure that scientists make a worthy contribution to the development of evaluation methodologies for funded research (European Commission, 2016).

In 2016 and 2017, altmetrics was discussed by high-level European Union advisory bodies such as Research, Innovation and Science Policy Experts (RISE) (Fraumann, 2017). RISE advised the European Union to replace the Journal Impact Factor with altmetrics (European Commission, in Fraumann, 2017). This was as a result of reports about the inaccuracy of JIF measurements and their various forms of bias (Brumback, 2012; Curry, 2012; Cronin and Sugimoto, 2015), especially the widely-debated variation of values between different subject categories (Andrés, 2009).

According to Fraumann (2017), research funders like the British Wellcome Trust argue that altmetrics can answer the question of return on investment in research, since mentions outside the scientific community provide evidence of an impact on society. Fraumann (2017) is not convinced that fully reliable measurements of societal impact will ever be achievable, but in science generally there is no measurement that is absolutely free of error.

2.7 Conclusion

This chapter began by highlighting the objectives of ths study, and consequently discussing the theoretical framework in detail.

Sugimoto et al. (2017) highlight that digitisation and the use of social media have enabled broader scholarly discussions outside the community of specialist scientists and opened a gateway for informal discussions among researchers themselves.

This enables scientists to make their work public by engaging with society at various levels, in part to align their activities with the development agendas of governments. Advances in

the tools and techniques used in scholarly communication have rendered the exclusive use of bibliometrics to measure research impact inadequate, especially because traditional metrics are biased towards print scholarship.

The literature shows that both traditional and alternative metrics have flaws and should be viewed not as competitors but as complementary to each other. There is thus a strong case for including altmetrics alongside bibliometrics in the assessment of the impact of scientific research.

In the next chapter researchmethodology will be discussed in a quest to describe the research approach and methods employed to achieve the aim and objectives of the study

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research approach and methods employed to achieve the aim and objectives of the study.

The aim of the study was to produce a bibliographic record of the corpus of the Department of Tourism and Events Management's research from 2005 to 2018, to study its impact using altmetric indicators, and to examine the online visibility (in terms of social media sites) of the researchers in the department.

The three research objectives of the study were:

- To establish which academic social media platforms are popular among researchers in the Department of Tourism and Events Management.
- To compile a bibliographic record of research output of the Department of Tourism and Events Management from 2005 to 2018 and perform an altmetric analysis of it.
- To establish the extent to which researchers in the Department of Tourism and Events Management make use of academic social media platforms.

3.2 Research philosophy, approach and design

3.2.1 Research philosophy

A research philosophy is a point of view shared among scientists in a particular discipline regarding how phenomena might be understood and described (Patel, 2015). Nsengimana (2017) explains it as a researcher's belief about what constitutes the reality of the phenomenon, and how knowledge about the phenomenon should be generated. It influences the choice of methodology for data collection.

There are three major philosophical paradigms: positivism, constructivism and pragmatism (Saunders, Lewis and Thornhill, 2012). Positivism believes in the objective existence of a reality that can be discovered scientifically and measured (Saunders, Lewis and Thornhill, 2012). Constructivists, on the other hand, believe that reality depends upon point of view and the means of knowing, and constructivism is often associated with a qualitative methodology (Creswell, 2009; Bryman and Bell, 2015). Pragmatism combines elements of both positivism and constructivism (Saunders, Lewis and Thornhill, 2012).

The most appropriate philosophical paradigm for this study is positivism because it assumes the objective existence of a reality that it is possible to discover scientifically and measure. This study investigates the impact of the research outputs of the Department of Tourism and Events Management at CPUT using altmetrics as an instrument of measurement.

3.2.2 Research approach

Greener (2011) asserts that the approach to social scientific research can be quantitative, qualitative or mixed, depending on the goals of the research. The qualitative approach emphasises the description of experiences and perceptions in order to understand people's behaviour from their perspective or on their terms (Collis and Hussey, 2003; Kumar, 2014), whereas the quantitative approach emphasises the measurement of variables (Kumar, 2014). The mixed-method approach combines aspects of the quantitative and qualitative approaches to achieve a holistic perspective on the phenomenon under study (Creswell, 2009).

According to Given (2008), in the quantitative research approach data is collected, analysed, and displayed in numerical form, often with the help of certain instruments (Creswell, 2009). Singh (2007) observes that quantitative data allows for mathematical operations to be carried out on it, and is therefore convenient for a research process that is calculation-intensive. In sum, quantitative research enables the quantification of the phenomenon under investigation.

This study used quantitative methods to collect data. Creswell; Plano Clark and Vicki (2011) argue that quantitative data provides a more general understanding of a problem, and studies that use a sample for quantitative analysis produce findings applicable to the research population as a whole. This is called generalisability. The quantitative research methodology is viewed as a structured approach in which the objectives are pre-determined and the research is conducted to determine the extent of a problem or situation (Kumar, 2014).

Part of the study used altmetric analysis to measure the impact of research outputs and track the attention paid to them, and data was derived from the secondary sources described in Section 3.5, below. The measurable variables in this study are authors, publications and altmetric impact indicators over a specific period of time. The researcher sought to obtain an overview of the impact of the research outputs of the department concerned.

Kerchhoff (2017) argues that quantifying academic research outputs measures scholars' academic success as well as the influence of the research works they produce. The quantification of research outputs has been successfully performed in several studies (e.g. Pouris and Pouris, 2008; Haustein and Larivière, 2015; Gorraiz, Wieland and Gumpenberger,

2016; Tran and Aytac, 2016; Kerchhoff, 2017). This study adopted a methodology similar to that utilised in these studies.

Kerchhoff (2017) argues that altmetrics contributes significantly to the assessment of the impact of research works in scholarly and non-scholarly settings using data retrieved from social media. Social media platforms increase the visibility and usage of research works (Kerchhoff, 2017). In addition, altmetrics is better suited to tracing academics' works on the web than bibliometrics (Haustein; Sugimoto and Larivière, 2015; Roemer and Borchardt, 2015). Almind and Ingwersen, in Kerchhoff (2017), characterise altmetrics as measurement of the impact of science in webometrics, webometrics being data pertaining to article usage and citation on the web (Priem and Hemminger, 2010).

Figure 3.1 illustrates how webometrics, bibliometrics and altmetrics relate to scientometrics, which Hood and Wilson in Stuart (2014) regarded as the quantifiable study of science, its communication and policy.

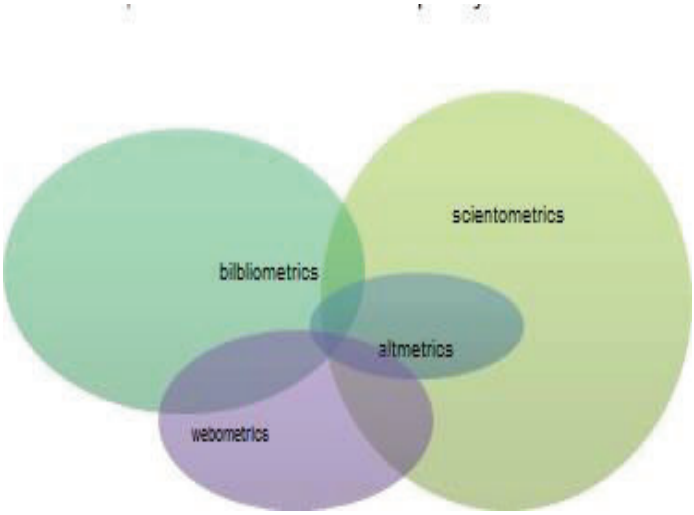

Figure 3.1: 'Metric' terminology in library and information science (Adapted from Stuart, 2014)

3.2.3 Research design

Mouton (2001) explains research design as a plan of how a piece of research is to be conducted, focusing on the kind of the result the study is aiming at. A research design is the procedure adopted by the researcher to answer questions objectively, carefully, accurately and transparently (Kumar, 2014).

Jensen and Laurie (2016) argue that whereas the research design is a plan of study, the research methodology is the strategy used to undertake the research plan. Research design incorporates decisions about the procedures for sampling, data collection and analysis (Terre

Blanche, Durrheim and Painter, 2006). It provides a framework for how the data will be collected and analysed, and how the findings will be presented (Leedy and Ormrod, 2014).

3.2.3.1 Case studies

The design chosen for this study is a case study. Yin in Rule and John (2011) defines a case study as an inquiry that investigates a phenomenon within its real-life context. A case is selected for study on the basis that it will produce the requisite quantity of data for exploration and analysis in order to answer the research questions.

In this study, altmetric data on the profiles of the academics in the Department of Tourism and Events Management was collected and analysed. The boundaries of the case study with regard to research works produced by academics in that department, is from 2005 to 2018. The results of a case study may not necessarily be generalisable because the case is a unique and specific phenomenon. As Stake (1995) says, the case study is really about particularisation and not generalisation.

If generalisation is to be made, there must be a clear basis for it, viz., a substantial motivation has to be given to support the generalisation. It is further emphasised that in a case study, a phenomenon must be looked from various angles in multiple ways, so that a lot of useful evidence can be collected (Thomas, 2016). Mills, Durepos and Wiebe (2010) argue that although the generalisability of case study research must remain dubious, a case may be useful in identifying themes and patterns which can be compared to those of other cases.

These comparisons can enable interested parties to explore the transferability of the case findings to other cases (Mills, Durepos and Wiebe 2010). In summary, Case studies are good for demonstrating uniqueness, which is appropriate for facilitating learning about situations that are poorly understood; nevertheless, they are capable of promoting understanding for similar situations (Leedy and Ormrod, 2014). This notion of lessons being learnt from similar circumstances endorses the notion that new knowledge emerges as an extension of existing information or facts (Saunders et al., 2012).

A case study provides a researcher with an opportunity to drill down deep for evidence (Yin, 2014). Rule and John (2011) confirm that in a case study, the researcher's priority should be the generation of data for in-depth knowledge about the phenomenon being probed. A case study accelerates problem-solving by enabling a researcher to focus precisely on the problem identified, and its inductive approach yields relevant, productive answers (Thomas, 2016).

Leedy and Ormrod (2014) claim that case studies can be useful for the formulation of theories, especially in their early stages. Case studies can have limitations in their subjective nature and development of formal generalisations (Simons, 2009).

Leedy and Ormrod (2014) and Swanborn (2010) agree that the case study's holistic approach can paint a complete picture from a variety of angles, essential for thorough scientific research. Such a rich, holistic picture can yield a lot of insight through diversified kinds of information (Thomas, 2016). Cousin (2009) notes that a case study can license expressive, descriptive and interpretative write-ups that are persuasive to the reader. This is attributable to the dynamic nature of case studies, which do not have a general step-by-step method like laboratory experiments.

Bell (2010) notes that a case study can be conducted as a follow-up to a survey or can precede a survey, to identify key issues which may need to be investigated further. Scientists seldom generalise on the basis of only one experiment, and normally make use of multiple experiments that have yielded the same results under different conditions (Thomas, 2016; Leedy and Ormrod, 2014; Yin, 2014). Similarly, a series of case studies might qualify for generalisation.

A case study's findings may be biased towards verification of the researcher's preconceived views, thus compromising the scientific value of the study (Flyvbjerg, 2006). However, bias in the reporting of findings can happen with any research design. It is only of real concern if it is deliberate.

Instrumentalist case study was used to investigate how alternative metrics can be used to supplement bibliometrics in a review of research impact.

3.2.4 Research population

A population is the pool from which a sample is drawn, and about which generalisation of a study's findings is made (Terre Blanche et al., 2006); though for this study generalisation is not applicable because it is a case study. The population provides or constitutes a set of objects which are the focus of the research and about which the researcher wants to collect information for analysis (Babbie, 2007). A population is therefore likely to be a collection of objects (or subjects) with common characteristics. For Bryman (2004) a population is simply a group of items or persons from which samples are taken.

With this case study research, the findings may not be applicable to the wider population of university academics and scientific articles. However, as mentioned earlier, the findings of this study can be compared with other cases to determine their transferability.

3.3 Sampling procedure

Sampling occurs when researchers select a portion of a larger population and use it representatively to gather information about the population as a whole (Fritz and Morgan, 2010).

Ishak, Bakar and Yazid (2014) believe that this is especially true for quantitative researchers who are concerned to select highly representative samples that will also serve for the application of probability theory. Probability theory becomes imperative because random sampling in quantitative study requires statistical analysis (Siegmund, 2018).

The sample was not necessary for this study because it is a case study; and therefore all researchers with known research outputs in the selected department are participants. For altmetric analysis, all researchers of the concerned department who produced outputs during 2005 to 2018 were selected sample of this study.

As for researchers' visibility investigation on social media platforms, focus was shifted to current staff members (2018), who were 26 in total. It would not be practical to investigate staff who have left CPUT, because online visibility is real time.

A final list was compiled from various sources including the following:

- Annual Research Reports produced by the Research Directorate of CPUT
- Department of Tourism and Events Management staff lists
- Institutional Repository's researchers' lists
- Centre for Tourism Research in Africa (CETRA) - which is housed in the Department of Tourism and Events Management at Cape Peninsula University of Technology.

The focus of the study was research outputs produced within the fourteen-year period from 2005 to 2018 by all staff members of the Department of Tourism and Events Management, including:

- Head of Department
- Senior Lecturers
- Lecturers
- Junior Lecturers
- Any other member of staff employed to work in the department capable of publishing a research document.

3.4 Reliability and Validity

Gushta and Rupp (2010) define reliability in terms of the credibility of the scores produced using the data-collecting instrument(s). Creswell (2009) characterises this as the internal consistency of scores to items on an instrument, i.e. test-retest correlations, as well as consistency in test administration and scoring. This means in part that if all things remain the same, and the research is repeated, it should produce the same results (Drost, 2011; Dudovskiy, 2016; Polit and Beck, 2017). In practice, reliability is typically concerned with the techniques applied to measure variables (Polit and Beck, 2017)

Babbie and Mouton (2001) describe validity as an expression of the extent to which an instrument measures what it is intended to measure. According to Creswell (2009), validity in quantitative research refers to meaningful and useful inferences from scores drawn using a particular instrument. The researcher should seek advice from subject experts or other researchers to determine whether a selected instrument is appropriate to gather data for a particular study (Creswell, 2009). An instrument is confirmed as valid when it yields correct measurements of what it is expected to measure (Thanasegaran, 2009).

Maree (2016) notes that threats to validity can be avoided by using an instrument that is reliable (see above). Validity determines the success of generalising the data gathered to a whole population (Maree, 2016).

3.5 Data collection instruments

The data required to answer the research questions and achieve the study's objectives was retrieved from secondary sources, or sources of existing knowledge about the phenomenon under investigation (Mouton, 2001). The data sources used in the study are discussed in detail in sections 3.5.1 to 3.5.6, below. They included various research reports, CPUT's institutional repository, academic social media platforms, ORCiD, Scopus database, PlumX and the departmental staff list.

3.5.1 CPUT's Research Reports

Research reports are produced by CPUT's Research Directorate on an annual basis. They outline the research outputs per Faculty, by departments within faculties, and by individual authors. The Research Directorate's reports were used alongside the publications of CETRA, CPUT's Institutional Repository and Google Scholar to collate the research outputs of staff of the Department of Tourism and Events Management over the period 2005 to 2018.

Google Scholar was used rather than Publish or Perish (PoP). PoP is Publish or Perish is software program that retrieves and analyzes academic citations; it publishes metrics of

outputs' production and citations (Harzing, 2007**).** Google Scholar is one of the main data sources for PoP (Harzing, 2007); it was anticipated that researchers' profiles in Google Scholar would yield a greater variety of data, including 'grey literature'.

For this study, all kinds of research outputs were included in the bibliographic list, viz, conference material, journal articles, books, book chapters, technical reports and reviews. This was because altmetrics is capable of measuring the impact of non-traditional research items which bibliometrics cannot.

An obvious limitation associated with using PoP is that its main focus is the citation data of scholarly publications (Harzing, 2007), whereas this study's focus is altmetrics, while another advantage of Google Scholar is that it has real time updates: for instance, when the researcher's updates his or her profile, the data is immediately available for use on the platform.

3.5.2 Publications of the Centre for Tourism Research in Africa (CETRA)

According to Swart (n.d.), CETRA promotes research on African tourism development and nurtures contact between tourism research centres and individual researchers globally. CETRA additionally functions to:

- Highlight CPUT's contribution to tourism and hospitality education
- Facilitate research in the fields of tourism, hospitality, sport and events at CPUT.
- Facilitate public engagement
- Provide research facilities for staff and students.

The following publications were consulted from CETRA's collection to search for additional research works produced by the Department of Tourism and Events Management staff:

- CETRA Quarterly
- CETRA Reports
- CETRA Research Updates.

3.5.3 CPUT's Institutional Repository

This is an online platform where the university's research outputs are loaded by researchers with the assistance of the library staff. The Institutional Repository disseminates and shares the outputs of researchers, and can provide metrics at the levels of author and publication outlet.

3.5.4 Academic social network platforms

Academic social media platforms were also good data sources for the research outputs of the Department of Tourism and Events Management staff. These platforms included Academia.edu, ResearchGate, Google Scholar, LinkedIn, ORCiD and Mendeley. LinkedIn, ORCiD and Mendeley may not be classified as academic social media platforms however, they are included in the list because researchers use these platforms to disseminate or promote their research outputs.

3.5.5 Scopus database

Scopus has partnered with PlumX to be able to provide altmetric information about publications in its repository and other research artefacts (Peters et al., 2016. PlumX is an online tool that provides research impact metrics data, collected in the form of altmetric indicators. PlumX was used because it is the only altmetric tool that CPUT's researchers have at their disposal to complement their bibliometric records for a holistic impact evaluation.

3.5.6 Staff list

The 2019 staff list of the Department of Tourism and Events Management was used to investigate the visibility and online activities of current departmental researchers on social media platforms. This was consequent on the decision that only researchers who were employed at the time that this study was conducted (in 2018, when data was collected) would have their online visibility and activities investigated. This was due to the limitations posed by the scope of this study.

3.6 The pilot study

Persaud (2010) refers to a pilot study as a trial run for a research procedure or a research instrument. In this study, certain secondary data sources were used for data collection and were therefore initially appraised to test if there would be problems prior to the commencement of the main study. If problems were encountered action would have been taken to improve the process in preparation for the actual study.

The piloting process was primarily aimed at establishing whether the data collection instruments which the author had identified provided sufficient data to answer the research questions and attain the study's objectives.

The data sought related to the following concepts derived from the study's aim and objectives:

- Alternative metrics' supplementary role in respect of bibliometrics
- Researchers' online visibility and activities
- Academic social network sites.

The outcomes of the pilot study indicated the need to add more data sources to finalise the list so as to provide sufficient data for analysis. The researcher believes that the accumulation of adequate data minimises the margin of error in the data analysis stage.

3.7 Data collection process

The data for this study was collected on the basis of two lists, the bibliographic list collated for altmetric analysis, and the 2019 staff list of the Department of Tourism and Events Management, as provided by the Faculty. The latter list was useful for identifying the researchers whose visibility and activities were explored on academic social network sites.

3.7.1 Bibliographic list

CPUT's institutional annual research reports from 2005 to 2018 were used to collate the list of publications emanating from the Department of Tourism and Events Management. Searches were also conducted in CETRA's publications, the Institutional Repository, Scopus database, ORCiD and Google Scholar, for research outputs which might have escaped notice in the list drawn up from the research reports.

Then a further search for research items was conducted on the Scopus database. PlumX API on Scopus enabled access to PlumX metrics to find research outputs on Scopus records. The altmetric scores for these outputs were subsequently captured through PlumX metrics. These scores were then used for the altmetric analysis of the research works.

3.7.2 List of current staff members

The 2019 list of staff members of the Department of Tourism and Events Management was used to investigate researchers' online visibility and activities on the scholarly social media networks listed in Section 3.5.4, above. Data was also generated by exploring the affiliations of staff members to these networks. This process helped to answer the research questions.

3.8 Data processing and analysis

All the data collected, being quantitative was captured into Microsoft Excel spread-sheets and analysed using the Excel software program.

3.8.1 Analysis of data from various output lists

Data was classified according to document types and quantified in each of the following lists: bibliographic list, research reports, CETRA's reports, institutional repository, Scopus database and Google Scholar. This data was subsequently analysed using available functionality within Excel program to produce graphs and tables.

3.8.2 Analysis of data from individual network platforms

The affiliation of current staff members to Academia.edu, Google Scholar, LinkedIn, Mendeley, ORCiD and ResearchGate was established to determine the researchers' visibility and activity on these platforms by:

- quantifying the networking scope of researchers
- probing the patterns of sharing outputs
- establishing usage, capture and social media metrics indicators.

All the data was captured in graphs or tables for analysis using Excel functionalities.

3.8.3 Analysis of altmetric data from PlumX

The altmetric indicators which signify the impact of research items were captured from PlumX, which is embedded in the Scopus database. Quantified altmetric indicators were put into tables to prepare for altmetric analysis. The data captured included:

- usage metrics indicators
- capture metrics indicators
- social media metrics indicators.

3.9 Ethical considerations

Babbie (2007) and Ross, Smith and Morrow (2015) agree that social scientists need to be consciously aware of the ethical principles shared by researchers about what is proper and improper in scientific inquiry. Ethical issues may arise at all stages of the research process, including the planning phase, while the study is being conducted or when the findings are reported (Ross, Smith and Morrow, 2015).

It is therefore important that before a study is conducted permission is secured from a formal ethics review committee within the researcher's institution. In this study, the researcher sought and was given the consent of the Department of Tourism and Events Management to garner data from the research works and social media profiles of its researchers.

Furthermore, the Faculty of Business and Management Sciences' Ethics Committee granted Ethical Clearance (see Appendix D) for the study.

The following ethical principles associated with research have been adhered to:

- Autonomy, informed consent and anonymity: participants must be fully informed about the study, should be made aware that its voluntary and their privacy must be safeguarded (Rule and John, 2011; Leedy and Ormrod, 2014).
- Avoidance of harm to participants: researchers should not expose respondents to psychological or physical harm (Leedy and Ormrod, 2014).
- Contribution to the body of knowledge: researchers must report complete and honest findings (Kumar, 2014; Leedy and Ormrod, 2014).

3.10 Conclusion

In this chapter, the research methodology of this study was explained. The use of a case study as the research design of choice was outlined and justified. The advantages and disadvantages of case studies were extensively argued. There was discussion of the research population, sampling, and the data instrumentation and collection. The data processing and analytical procedures were described, and issues pertaining to the principles of ethical research were outlined

CHAPTER 4

DATA PRESENTATION AND ANALYSIS

4.1 Introduction

In this chapter, the quantitative data collected is presented and analysed. Complex raw data can be represented in the form of figures, tables, graphs and/or text in order to assist in its interpretation (Welman and Kruger, 2001; Jackson, 2009; Choi and Pak, 2010). Denscombe (2010) confirms that the data presentation process involves arrangement of the data so as to produce a comprehensive and meaningful text or display of visual material.

Data was collected from the following sources, as discussed in Section 3.5:

- Departmental staff list
- CPUT Annual Research Reports
- CPUT's Institutional Repository
- Selected scholarly social media networks, namely, Academia.edu, Google Scholar, LinkedIn, Mendeley, ORCiD and ResearchGate
- Scopus Database
- PlumX

PlumX is one of the three most recognised tools available for the altmetric analysis of research outputs. The other two are ImpactStory and Atmetric.com. PlumX was chosen for this study because it is the only one that the researchers concerned have at their disposal, by virtue of CPUT's paid subscription to Scopus.

4.2 Description of data

The study's data analysis consists of three parts. The first part focuses on research items captured in the bibliography of outputs of the Department of Tourism and Events Management from 2005 to 2018, compiled from the following secondary sources:

- CPUT's annual research reports
- CETRA reports
- Institutional repository
- Scopus database
- Google Scholar.

The second part of the data analysis in this chapter, concentrated on the visibility and the activities of researchers of the Department of Tourism and Events Management in Academic

Social Media platforms, viz. Academia.edu, Google Scholar, LinkedIn, Mendeley, ORCiD and ResearchGate.

The third part of the study deliberated on the altmetric analysis of the individual publications which are recorded in the bibliographic list, using PlumX as an altmetric tool. The altmetric indicators of the individual publications were downloaded from PlumX and thereafter the comparative analysis was performed on characteristics of the indicators.

4.3 Data presentation

The data was prepared for analysis by categorising the research outputs by year of publication and type of document or artefact.

First, research items were examined individually to detect the date of publication so that they could be arranged in order of year of publication. The research items were also captured according to their types, which included:

- Books
- Book chapters
- Journal articles
- Reviews
- Conference papers and posters
- Technical reports.

After identifying the research items by type, the data was then captured into tables or illustrated by graphs. Statistical frequencies and percentages were calculated, where applicable. Data was analysed using functionalities embedded within Excel. As Du Plooy-Cilliers, Davis and Bezuidenhout (2014) suggest, however, explanatory text has been added to clarify what is illustrated by the table and graphs. The amount and type of data in this thesis did not necessitate the inclusion of a coding process.

4.3.1 Research outputs for the period 2005 to 2018

The total number of research items published during the period 2005 to 2018 was 260. Figure 4.1 illustrates the quantified output productivity in descending order of the year of publication. The 40 research items produced in 2012 constituted the greatest annual total for the period 2005 to 2018. The second highest figure was 28 items in 2010, followed by 27 items in 2008. The least productive year was 2014 (9 items).

The average number of research outputs per year according to the recorded frequencies for the period 2005 to 2018 was 19. The average was met in 2005 and in 2015. However, it was

exceeded in 2008, 2010, 2012 and 2017, with the following frequencies: 27, 28, 40 and 24, respectively.

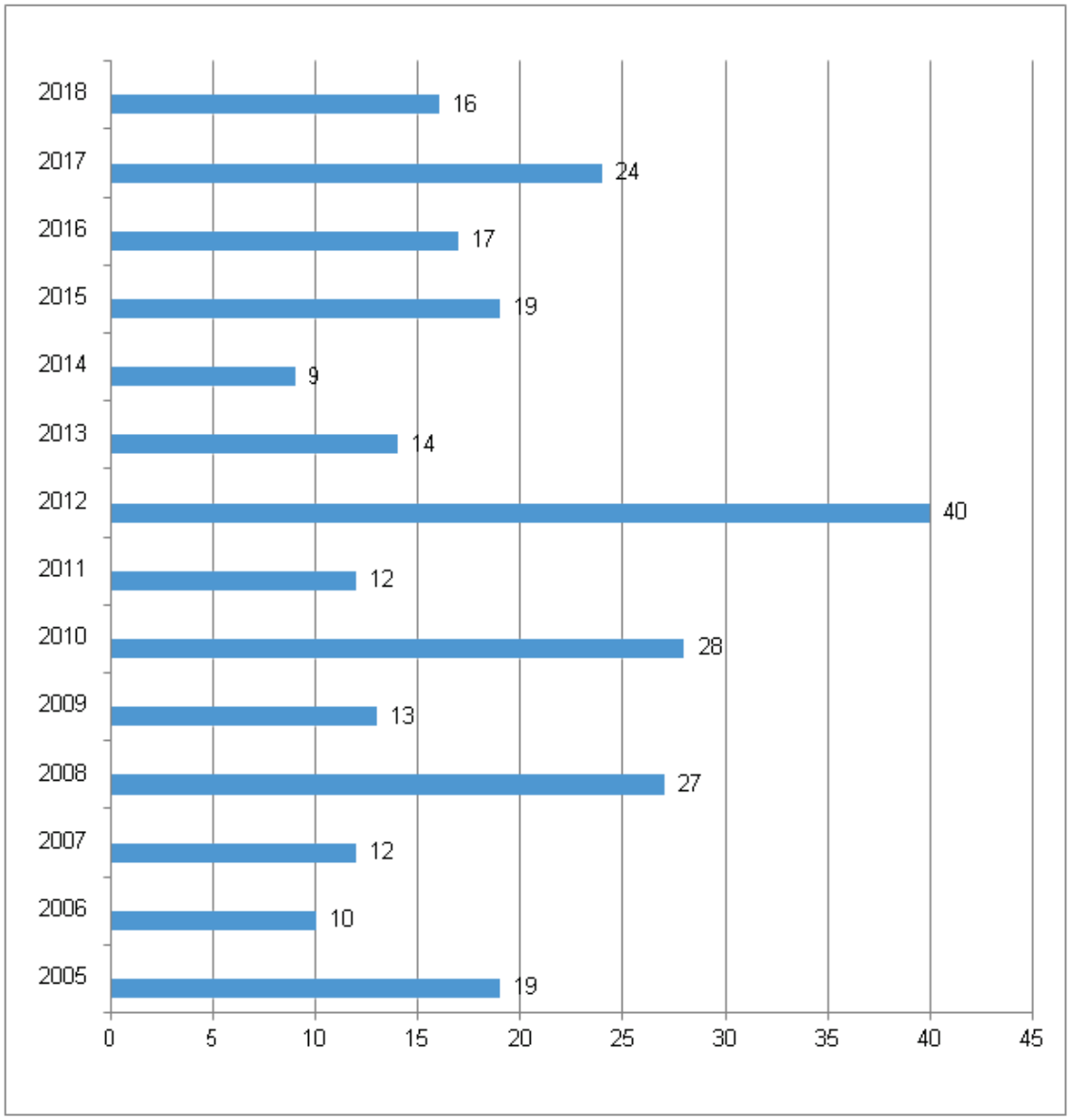

Figure 4.1: Research outputs 2005 to 2018 (n=260)

4.3.1.1 Document types

Document types in the Bibliographic list of outputs over the period 2005-2018

Table 4.1 below, presents the frequencies and percentages of document types among the research outputs of the Department of Tourism and Events Management. The most frequently produced type of output over the period 2005 to 2018 was the journal article. There were 123 journal articles, representing 47% of the overall outputs, followed by conference publications at 95. Conference publications included both conference papers and posters. Conference material represents 36% of the research items on the bibliographic list.

The lowest frequency of document types recorded on the 2005-2018 bibliographic list was for books and reviews. There were 2 of each or 0.8%.

Items by type	Frequency	Percentages
Books	2	0.8
Book chapters	24	9
Journal articles	123	47
Conference material	95	37
Reviews	2	0.8
Technical reports	14	5.4
Total	**260**	**100**

Table 4.1 Document types in the bibliographical list (2005 to 2018)

Document types in CPUT's Research Reports

The data in Table 4.2 portrays the frequency of document types in the bibliographical list versus the list compiled from the Annual Research Reports issued by CPUT's Research Directorate. The captured data show that the category of books was represented at 100% in the Research Report list. The second highest representation of document type found in the Research Reports consists of technical reports at 79%. In the bibliographic list, there are a total of 14 records of technical reports produced during the period 2005-2018, whereas the Research Reports recorded a total of 11. Technical reports are followed by book chapters: of the 24 book chapters in the bibliographic list, 16 records or 67% appear in the Research Reports list.

The least represented document type in the Research Reports list is Reviews at 50%, only one of the two in the bibliographic list being documented in the Research Reports. In short, 64% of the bibliographic list's documents feature in the Research Reports, a secondary document source for the bibliographic list.

Items by type	Bibliographic list's frequency	Research Reports' frequency	Percentage
Books	2	2	100
Book chapters	24	16	67
Journal articles	123	73	59
Conference material	95	63	66
Reviews	2	1	50
Technical reports	14	11	79
Total	**260**	**166**	**64**

Table 4.2 Document types in CPUT's research reports

Table 4.3 presents data relating to document type by year of publication in the Research Reports. Like the data in the bibliographic list, it indicates 2012 as the year with of highest productivity with 34 research items. According to the data captured in the Research Reports, the second-highest productive year was 2008 with 29 research items, followed by 2010 with 24 research items produced.

The least productive year was 2005 with no research publications reported, followed by 2009 with 3 research items.

Year Range	Books	Book chapters	Journal articles	Conference Material	Reviews	Technical reports	Total
2018	0	0	11	1	1	0	**13**
2017	0	1	8	0	0	0	**9**
2016	0	1	5	1	0	0	**7**
2015	0	2	2	0	0	0	**4**
2014	0	1	4	6	0	0	**11**
2013	1	1	9	2	0	0	**13**
2012	1	4	15	14	0	0	**34**
2011	0	1	2	2	0	0	**5**
2010	0	3	6	15	0	0	**24**
2009	0	1	0	2	0	0	**3**
2008	0	0	8	14	0	7	**29**
2007	0	0	1	3	0	4	**8**
2006	0	1	2	3	0	0	**6**
2005	0	0	0	0	0	0	**0**
Total	**2**	**16**	**73**	**63**	**1**	**11**	**166**

Table 4.3 Summary of output by publication year and research item in research reports

Document types in CETRA Reports

Table 4.4 which follows provides insight into the numbers of research documents captured in CETRA reports in comparison to those captured in the bibliographic list. The majority of documents recorded in CETRA reports comprises journal articles (35). They are followed by 16 listings of conference material and 12 book chapters.

The book chapters amount to 50% of those in the bibliographic list, whereas the 35 journal articles only account for 29% of those on the bibliographic list and, the conference material a mere 17%.

There are no books or reviews recorded in the CETRA reports. In summary, the total of 75 records of CETRA documents amount to 29% of all the documents recorded in the bibliographic list.

Items by type	Bibliographic list's Frequency	CETRA Reports' Research Items	Percentage
Books	2	0	**0**
Book chapters	24	12	**50**
Journal articles	123	35	**29**
Conference material	95	16	**17**
Reviews	2	0	**0**
Technical reports	14	12	**86**
Total	**260**	**75**	**29**

Table 4.4 CETRA reports' item list: document type

Table 4.5 displays the research production in CETRA reports by year of publication. The year with the highest production was 2008 with 33 research items yielded. The next high production recorded was in 2005 with 20 items listed; it was followed by 11 items in 2007. The 2011 to 2018 range has no records of research items produced; the reason is not clear.

Year Range	Books	Book chapters	Conference material	Journal articles	Reviews	Technical reports	Total
2018	0	0	0	0	0	0	**0**
2017	0	0	0	0	0	0	**0**
2016	0	0	0	0	0	0	**0**
2015	0	0	0	0	0	0	**0**
2014	0	0	0	0	0	0	**0**
2013	0	0	0	0	0	0	**0**
2012	0	0	0	0	0	0	**0**
2011	0	0	0	0	0	0	**0**
2010	0	1	0	0	0	0	**1**
2009	0	8	0	1	0	0	**9**
2008	0	0	16	12	0	5	**33**
2007	0	0	3	1	0	7	**11**
2006	0	1	0	0	0	0	**1**
2005	0	2	16	2	0	0	**20**
Total	**0**	**12**	**35**	**16**	**0**	**12**	**75**

Table 4.5 Overview of Output by publication year and research item in CETRA report

Document types in Institutional Repository

As was the case with other secondary data sources discussed in Section 4.3.1, Document types in CPUT's Research Reports and Document types in CETRA Reports, it can be seen from the data in Table 4.6 that the document type with the highest frequency in the Institutional Repository is the journal article. There are 64 journal articles itemised, followed by 30 instances of conference material and 13 records of book chapters.

The book chapters, journal articles and conference material represent 54%, 52% and 32%, respectively, of the documents in the bibliographic list. The Institutional Repository has no records of reviews and technical reports. The one book that is itemised in the Institutional Repository records represents 50% of books in the bibliographic list. Overall, the sum of 108 documents in the Institutional Repository represents 42% of the bibliographic list's documents.

Items by type	Bibliographic list's frequency	Institutional Repository frequency	Percentage
Books	2	1	50
Book chapters	24	13	54
Journal articles	123	64	52
Conference material	95	30	32
Reviews	2	0	0
Technical reports	14	0	0
Total	**260**	**108**	42

Table 4.6 Document types in institutional repository

Table 4.7, below, offers a breakdown of all the research items recorded in the Institutional Repository by document type and by year of publication. The sub-totals of the research items are captured in the last column and last row of the table.

Year	Books	Book chapters	Journal articles	Conference material	Reviews	Technical reports	Total
2018	0	0	3	0	0	0	3
2017	0	0	14	2	0	0	16
2016	0	0	9	0	0	0	9
2015	0	0	1	1	0	0	2
2014	0	0	7	1	0	0	8
2013	1	1	9	1	0	0	12
2012	0	4	10	0	0	0	14
2011	0	0	3	0	0	0	3
2010	0	6	3	3	0	0	12
2009	0	1	0	0	0	0	1
2008	0	0	5	11	0	0	16
2007	0	0	0	2	0	0	2
2006	0	1	0	5	0	0	6
2005	0	0	0	4	0	0	4
Total	**1**	**13**	**64**	**30**	**0**	**0**	**108**

Table 4.7 Overview of output by year per document type in CPUT's institutional repository

Document types in Scopus

The data featured in Table 4.8 indicates that there are 44 journal articles in the Scopus database, followed by 5 book chapters and 2 reviews, representing 36%, 21% and 100%, respectively, of the same document types in the bibliographic list. In a nutshell, the 51 research items in Scopus represent 20% of the overall output recorded in the bibliographic list.

Document type	Frequency: Bibliographic list	Frequency: Scopus database	%
Books	2	0	0
Book chapters	24	5	21
Journal articles	123	44	36
Conference material	95	0	0
Reviews	2	2	100
Technical reports	14	0	0
Total	**260**	**51**	**20**

Table 4.8 Document types in Scopus

Table 4.9 presents a breakdown of all the output items recorded in the Scopus database by document type and year of publication. Sub-totals of the research items reflect in the last column and last row of the table.

Year	Books	Book chapters	Journal articles	Conference material	Reviews	Technical reports	Total
2018	0	0	12	0	1	0	13
2017	0	0	12	0	0	0	12
2016	0	0	3	0	0	0	3
2015	0	2	2	0	0	0	4
2014	0	0	2	0	0	0	2
2013	0	1	4	0	0	0	5
2012	0	1	2	0	0	0	3
2011	0	0	3	0	0	0	3
2010	0	1	0	0	0	0	1
2009	0	0	1	0	0	0	1
2008	0	0	1	0	0	0	1
2007	0	0	1	0	0	0	1
2006	0	0	0	0	1	0	1
2005	0	0	1	0	0	0	1
Total	**0**	**5**	**44**	**0**	**2**	**0**	**51**

Table 4.9 Summary of output by year per document type in Scopus

Document types in Google Scholar

Table 4.10 shows that in Google Scholar the trend of journal articles leading other document types in terms of frequency is continued. There are 85 articles, which represents 60% of the 123 journal articles verified by the bibliographic list. In second place is 25 conference items, representing 26% of the 95 conference documents recorded in the bibliographic list. There are 13 book chapters, which is 54% of the 24 book chapters recorded in the bibliographic list.

Document type	Bibliographic list's frequency	Frequency: Google Scholar's frequency	%
Books	2	1	50
Book chapters	24	13	54
Journal articles	123	85	59
Conference material	95	25	26
Reviews	2	1	50
Technical reports	14	0	0
Total	**260**	**125**	**48**

Table 4.10 Document types in Google Scholar

Table 4.11 provides an overview of the output in Google Scholar arranged by year of publication and document type. Sub-totals of outputs appear in the last column and last row of the table.

Year	Books	Book chapters	Journal articles	Conference material	Reviews	Technical reports	Total
2018	0	0	5	0	0	0	5
2017	0	1	19	1	0	0	21
2016	0	0	8	5	0	0	13
2015	0	2	13	2	0	0	17
2014	0	0	5	4	0	0	9
2013	0	1	4	2	0	0	7
2012	0	3	11	1	0	0	15
2011	0	1	7	0	0	0	8
2010	0	2	4	1	0	0	7
2009	0	3	1	2	0	0	6
2008	0	0	7	1	0	0	8
2007	0	0	1	0	0	0	1
2006	1	0	0	3	1	0	5
2005	0	0	0	3	0	0	3
Total	1	13	85	25	1	0	125

Table 4.11 Overview of output by year of publication and document type in Google Scholar

Overview of research output frequencies of the bibliographic list and individual secondary data sources

Figure 4.2 illustrates the research output frequencies of the bibliographic list vis-à-vis the five individual secondary data sources discussed in Section 4.3.1.1. All the secondary data sources are effectively subsets of the bibliographic list, each individually having fewer items than the bibliographic list.

The Research Reports have the highest frequency of 166, followed by Google Scholar at 125 with and the Institutional Repository with 108. The CETRA Reports and Scopus have the lowest frequencies, with 75 and 51, respectively.

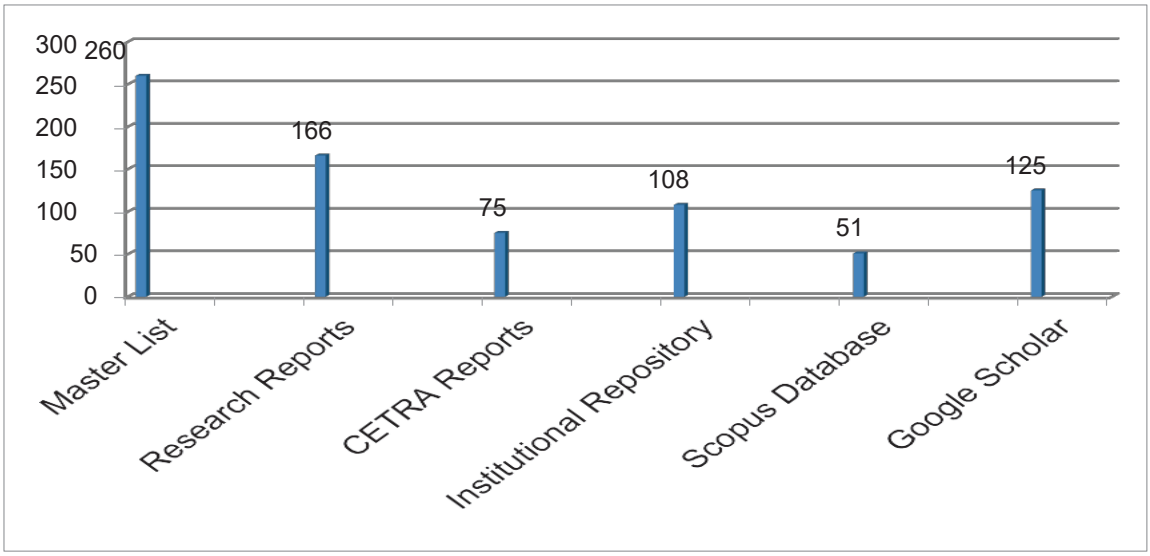

Figure 4.2 Output frequencies of bibliographic list vis-à-vis various secondary data sources

4.4 Online visibility of researchers

This section of the study focuses on analysis of the data depicting the online visibility and activities of researchers who are currently members of staff in the Department of Tourism and Events Management. Special attention is given to academic social networking sites.

4.4.1 What are academic social networking sites?

Academic social networking sites are social media platforms that are aimed at the academic community. Users are encouraged to create personal profiles for the purpose of interacting with each other as peers (Boyd and Ellison in Jordan, 2014; Weingart, Joubert and Falade, 2019). Such interaction can initiate scientific research debates and result in future collaborations. Academic social networking sites are also used by scholars to share and promote their research outputs to diverse groups, national and international.

4.4.2 The role of academic social networking sites in research impact

According to Erdt et al. (2018), academic social networking sites increase research output's visibility and impact. Increased visibility promotes research output to a wider audience, in the process increasing its potential to make a greater impact. Scholarly social media networks can also help researchers to improve their performance through benchmarking, that is, they can raise scholars' awareness of the latest trends and topics of prominence in their subject fields. They can leverage this awareness to influence the acceptance of their articles by publishers, thus increasing productivity and maximising impact.

At the same time, academic social networking platforms make it possible for stakeholders in the research ecosystem to track traces of the impact of research items, by author, article or other marker.

Research impact can be traced by using metric indicators that are unique to social media platforms and are discussed at length in Section 4.5.2.1 of this study, below. These metrics are real-time, which means that no window period is necessary for up-to-date metric records. Social media impact metrics do not replace traditional bibliometrics, but play a complementary role in building a holistic approach that advances the measuring of research impact (Erdt et al., 2018).

4.4.3 Popular scholarly social media platforms at CPUT

The popularity of the following scholarly platforms among researchers of the Department of Tourism and Events Management will be investigated: Google Scholar, LinkedIn, Mendeley, ORCiD and ResearchGate. They are used by researchers to promote their outputs and to network with other scholars.

The data presented in Tables Tables 4.12 to 4.17 and Figures 4.3 to 4.5, below, is retrieved from the scholarly social media platforms popular at CPUT. The investigation was confined to the scholarly social media profiles of the current 26 staff members of the Department of Tourism and Events Management. To adhere to the anonymity principles, their names have been replaced by the 26 letters of the alphabet.

4.4.3.1 Academia.edu

Table 4.12 shows the number of staff members in the Department of Tourism and Events Management who have profiles on the Academia.edu platform. Their membership on this platform enables them to connect with other scholars, nationally and internationally. These connections are divided into two categories, followers and following.

The followers are individuals who have initiated the connection relationship with the owner of profile. The following connection relationship on the other hand, is initiated by the owner of the profile. In this instance, the owners of the profiles are staff of the Department of Tourism and Events Management.

Ten out of 26 staff members have signed up for profiles on Academia.edu. As outlined in Table 4.12, the highest number of followers of an account holder is 392. The second-highest number of followers connected to an individual is 23, and the third, 13 followers.

The staff member who is labelled M is leading on the following front, with 78 connections. The second-largest number in the following category is 30 (staff member U) and the third-

largest is 22 (staff member Z). Staff member N has only 1 following, which is also his/her only connection. There are 441 followers in total and 171 counts of following.

It is also important to note the number of research works that the staff members have shared in their profiles: only two staff members, namely S and Z, have promoted their research works on the Academia.edu platform. S has shared 7 research items, and Z has shared 1 item. As a result, only 8 research items have been promoted in Academia.edu, all them journal articles.

Staff	Profiles	Followers	Following	Output
Staff member A	0	0	0	0
Staff member B	1	1	0	0
Staff member C	1	3	6	0
Staff member D	1	0	6	0
Staff member E	0	0	0	0
Staff member F	0	0	0	0
Staff member G	1	1	2	0
Staff member H	0	0	0	0
Staff member I	0	0	0	0
Staff member J	0	0	0	0
Staff member K	0	0	0	0
Staff member L	1	13	12	0
Staff member M	1	392	78	0
Staff member N	0	0	1	0
Staff member O	0	0	0	0
Staff member P	0	0	0	0
Staff member Q	0	0	0	0
Staff member R	0	0	0	0
Staff member S	1	23	11	7
Staff member T	0	0	0	0
Staff member U	1	0	30	0
Staff member V	1	7	9	0
Staff member W	0	0	0	0
Staff member X	0	0	0	0
Staff member Y	0	0	0	0
Staff member Z	1	1	22	1
Total	**10**	**441**	**171**	**8**

Table 4.12 Staff networks data retrieved from Academia.edu

4.4.3.2 Google Scholar

The data that is presented in Table 4.13 provides evidence that only 5 of 26 current researchers in the Department of Tourism and Events Management have profiles in Google Scholar and have used it to share their research outputs. The research items are shared by the following staff members: K, M, S, V and Z. The numbers of research items shared with

the public by these researchers individually are 3, 5, 12, 4 and 2 in the same order. Hence the total number of items promoted, the sum all 5 postings, is 26.

Staff	Profile	Output
Staff member A	0	0
Staff member B	0	0
Staff member C	0	0
Staff member D	0	0
Staff member E	0	0
Staff member F	0	0
Staff member G	0	0
Staff member H	0	0
Staff member I	0	0
Staff member J	0	0
Staff member K	1	3
Staff member L	0	0
Staff member M	1	5
Staff member N	0	0
Staff member O	0	0
Staff member P	0	0
Staff member Q	0	0
Staff member R	0	0
Staff member S	1	12
Staff member T	0	0
Staff member U	0	0
Staff member V	1	4
Staff member W	0	0
Staff member X	0	0
Staff member Y	0	0
Staff member Z	1	2
Total	**5**	**26**

Table 4.13 Research items promoted in Google Scholar

4.4.3.3 LinkedIn

Table 4.14 illustrates the network connections that individual staff members have with other networkers on the LinkedIn platform. The data reveals that LinkedIn is the most popular platform in the Department of Tourism and Events, with 15 staff members signed up with profiles on LinkedIn.

While other social media platforms categorise their network group according to who initialised the networking connection, in LinkedIn – irrespective of who started the network relationship – every scholar who is connected to another is a follower of whomever he or she is connected to. There is only one category of networking connection, labelling all networkers followers.

The highest number of followers connected to one staff member, S, is 434. The second-highest number of followers is 300, connected to staff member L, followed by 204 followers of staff member G. The least followed is staff member U, with 2 followers. The total number of followers for all staff is 1 631.

Even though LinkedIn is popular among scholars in the Department of Tourism and Events Management, only one academic, staff member S, had shared publications (9 of them) with the public for promotion purposes.

Staff Members	Profile	Followers	Output
Staff member A	1	39	0
Staff member B	1	3	0
Staff member C	0	0	0
Staff member D	0	0	0
Staff member E	0	0	0
Staff member F	1	9	0
Staff member G	1	204	0
Staff member H	0	0	0
Staff member I	1	42	0
Staff member J	1	6	0
Staff member K	1	10	0
Staff member L	1	300	0
Staff member M	1	144	0
Staff member N	1	112	0
Staff member O	1	126	0
Staff member P	1	120	0
Staff member Q	1	80	0
Staff member R	0	0	0
Staff member S	1	434	9
Staff member T	0	0	0
Staff member U	1	2	0
Staff member V	0	0	0
Staff member W	0	0	0
Staff member X	0	0	0
Staff member Y	0	0	0
Staff member Z	0	0	0
Total	**15**	**1 631**	**9**

Table 4.14 Network connections and output shared in LinkedIn

4.4.3.4 Mendeley

The data provided in Table 4.15 reveals that Mendeley is the least popular platform among staff in the Department of Tourism and Events Management. It shows that only 2 academics, staff members F and S, have profiles on Mendeley. Moreover, the profile of staff member F has been put in private mode, closed to public access, so no information or data could be retrieved from it.

Although staff member S has no networking connections (followers or following), S has nevertheless shared 8 journal articles with the public. It is also important to note that the 8 journal articles have been consulted 47 times.

Staff	Staff Profiles	Followers	Following	Output	Reads
Staff member A	0	0	0	0	0
Staff member B	0	0	0	0	0
Staff member C	0	0	0	0	0
Staff member D	0	0	0	0	0
Staff member E	0	0	0	0	0
Staff member F	1	0	0	0	0
Staff member G	0	0	0	0	0
Staff member H	0	0	0	0	0
Staff member I	0	0	0	0	0
Staff member J	0	0	0	0	0
Staff member K	0	0	0	0	0
Staff member L	0	0	0	0	0
Staff member M	0	0	0	0	0
Staff member N	0	0	0	0	0
Staff member O	0	0	0	0	0
Staff member P	0	0	0	0	0
Staff member Q	0	0	0	0	0
Staff member R	0	0	0	0	0
Staff member S	1	0	0	8	47
Staff member T	0	0	0	0	0
Staff member U	0	0	0	0	0
Staff member V	0	0	0	0	0
Staff member W	0	0	0	0	0
Staff member X	0	0	0	0	0
Staff member Y	0	0	0	0	0
Staff member Z	0	0	0	0	0
Total	**2**	**0**	**0**	**8**	**47**

Table 4.15 Profiles, network connections and research items captured in Mendeley

4.4.3.5 ORCiD

As can be seen in Table 4.16, there are only 4 staff members in the Department of Tourism and Events Management who have signed up for ORCiD, 3 of whom have made their accounts private, making it impossible for the public to access information contained in them. Staff member S has an open account and has shared 10 research items for promotion.

The main purpose of ORCiD is to provide authors with unique and permanent digital identifiers that distinguish them from one other, especially those who happen to share the same name. Thus, despite the 3 staff members having their accounts closed to the public, they may have accomplished their main objective, that is, to avoid authorship ambiguity by registering on the ORCiD platform.

Staff	Staff Profiles	Output
Staff member A	1	0
Staff member B	0	0
Staff member C	1	0
Staff member D	0	0
Staff member E	0	0
Staff member F	1	0
Staff member G	0	0
Staff member H	0	0
Staff member I	0	0
Staff member J	0	0
Staff member K	0	0
Staff member L	0	0
Staff member M	0	0
Staff member N	0	0
Staff member O	0	0
Staff member P	0	0
Staff member Q	0	0
Staff member R	0	0
Staff member S	1	10
Staff member T	0	0
Staff member U	0	0
Staff member V	0	0
Staff member W	0	0
Staff member X	0	0
Staff member Y	0	0
Staff member Z	0	0
Total	**4**	**10**

Table 4.16 Profiles and output in ORCiD

4.4.3.6 ResearchGate

According to Table 4.17, 12 members of staff in the Department of Tourism and Events Management have profiles on ResearchGate. Table 4.17 shows that the highest number of followers, 109, is that claimed by staff member S, while staff member V has 11 followers and

G has 10 followers. The least followed are N and R, with 1 follower each. The sum total of followers is 154.

The highest number in the following category is 43, belonging to staff member S. In the second position is staff member G with 34 followings, and staff member R with 29 followings. Staff member Z has the lowest connection with 1 following. Overall, the following number is 193.

The data in Table 4.17 point out that most of the publications, 17, are produced by staff member S. The next biggest collection comprises 7 research items, produced by staff memberB. The sum total of outputs is 33.

The research works that have been created by staff member S have accumulated 7 081 reads, the publications by staff member B have a record of 629 reads, followed by 411 reads belonging to staff member N. The least read publications are those of staff member V, on 14 reads. The total number of reads is 8 233.

Staff Members	Profiles	Followers	Following	Output	Reads
Staff member A	0	0	0	1	0
Staff member B	1	0	6	7	629
Staff member C	1	2	20	0	0
Staff member D	0	0	0	0	0
Staff member E	0	0	0	0	0
Staff member F	0	0	0	0	0
Staff member G	1	10	34	0	0
Staff member H	0	0	0	0	0
Staff member I	0	0	0	0	0
Staff member J	0	0	0	0	0
Staff member K	0	0	0	0	0
Staff member L	0	0	0	0	0
Staff member M	1	6	1	1	0
Staff member N	1	1	2	4	411
Staff member O	0	0	0	0	0
Staff member P	0	0	0	0	0
Staff member Q	0	0	0	0	0
Staff member R	1	1	29	1	0
Staff member S	1	109	43	17	7 081
Staff member T	1	3	16	0	0
Staff member U	0	0	0	0	0
Staff member V	1	11	20	1	14
Staff member W	1	9	21	0	0
Staff member X	1	0	0	0	0
Staff member Y	0	0	0	0	0
Staff member Z	1	2	1	1	98
Total	**12**	**154**	**193**	**33**	**8 233**

Table 4.17 Networking, output and reads data in ResearchGate

4.4.4 Overview of the usage of scholarly social media platforms

4.4.4.1 Comparison of output frequencies on scholarly social media platforms

Figure 4.3 presents the sum totals of outputs posted by staff of the Department of Tourism and Events Management for the period 2005 to 2018 on various social media platforms. The chart shows that ResearchGate has highest frequency, with 32 research items. The second-largest collection is in Google Scholar with 21 items. In third position is ORCiD, with 10 items. The least populated platforms are Academia.edu and Mendeley, with 8 publications each.

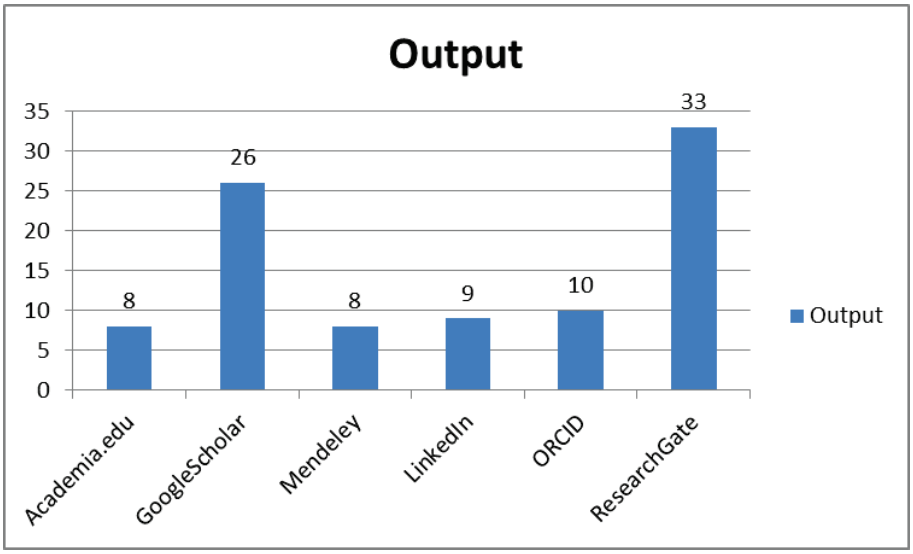

Figure 4.3 Comparison of output frequencies

4.4.4.2 Researchers' activity and visibility on various social networks platforms

Figure 4.4 depicts the number of scholars who follow researchers of the Department of Tourism and Events Management in terms of online networking on scholarly social media platforms. The bar graph also depicts the number of scholars that staff members in the department are following.

It can be seen in the graph that LinkedIn has the highest networking frequencies compared to other network platforms represented in the graph. But LinkedIn does not differentiate between followers and following, capturing the whole networking community in one category of connectivity.

LiinkedIn leads other platforms with 1 631 connections. It is followed by Academia.edu with 441 followers, though Academia.edu has the additional category of following, which in this case has 171 counts. If the two categories of networking communities on Academia.edu

were combined into one category, the total would be 612. LinkedIn would still be in the leading position, with Academia.edu in second place.

ResearchGate is in third position with a tally of 154 followers and 193 being followed. In Mendeley, staff members of the Department of Tourism and Events Management have neither followers nor followings, so the graph registers a pair of zeros for Mendeley's counts.

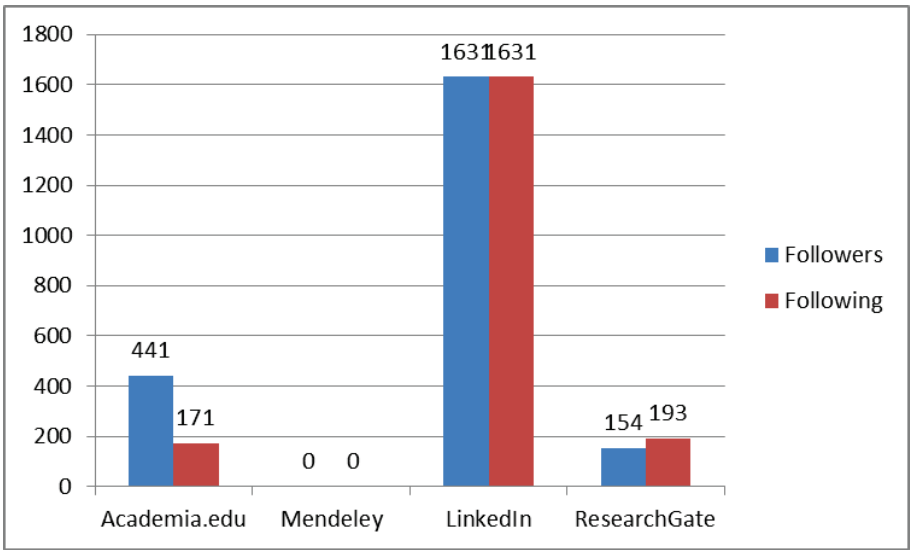

Figure 4.4 Researchers' activity and visibility on various social networks platforms

4.4.4 3 Outputs' visibility in Mendeley and ResearchGate

Figure 4.5 presents the number of reads that the outputs of the Department of Tourism and Events Management have accrued in Mendeley vis-à-vis ResearchGate. According to the figures specified in the bar chart, publications posted on Mendeley have had 47 reads, whereas ResearchGate shows a whopping 8 233. There are only 8 publications shared by staff member S on Mendeley. On the other hand, ResearchGate has 32 publications shared by 8 researchers.

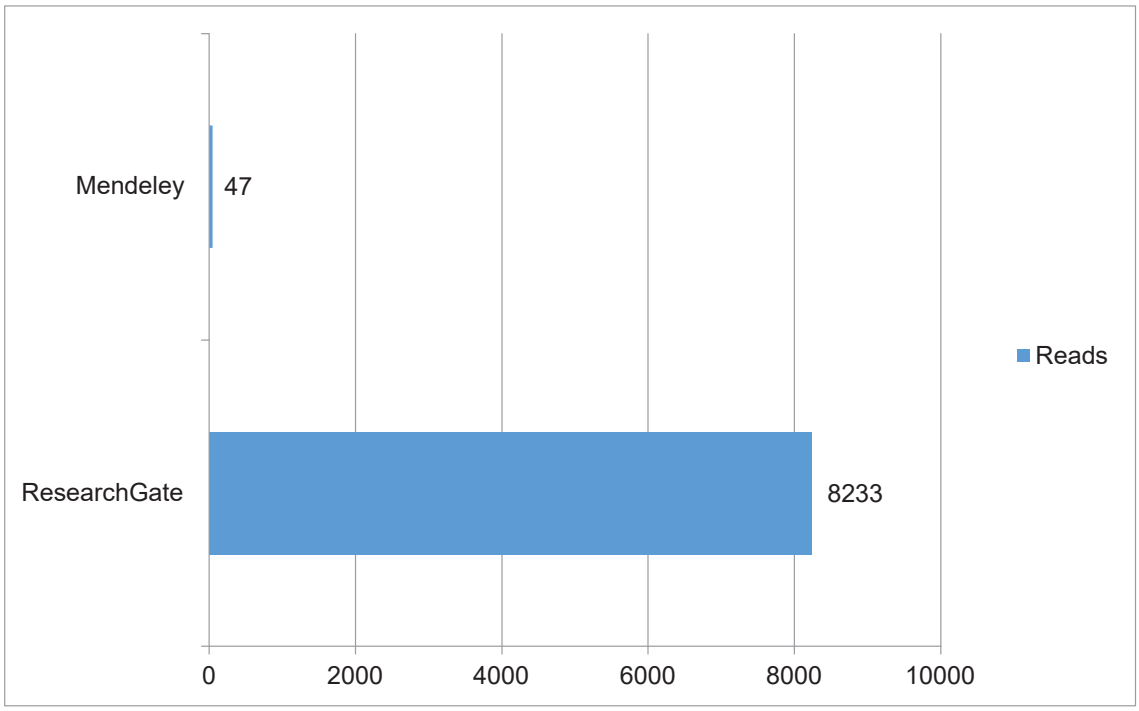

Figure 4.5 Outputs' visibility in Mendeley and ResearchGate

4.5 Altmetrics

The altmetric data presented in this study was retrieved through the use of the PlumX altmetric tool embedded in the Scopus database.

4.5.1 Scopus database

The author search function in Scopus was used to detect publications authored by researchers in the Department of Tourism and Events Management. In all, 51 publications were found. It was necessary to search for these items in Scopus because only Scopus-indexed publications could undergo altmetric analysis because the PlumX tool is embedded in Scopus.

Of the 260 documents recorded in the bibliographic list for the period 2005 to 2018, Scopus includes about 20%. All 51 items retrieved from Scopus are traditional scholarly documents, the bulk of them being journal articles (44 in number). Scopus also lists 5 book chapters and 2 journal article reviews.

4.5.2 PlumX

Like the other two altmetric tools, ImpactStory and Altmetric.com, PlumX provides data about activities that take place on scholarly and non-scholarly social network platforms regarding engagement with scholarly publications and other research artefacts.

Regrettably, the quantity of data retrieved was compromised by the fact that the performance of altmetric analysis was limited to 51 research items which have been indexed by Scopus.

The discussion of the altmetric analysis covers various types of metrics, including usage metrics, capture metrics, mention metrics and social media metrics. These metrics' individual indicators are also elaborated upon in the section that follows.

4.5.2.1 PlumX metrics

PlumX metrics are divided into four categories, usage, captures, mentions and social media. Explanations of these categories are provided, along with descriptions and examples of metric indicators, in Table 4.18, below, but in brief:

- Usage metrics are measures of content usage
- Captures metrics indicate that the reader saved the work for later use
- Mentions metrics track attention to research in the media
- Social media metrics show the tracks of research in the social media.

PlumX metrics include citations, but citations are excluded from this study because they are are also the primary feature of conventional bibliometrics. When citation metrics measure a non-traditional research item, like policy citations, clinical citations and patent citations, they are viewed as altmetrics.

The logic behind this reasoning is that when citations measure the impact of a non-traditional research item, they are performing an alternative metrics function (alternative because bibliometrics does not perform that function).

Nonetheless, all 51 research items retrieved from Scopus for altmetric analysis were of a traditional research artefact nature.

METRIC	EXAMPLE OF INDICATOR	DESCRIPTION
Usage	Abstract views	The number of times the abstract of an artifact has been viewed
	Full text views	The number of times the full text of an article has been viewed
	Downloads	The number of times an artifact has been downloaded
	Link outs	The number of times an outbound link has been clicked to a link resolver
Capture	Export/saves	The number of times an artifact's citation has been exported direct to bibliographic management tools
	Favourites	The number of times the artifact has been marked as a favourite
	Readers	The number of people who have added the artifact to their library
	Followers	The number of times a person or artifact has been followed
Mention	News mentions	The number of times news articles are written about artefact
	Reviews	The number of reviews written about the artefact
Social Media	Like	The number of times an artefact has been liked
	Share	The number of times an artefact has been shared
	Comment	The number of comments are made about an artefact

Table 4.18 PlumX metrics

(Reproduced from https://plumanalytics.com/learn/about-metrics/usage-metrics)

Usage metrics of outputs published during the period 2005 to 2018

Table 4.19, below, presents the usage metrics and their indicators. In this case, the indicators under scrutiny are abstract views, full views and link-outs. The overall usage metric for the period 2005 to 2018 period stands at 32 157 counts. The highest indicator was for abstract views, with 20 223 counts. There were 10 408 full views and 1526 link-outs.

Abstract views reached a record high of 5 281 counts in 2011, whilst full views were at their peak in 2009 with a count of 4 342, and link-outs in 2013 with a count of 499. The year 2009 had the highest overall total of 9 417, adding the various metric indicators together. The second-highest year was 2011 with 7 378 counts, followed by 2013 with a total of 3 655 counts.

Worth mentioning is that publications that came out in 2010 did not get any attention, and their metrics count is zero. It must also be remembered that the over and above the three indicators discussed under the usage metrics heading in this study, there are other indicators that fall under the same heading but are not discussed because they do not feature in the

findings outlined in Table 4.19. Indicators that do not feature in this study include downloads, clicks, collaborators and library holdings.

Year of Publication	Abstract views	Full views	Link-outs	Total
2005	1258	1065	110	**2433**
2006	1251	418	168	**1837**
2007	1454	647	43	**2144**
2008	550	0	48	**598**
2009	4999	4342	76	**9417**
2010	0	0	0	**0**
2011	5281	2067	30	**7378**
2012	1303	855	152	**2310**
2013	2308	848	499	**3655**
2014	1084	48	248	**1380**
2015	16	0	3	**19**
2016	12	1	0	**13**
2017	557	59	90	**706**
2018	150	58	59	**267**
Total	**20223**	**10408**	**1526**	**32157**

Table 4.19 Usage metric: indicators arranged by output's date of publication

Capture Metrics

As revealed in Table 4.20, the only indicators that feature in the capture metrics' data for the period 2005 to 2018 are saves and reads. Indicators in the same category that do not appear in the data include bookmarks, code forks and favourites. Table 4.20 also shows that the saves frequency is more than the reads frequency, as the recorded tallies are 1 799 and 1 240 counts, respectively.

The year 2009 recorded the highest number of saves, with 530 counts, followed by 2011 with 281 and 2013 with 215. If 2010 is not considered because no impact was recorded for its publications whatsoever, then the lowest score of 14 saves occurred in 2015.

The reads score for the year 2014 was the highest, with 262 counts. In 2017 there were 155 counts, and in 2009, 118. The year which scored the lowest was 2007, with only 5 reads.

In terms of overall capture metrics, the best performance was in 2009 (648 counts), followed by 2011 with 377 counts and 2014 with 321 counts. The fewest counts captured (59) occurred in 2016, disregarding 2010, the year with zero metrics.

Year of Publication	Saves	Reads	Total
2005	165	23	**188**
2006	90	89	**179**
2007	170	5	**175**
2008	19	82	**101**
2009	530	118	**648**
2010	0	0	**0**
2011	281	96	**377**
2012	158	114	**272**
2013	215	105	**320**
2014	59	262	**321**
2015	14	61	**75**
2016	27	32	**59**
2017	21	155	**176**
2018	50	98	**148**
Total	**1 799**	**1 240**	**3 039**

Table 4.20 Capture metrics: indicators arranged in order of output's date of publication

Social Media Metrics

The findings set out in Table 4.21 indicate that social media metrics show tracks in only 2 years, viz. 2016 and 2018. The counts recorded are 2 tweets in 2016, and 2 likes and 2 comments in 2018, making an overall tally for the various indicators of 6.

Year of Publication	Likes	Tweets	Comments	Total
2005	0	0	0	**0**
2006	0	0	0	**0**
2007	0	0	0	**0**
2008	0	0	0	**0**
2009	0	0	0	**0**
2010	0	0	0	**0**
2011	0	0	0	**0**
2012	0	0	0	**0**
2013	0	0	0	**0**
2014	0	0	0	**0**
2015	0	0	0	**0**
2016	0	2	0	**2**
2017	0	0	0	**0**
2018	2	0	2	**4**
Total	**2**	**2**	**2**	**6**

Table 4.21 Social media metrics: indicators arranged in order of output's date of publication

Overview of counts under various metrics' headings

Table 4.22, below, indicates that usage metrics achieved the highest total score in 2005 to 2018 period with 32 157 counts, followed by capture metrics with 3 039 counts. The social media recorded only 6 counts.

Year of Publication	Usage Metrics	Capture Metrics	Social Media Metrics
2005	2433	188	0
2006	1837	179	0
2007	2144	175	0
2008	598	101	0
2009	9417	648	0
2010	0	0	0
2011	7378	377	0
2012	2310	272	0
2013	3655	320	0
2014	1380	321	0
2015	19	75	0
2016	13	59	2
2017	706	176	0
2018	267	148	4
Total	**32 157**	**3 039**	**6**

Table 4.22 Overview of counts by type of metrics

Figure 4.6 portrays these figures as percentages, with usage metrics making up 91% of the whole metrics spectrum and capture metrics representing 8.6%. The social media metrics score is less than 0.02% and therefore insignificant.

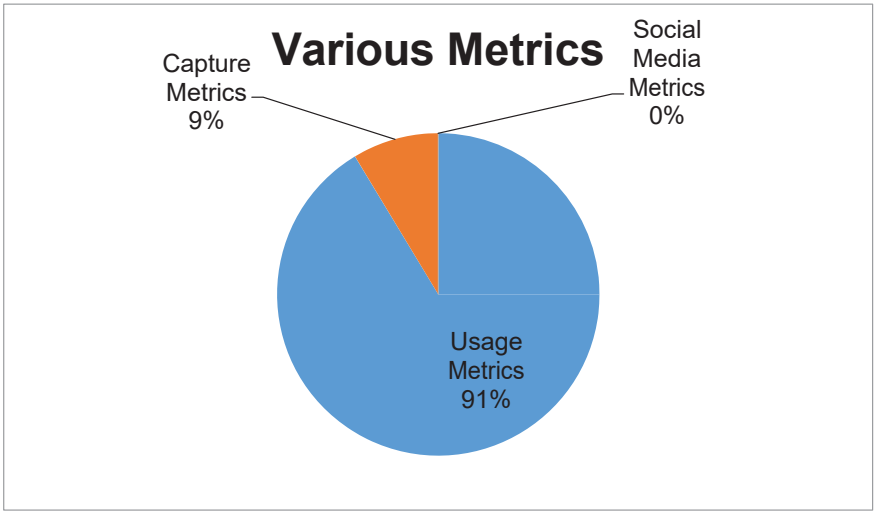

Figure 4.6 Percentages of various metrics counts for the period 2005 to 2028

Overview of various indicators' totals by type for the period 2005 to 2018

According to the findings presented in Table 4.23, abstract views have the highest score for the period 2005 to 2018 with 20 223 counts. They are followed by full views with 10 408 counts and saves with 1 799 counts. Likes, tweets and comments trail with 2 counts each.

Year of publication	Abstract views	Full views	Link- outs	Saves	Readers	Likes	Tweets	Comments
2005	1258	1065	110	165	23	0	0	0
2006	1251	418	168	90	89	0	0	0
2007	1454	647	43	170	5	0	0	0
2008	550	0	48	19	82	0	0	0
2009	4999	4342	76	530	118	0	0	0
2010	0	0	0	0	0	0	0	0
2011	5281	2067	30	281	96	0	0	0
2012	1303	855	152	158	114	0	0	0
2013	2308	848	499	215	105	0	0	0
2014	1084	48	248	59	262	0	0	0
2015	16	0	3	14	61	0	0	0
2016	12	1	0	27	32	0	2	0
2017	557	59	90	21	155	0	0	0
2018	150	58	59	50	98	2	0	2
Total	**20223**	**10408**	**1526**	**1799**	**1240**	**2**	**2**	**2**

Table 4.23 All indicators' totals for the period 2005 to 2018

Figure 4.7 shows the various indicators in terms of percentages. Abstract views account for 57% of the total, full views 30%, saves 5%, while link-outs and reads are estimated at 4% each. The percentage of likes, tweets and comments does not appear because it is insignificantly low.

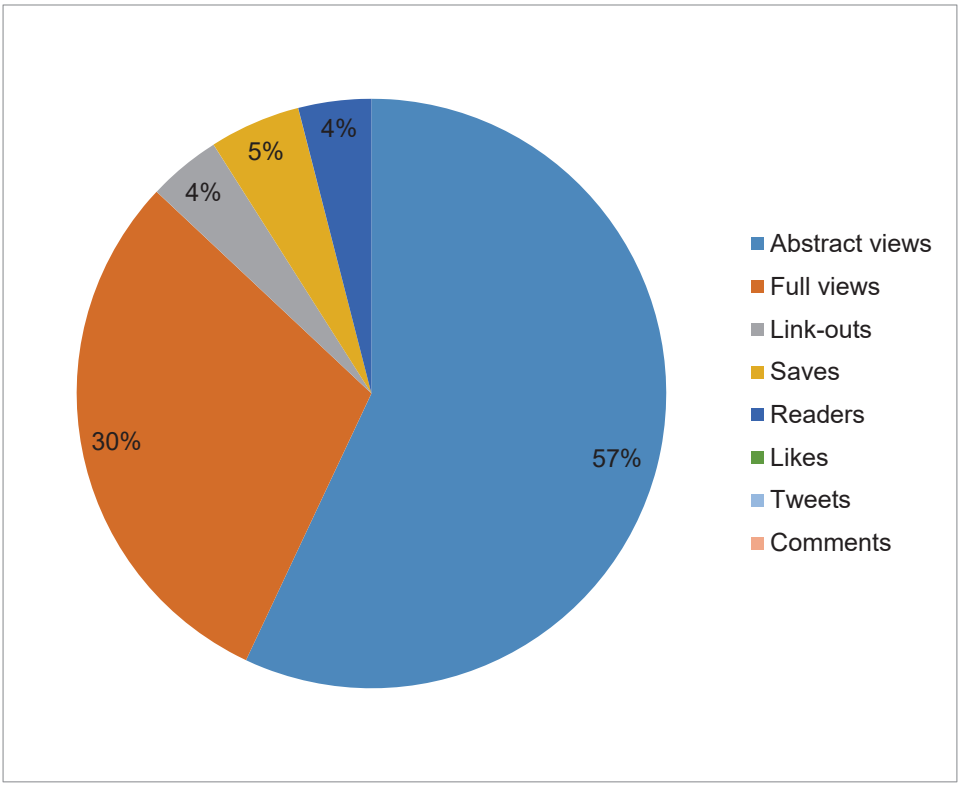

Figure 4.7 Percentages of indicators by type over the period 2005 to 2018

Overview of totals of all indicators by years

The findings in Table 4.24 show that the highest sum all metrics in one year was recorded in 2009, with 10 065 counts. The second-highest recorded score was in 2011 with 7 755 counts, followed by 2013 with 3 975 counts. The lowest number of counts was in 2016 (74), apart from 2010 when there were no metrics tracked

Year of publication	USAGE METRICS			CAPTURE METRICS		SOCIAL MEDIA METRICS			
	Abstract views	Full views	Link -outs	Saves	Readers	Likes	Tweets	Comments	Total
2005	1258	1065	110	165	23	0	0	0	**2621**
2006	1251	418	168	90	89	0	0	0	**2016**
2007	1454	647	43	170	5	0	0	0	**2319**
2008	550	0	48	19	82	0	0	0	**699**
2009	4999	4342	76	530	118	0	0	0	**10065**
2010	0	0	0	0	0	0	0	0	**0**
2011	5281	2067	30	281	96	0	0	0	**7755**
2012	1303	855	152	158	114	0	0	0	**2582**
2013	2308	848	499	215	105	0	0	0	**3975**
2014	1084	48	248	59	262	0	0	0	**1701**
2015	16	0	3	14	61	0	0	0	**94**
2016	12	1	0	27	32	0	2	0	**74**
2017	557	59	90	21	155	0	0	0	**882**
2018	150	58	59	50	98	2	0	2	**419**
Grand Total									**30702**

Table 4.24 Sub-totals of various indicators by output's year of publication

4.6 Conclusion

In Chapter 4 the data gathered was presented and analysed, having been collected from the following secondary sources: various scholarly social network platforms, CETRA's Reports, CPUT's Annual Research Reports, CPUT's Institutional Repository and the Scopus Database. The data revealed the productivity of researchers in the Department of Tourism and Events Management during the period 2005 to 2018.

The data provided insight into the extent to which members of staff in the Department of Tourism and Events Management have used the Institutional Repository and the scholarly social network platforms to network, promote their research output, and enhance their online visibility.

It was discovered that the coverage of publications produced by authors employed in the Department of Tourism and Events Management was low, at 20%, in the authoritative database Scopus. This low rate of coverage limited the scope of altmetric analysis, which could only be performed on research items indexed in Scopus. This was because the PlumX altmetric analytical tool used in this study is embedded in Scopus.

CHAPTER 5

INTERPRETATION OF THE DATA

5.1 Introduction

The data presented and analysed in Chapter Four was generated from various secondary sources, including CPUT's Research Reports, CPUT's institutional repository, academic social media platforms, the Scopus database, PlumX and a departmental staff list. The data was employed to answer the study's research questions.

The main aim of this study was to determine how modern alternative metrics can be used to supplement traditional bibliometrics in measuring the impact of research produced by the Department of Tourism and Events Management at CPUT. It also sought to explore the online visibility of researchers from that department in academic social media networks.

This chapter seeks to interpret the data presented in accordance with the study's objectives. The first section of the discussion deals with the online visibility of researchers in the Department of Tourism and Events Management. The second section covers popular academic social media platforms, and the third addresses the altmetric analysis of the research outputs of the department under review.

The theoretical framework for this study is explained in Chapter Two. Haustein, Bowman and Costas (2016) have modified certain citation and social theories to explain relevant activity on the social media and clarify the nature and function of altmetric indicators. Normative and social constructivist approaches are applied to altmetrics, while theories of social capital, attention economics and impression management are invoked to help interpret the nature of social media platforms.

5.2. Researchers' online visibility

The growth of social media activities in higher education communities has forced academics to incorporate social media into the scholarly communication landscape to maximise the effectiveness of such communication (Neal, 2012) Researchers around the world have started paying attention to the presence of various social media platforms and the activity that occurs on them (Birkholz, Seeber. and Holmberg, 2015; Gumpenberger; Glänzel and Gorraiz, 2016). CPUT libraries have sought to persuade researchers about the importance of using academic social media platforms to promote their research and accelerate the discoverability of their research outputs.

To determine the online visibility of researchers in the Department of Tourism and Events Management the following social media platforms were examined: Academia.edu, Google Scholar, LinkedIn, Mendeley, ORCiD and ResearchGate. The investigation was confined to the current 26 staff members in the Department.

The findings of the study show that 85% of staff have at least one profile among the six social media platforms examined. This percentage is almost the same as that recorded in the study conducted by Tinti-Kane, Seaman and Levy (2010) about social media in higher education. They found that about 80% of academics have social media accounts.

Only one researcher has profiles on all six platforms examined. Only a third (33%) of the total output of all researchers is shared on all six platforms combined. The researchers have a high number of followers compared to the number of those whom they follow (53% is to 47% respectively). Social capital theory explains why researchers seek to build a large network of followers and colleagues followed, believing that these networked associates may be of benefit to them in the future (Haustein, Bowman and Costas, 2016).

Social capital theorists argue that social network engagement can be seen as an investment that will benefit the community of scientists by offering them new resources for disseminating knowledge (Hofer and Aubert, 2013; Steinfield et al., 2009). Researchers in the department under study may well be using this strategy, because across all six platforms examined there was a social network count of 2 590, is almost 100 times the size of staff of 26. One would tend to infer that the staff is aware of the benefits of being participants of such networks, treating them – as per social capital theory – as a composite investment.

A large social network also means a large online visibility pool. As of the time of writing, a large majority of the researchers in this department show no signs of activity on their platforms, but should they want to promote their research in future they at least have a large audience. It is difficult to comprehend why these researchers have such a large number of followers when their activity on their platforms is so minimal.

The explanation that seems to be capable of putting things into perspective is the phenomenon of the Matthew effect, here a function of the networked nature of the social media platforms. Put reductively, users choose to follow a researcher whom they notice already has a significant number of followers. Merton (1968) explains the Matthew effect or phenomenon as cumulative advantage, of success breeding success. However, other theories being employed in this study could also have been used as an explanation for this phenomenon.

Shema, Bar-Ilan and Thelwall (2012) give a similar explanation for bloggers who will pay more attention to popular scholars, while Haustein, Bowman and Costas (2016) point out that like other social media users, bloggers want so badly to increase their number of followers that they will even resort to posting conflicting ideas or facts.

Attention economy theory clarifies how researchers use social media to minimise the time they spend on searching for information sources (Huberman, 2013). Researchers have an understanding of what they have subscribed to in terms of network membership, so they know which social media site to go to for specialised information. Again, 92.3% of staff in the department under study have membership in 4 of the 6 platforms that were investigated. This means that they can enjoy the benefit of easy access to publications shared on these platforms.

The single researcher who has profiles on all six of the social networks being investigated has also shared his publications on all of them. The same researcher scored the highest altmetric count and therefore obtained the highest research impact. His visibility is consequently greater than that of his colleagues. The theory of attention economics is applicable to this researcher who may be hungry for the attention and citations.

5.3 Popular academic social media platforms

The impact of researchers' outputs is of high importance to funders of research, and academic social networks have the potential to promote and attract impact in the form of feedback from readers of the published works in real time.

Joubert (2018) claims that popular media that is accessible to larger number of members of the public has the potential to increase public awareness of trends in science as well as escalate research impact. However, Jordan (2014) cautions that the benefits that these social networking sites hold for academics have been the centre of attention, rather than the question of the ways in which academics use these sites in practice.

Cui et al. (2018) point out that South African researchers' publications dissemination behaviour on social media networks is similar to the practices of their global counterparts, especially in terms of the variety of social media tools being used.

The findings revealed that LinkedIn is leading the rest of the platforms in terms of researchers' presence and followers' networks, but only one staff member shared 3.5% of the overall departmental outputs on that platform. ResearchGate has the highest percentage of shared publications at 12%, shared by 7 researchers. It is in second place behind LinkedIn with regard to networking counts. Academia.edu is in third place with regard to researchers' online presence but in second place on networking counts.

Platform	Researchers Profiles	Followers	Following	Research Items Shared
Academica.edu	11	441	171	8
GoogleScholar	5	Not applicable	Not applicable	26
LinkedIn	15	1 631	1 631	9
Mendeley,	2	0	0	8
ORCiD	4	Not applicable	Not applicable	10
ResearchGate	12	154	193	32

Table 5.1 Comparison of social media platforms' popularity

On the other hand, LinkedIn is viewed as a generalist platform which scholars use to communicate, interact and connect with each other through altmetric indicators such as liking, sharing, comments, poking, etc. on each other's pages (Nentwich and König, 2014; Bowman, 2015; Wouters, Zahedi and Costas, 2018).

LinkedIn might therefore not be considered an academic networking site, which might explain why it has the highest numbers in terms of staff presence and network counts and yet a practically insignificant number of shared publications. In that case one would be tempted to regard ResearchGate and Academia.edu as popular, specifically academic network platforms. Moreover, the data that ResearchGate and Academia.edu have accumulated has a pattern that can be recognised. They have scores in all categories of activity indicators as shown in Table 5.1. Some might want to raise an argument that Google Scholar and ORCiD do not have networking facilities to boost platform' activity. The counter-argument would then be the case of Mendeley, which has the capacity to build a network but performed poorly in this study.

Thelwall et al. (2013) claim that some indicators like mentions on social media platforms have turned out to be marketing tools. It seems that members of society are persuaded by each other's recommendations. If this is the case, it can be explained by social constructivist theory, which claims that personal influences can drive scientists' behaviour (White, 2004). In this perspective, a scientist is a researcher who holds others' recommendations in the highest regard (Haustein, Bowman and Costas, 2016). This phenomenon can also be explained as one person trying to impress others through association (White, 2004).

5.4 Altmetrics of bibliographic records: Department of Tourism and Events Management

5.4.1 Bibliographic items: Department of Tourism and Events Management: 2005-2018

This study aimed to produce a bibliographic record of the research corpus of the department under investigation, for the years 2005 to 2018. The department did not have collated records of its research outputs, which limited its ability to quantify and demonstrate the impact of these outputs.

All kinds of research outputs were retrieved from secondary sources for recording in the bibliographic list because altmetrics is capable of measuring the impact of non-traditional research items that are not measurable through bibliometrics, including so-called grey literature. The bibliographic list was compiled from the following secondary sources: CPUT's annual Research Reports, CETRA reports, the CPUT institutional repository, the Scopus database and Google Scholar. The data collection procedure is discussed in detail in Chapter 3.

The findings show that 260 research items were published by researchers in the department concerned. The list includes research produced under the auspices of the department by researchers who have since left CPUT. The majority of the publications consist of journal articles, followed by conference material comprising conference papers and posters. There were also a significant number of technical reports and book chapters, but few reviews or whole books. A preponderance of the research items featuring in the bibliography was retrieved from the annual Research Reports, followed by Google Scholar, CETRA, Scopus database and the library's Institutional Repository.

The production of outputs was highest in 2012, followed by 2010 and 2008. Very few items were published in 2014. The production numbers increased again in 2015, but decreased again in 2018. Unfortunately, no explanation can be provided for this because the study was purely quantitative. But certain recommendations will be made in this regard in Chapter 6.

Though there is not much that one can extrapolate from the findings of a collated bibliography, normative theory can be applied via Merton's norm of organised scepticism. This norm states that there has to be continuous challenging of the current state of a discipline in academia

(Macfarlane and Cheng, 2008). This challenging may be interpreted as a quest to discover new knowledge for the subject field. It is abundantly obvious that researchers in CPUT's Department of Tourism and Events Management are a group of organised sceptics,

constantly creating new knowledge by participating in conferences and publishing the results of their research. (The bibliographic list is reproduced in full in Appendix A.)

5.4.2 Altmetric analysis of bibliographic records: 2005-2018

Robinson-Garcia et al. (2017) assert that altmetric tools are growing in popularity since researchers benefit from retrieving the additional evidence of research impact generated through altmetric indicators. Altmetrics can produce significant research impact data for the purposes of evaluation. Piwowar (2013) and Bornmann (2014b) remind us that, uniquely, altmetrics contain data that is used for measuring societal engagement as well.

Social media altmetric indicators reveal how scholars participate in debates and disseminate scientific information (Robinson-Garcia et al., 2017). Altmetric indicators are transparent and open for public scrutiny. Rousseau and Ye (2013) suggest that a combination of data gathered from multi-metrics and peer review is what makes academic evaluations valid. This study thus sought to reveal how almetrics can supplement traditional bibliometrics in the evaluation of research impacts.

Moed (2016) believes that altmetrics is promoted by, among others, the demand for a framework for research evaluation which views science as a multi-dimensional activity concerned with societal as well as academic impact. Altmetrics can be associated with the open science movement, which promotes accessibility and transparency in research practices.

One of the strengths of altmetics is that it can be used to measure the impact of non-traditional research items, although the list at hand contained only traditional research items. Altmetric analysis was nevertheless performed on 51 of the 260 research items produced by the Department of Tourism and Events Management. Some items could not be analysed because they were not indexed in the Scopus database. The PlumX tool embedded in Scopus was used to perform the analysis, which provided data about activities from both scholarly and non-scholarly sources.

The distinctive benefits derived were unique to altmetric analysis because the impact data was obtained via indicators like abstracts views, saves and downloads, to mention a few.

The findings of this study showed that, according to the Usage metrics, abstract views had the highest number of counts, followed by full views, and linked–outs (which are links transferred to other platforms). The Capture metrics, on the other hand, provided data regarding saves and reads indicators. This is logical because before one can read a publication after downloading it, saving it is the natural thing to do. This is a useful metric because in many instances researchers do not search for one item at a time, which means

the downloaded articles will be saved because they cannot be read simultaneously, even if there are only two of them.

Social media metric tracks have the lowest counts, consisting of 2 tweets, 2 likes and 2 comments, while other metrics (Usage and Capture) are in their hundreds, even thousands. Interestingly the tweets were not even in a South African language. This confirms that the universalism norms in Merton's (1973) normative theory – to the effect that science is a global collaborative intervention (Haustein, Bowman and Costas, 2016) – are applicable to academic debates on Twitter.

According to Haustein, Bowman and Costas (2016) , Mendeley and Twitter platforms are known to have larger audiences and higher visibility and in most cases confirm the processes associated with the Matthew effect by gaining a higher number of followers or re-tweets. In this study, however, Twitter and the social media generally did not feature prominently, with surprisingly little interest shown in tweets. This is despite the fact that the Matthew effect is said to be mostly demonstrated in Mendeley and Twitter (Haustein, Bowman and Costas, 2016).

Another pattern that the social media metrics showed which was distinctive to this study's findings is that all the altmetric indicators found date from 2016 (2 indicators) and 4 others in 2018. It is possible that the use of the social media for academic purposes has been slow to catch on in South Africa, and that future studies might produce somewhat different results.

An overview of the altmetric analysis reveals that the research items analysed provided metric indicators showing that the content of the research items was used more than capturing them in terms of saves and linking them out, or discussing them on Social Media platforms. Though it is understood that Capture metrics may point to later use, the best finding for the researcher is to hear that the content of their work is actually being read!

The study's results showed that more often than not, the publications with more saves and link-outs indicators acquired more reads indicators in Mendeley than publications with fewer saves and link-outs indicators. Whether the same behaviour applies to Twitter was not determined as the scope of this study did not extend to Twitter.

5.5 Conclusion

This chapter has discussed the findings presented in Chapter 4 about the online visibility of researchers in the Department of Tourism and Events Management, the popular academic social media platforms, and the altmetric analysis of research outputs of the department under review.

The study found that the online presence of researchers in the Department of Tourism and Events Management is in line with the findings of other studies, although their utilisation of the tools available needs to be increased. The network count, on the other hand, is impressive, which means that the researchers may be benefitting from accessing information by virtue of being members of networks.

The majority of researchers have not fully explored the basic activities of maintaining their profiles and sharing their research. The research outputs of the department are therefore at a relatively low level of visibility. And while the study has revealed which social media platforms are preferred, a firm online footprint is not evident.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter presents the conclusion to the study and makes certain recommendations based on the findings presented in Chapters 4 and discussed in Chapter 5. These findings pertain to the online visibility of researchers in the Department of Tourism and Events Management, the researchers' most popular academic social media platforms, and altmetric analysis of the research outputs of the department in question.

6.2 Summary of findings on issues relating to the study's objectives

This section provides a brief description of the research findings in respect of the objectives of the study.

6.2.1 Findings on the online visibility of researchers

To determine the online presence of researchers in the department under inquiry, various social media platforms were examined. The investigation was confined to the current 26 staff members.

The findings showed that 81% of the researchers have a profile on at least one of the six social media platforms scrutinised (Academia.edu, ResearchGate, Google Scholar, LinkedIn, ORCiD and Mendeley). This percentage is in line with the figure documented in the study by Tinti- Kane et al. (2010), who reported that 80% of academics had social media accounts.

The finding in the network counts component was quite remarkable, in that 2 590 networkers (followers and following combined) almost 100 times the size of staff of the department concerned. It was also realised that researchers were not using the social media enough to disseminate their research work.The total number of outputs produced by 26 current staff was not investigated, it would be beyond the scope of this study. In a related study, Kersten (2014) reported that almost 30% of researchers used social media platforms for networking purposes only.

6.2.2 Findings on the most popular academic social media platform among researchers

The goal was to determine which academic social network site was most widely used by researchers in the department under study. LinkedIn was found to be the most popular platform among researchers, with no less than 58% of them operating LinkedIn accounts. Following LinkedIn was ResearchGate, with 46% membership, while the researchers' presence on the remaining platforms spiralled downwards from 31%.

The followers' network was also huge (2 590), at almost 100 times the size of the department. Some research outputs were shared on social media, however, the outputs were not identified because overlaps and limited bibliographic details provided by staff on their profiles. This finding reinforces the perception articulated by Jordan (2014), Dunlop (2015) and Kerchhoff (2017), that academic social networks are underutilised.

6.2.3 Findings on the altmetric analysis of research outputs of the department under scrutiny

Research items listed in the bibliography of the Department of Tourism and Events Management were retrieved from secondary sources that included CPUT's Research Reports, CPUT Libraries' Institutional Repository, CETRA's reports, the Scopus database and Google Scholar. Most of the items were sourced from the CPUT Research Reports, and the majority of them comprised journal articles.

The altmetric analysis tool used, PlumX, grouped altmetric indicators under the following headings: usage metrics, mention metrics, capture metrics, and social media metrics. The findings showed that usage metrics had the highest counts among these indicators when the research works of the department under study were assessed.

This means that the content usage of research items was the highest at 91%. (This is the best measurement of the extent to which the material is actually being read.) This was followed by capture metrics indicators at 8.6%, and lastly the traces or tracks of research items on social media platforms, with coverage of only 0.02%. The altmetric tool used in this study limited analysis to 20% of the items on the bibliographic list of the department (those indexed on Scopus). It is therefore possible that the findings could have been different if more research items had been included in the assessment.

6.3 Recommendations

In this section, recommendations are provided on issues arising from the study's objectives, based on the results of the analysis and interpretation of the data generated.

6.3.1 Recommendations regarding the online visibility of researchers

The findings show that the presence of researchers in the department concerned on various social media platforms was in congruence with the findings of other studies. Like their counterparts in studies undertaken by Jordan (2014), Dunlop (2015) and Kerchhoff (2017), the researchers investigated in this study do not take full advantage of the benefits to be derived from social media tools.

Bar-Ilan et al. (2012) and Tise, Raju and Adam (2015) argue that universities have to increase their research visibility in the form of their web footprint, to demonstrate the contribution they are making to the knowledge economy. The purpose is to win the competition for research funding. It is important for researchers to be made aware that the online visibility of a researcher and research outputs promotes public access to science, thus impacting on society and making further research possible.

6.3.2 Recommendations associated with the most popular academic social media platform among researchers

This study found that LinkedIn was the most popular scholarly social network site among researchers in the Department of Tourism and Events Management. However, the study also revealed that these researchers do not maintain their profiles nor utilise the social media tools effectively.

There is a possibility that the reason why researchers do not utilise these tools fully is that they do not have sufficient skills to manipulate them. Sutton (2014) suggests that libraries have to provide training to researchers on how to use social media tools, because librarians have all along been assisting researchers to influence the impact of their research. In order to be comprehensive, the training will have to cover altmetrics as well as bibliometrics.

6.3.3 Recommendations stemming from the altmetric analysis of the research outputs of the department under scrutiny

The results of the study show that the tracks of researchers' activity on social media platforms are minimal. For that reason, intervention is needed to boost the activity of researchers on the social media.

Kersten (2014) argues that if more researchers are active on similar social media platforms, the amount of knowledge generated will increase, and new readers and contributors will be attracted. Being active on the web will make researchers visible, and visibility goes hand-in-hand with popularity (Kersten, 2014).

The altmetric analysis also showed that the researcher who had accounts on all six social media platforms investigated, scored more altmetric counts than the other researchers, meaning that his research impact was greater than that of his colleagues.

6.4 Further research

This research adopted a quantitative approach, so as a result the attitudes of the researchers concerned could not be captured. Some qualitative research should be conducted to ascertain how academic staff feel about the use of social media for networking or promoting their research, what they find attractive or unpleasant about various platforms, whether they regard altmetric analysis as worthwhile, and so on.

Further studies could be conducted on other academic departments or faculties, or even universities, so that findings can be compared and generalisability established.

6.5 Conclusion

The study achieved its aim of demonstrating that altmetrics can be used to supplement bibliometrics in the measurement of research impact in a given environment. The study has also shown how altmetric indicators on the social media can advance new ways of measuring the impact of research outputs with transparency, accessibility, and reduced complexity.

The study compiled a bibliographic record of the research output of the Department of Tourism and Events Management at CPUT from 2005 to 2018, and subjected it to altmetric analysis. The study revealed which academic social media platforms were popular among the researchers in question, and what their activities and visibility were like on these platforms.

Several recommendations were made to improve the research impact of the researchers through their becoming more active and visible on the social media and thus increasing their altmetric indicators counts. It was also suggested that libraries need to train researchers to use social media tools, and that research metrics should feature in the training programmes.

The altmetric analysis performed in this study has shown that altmetrics has significant potential to complement bibliometrics in the research evaluation process. This view is supported in the literature by Bornmann (2014b), Hammarfelt (2014), Mamtora and Haddow

(2015), Yang and Li (2015), Kerchhoff (2017), Tattersall (2017) and Abbasi (2018). These authors agree that altmetric indicators should be used as a supplement, not a replacement, for traditional metrics, because of their ability to demonstrate on a wider level the societal impact made by research.

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APPENDIX A: BIBLIOGRAPHY OF THE DEPARTMENT OF TOURISM AND EVENTS MANAGEMENT

Year	Authors	Title	Doc type
2018	Bavuma, Z.	The economic contribution of the Design Indaba: a case study of the International Buyers' Programme	Journal article
2018	Spencer, J.P.; Bavuma, Z.	How important are mice to the tourism economy	Journal article
2018	Dube, C.N.	Community participation in the management of South Africa's protected areas.	Journal article
2018	Hattingh, C.; Spencer, J.P.	Homosexual not Homogeneous: A Motivation-Based Typology of Gay Leisure Travelers Holidaying in Cape Town	Journal article
2018	Venske, E.	Rising to the Occasion: Experiential Learning Experiences of Event Management Students at a South African University of Technology	Journal article
2018	Carse, C.; E Venske, E.; Steyn, J.N.	Critical factors influencing visitor attendance at a literary arts festival in Stellenbosch	Journal article
2018	Machisa, P.; Muresherwa, G.; Steyn, J.N.	Green Point residents' perceptions of the socio-economic impact of the Cape Town Carnival	Journal article
2018	Iwu, G.C.; Ezeuduji, I .O.; Iwu, I.C.; Ikebuaku, K.; Tengeh, R.K.	Achieving Quality Education by Understanding Teacher Job Satisfaction Determinants.	Journal article
2018	Engelbrecht, M.; Spencer, J.	Challenges Facing the National Certificate (Vocational) Tourism Programme in the Western Cape	Conference material
2018	Hattingh, C.	Motives for attending live stand-up comedy: an audiences' perspective	Journal article
2018	Mokoena, P.P.	Analysis of the research design used in a Tourism Management service learning project-	Journal article
2018	Makuzva,W.; Ntloko, N.J.	Tourism product as a measure to determine the key elements that influence tourists' decisions to visit Victoria Falls, Zimbabwe	Journal article

2018	Mhlanga, O.; Steyn, J.; Spencer, J.	The airline industry in South Africa: drivers of operational efficiency and impacts. Tourism Review	Journal article
2018	Hatting, C.; de Waal, A.; Parsons, P.	Assessing high performance: South African case study	Journal article
2018	Mhlanga, O.; Steyn, J.; Spencer, J.	Impacts of the micro environment on airline performances in Southern Africa: Management perspectives	Review
2018	Mhlanga, O.; Steyn, J.	Liberalisation initiatives of the airline industry in southern Africa: Progress achieved and hindrances to implementation	Journal article
2017	Mhlanga, O.; Steyn, J.; Spencer, J.	Good bye Air Zimbabwe...Hello Zimbabwe Airways: Will re-branding solve Air Zimbabwe's financial woes	Journal article
2017	Bavuma, Z. ; Swart, K.	The economic contribution of the Design Indaba: a case study of the international buyers' programme	Conference material
2017	Mhlanga, O,; Steyn, J.; Spencer, J.	Impacts of the micro environment on airline performances in Southern Africa: Management perspectives	Journal article
2017	Mhlanga, O.; Steyn, J.	Impacts of the macro environment on airline operations in southern Africa.	Journal article
2017	Muresherwa, G.; Machisa, P.; Steyn, J.N.	Residents' perceptions of the impacts of a carnival in Cape Town	Journal article
2017	Swart, K.; Linley, M.; Muresherwa, G.	Sport mega-events and the media. In Legacies and Mega Events : 235-243.	Book Chapter
2017	Iwu, C.G.; Ezeuduji, I.O.; Iwu, C.I.; Ikebuaku, K.; Tengeh, R.K.	Job motivation and management implications: A case of teachers in Nigeria.	Journal article
2017	Ezeuduji, I.O.; Chibe, M.E.; Nyathela, T.	Hospitality management study programme and students' perceptions: universities in South Africa	Journal article
2017	Ezeuduji, I.O.; Mbane, T.L.	Length of service versus employee retention factors: hotels in Cape Town, South Africa	Journal article

2017	Ezeuduji, I.O.; Nkosi, G.S.	Tourism destination competitiveness using brand essence: Incorporating the 'zuluness' of the Zulu Kingdom	Journal article
2017	Ezeuduji, I.O.; Mbane, T.L.	Employee Retention Factors: The Case of Hotels in Cape Town, South Africa	Journal article
2017	Ezeuduji, I.O.; Chibe, M.E.; Nyathela, T.	Student profile and perceptions of Hospitality Management education: Universities in South Africa.	Journal article
2017	Ezeuduji, I.O.; Mdiniso, J.M.; Nzama, A.T.	Assessing Nature Conservation and Tourism Development Effectiveness towards Local Economic Development in South Africa: Nuanced by the Perceptions of Local Communities?	Journal article
2017	Ezeuduji, I.O.; Ntshangase, S. D.	Entrepreneurial Inclination: South African Youth's Mental Attitude towards starting Tourism Business	Journal article
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2017	Muresherwa, G.	The media impact of the 2014 FIFA World Cup in selected tourism markets	Journal article
2016	Venske, E.	Learning to leave a legacy: corporate social responsibility in South African business event tourism curricula	Journal article
2016	Iwu, C.G.; Ezeuduji, I.O.: Eresia-Eke, C.	The entrepreneurial intention of university students: the case of a university of technology in South Africa	Journal article
2016	Ezeuduji,I.O.; November,K. L.; Haupt, C.	Tourist profile and destination brand perception: the case of Cape Town, South Africa	Journal article
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2016	Ezeuduji, I.O.; November, K.L.; Haupt, C.	Tourist Activity and Destination Brand Perception: The Case of Cape Town, South Africa	Journal article
2016	Mbane, T.L.; Ezeuduji, I.O.	Hotel employee profile and employee retention statements: the case of hotels in Cape Town, South Africa	Journal article
2016	Khoalenyane, N.; Ezeuduji, I.O.	Local community and Ts'ehlanyane National Park in Lesotho: Perception of participation. African	Journal article
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2016	BManners,B.; Kruger, M.; Saayman, M.	Managing live music performances: a demand and supply analysis	Journal article
2016	George, R.; Barben,T.; Chivaka,R.; van Vuuren, M.J.; Knott,B.; Lehmann,S .	Managing tourism in South Africa. Managing tourism in South Africa.	Book chapter
2016	Ismail, S.; Swart, K.; Ntloko, N.J.	The impact of outdoor and wine festival on established businesses in the Breede Valley region, Western Cape, South Africa	Journal article
2016	Ntloko, N.J.; Swart, K.	Reflections on government engaging business in planning initiatives for the 2010 FIFA World Cup: a case of a non-host area.	Journal article
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2016	Sewell, W.; Steyn, J.N.; Venter, P.; Mason, R. B.	Governance of strategically relevant research in the wholesale and retail sector.	Journal article
2016	Mabinda, B.; Spencer,J.	Risks connected to the work force at the small medium and micro enterprises.	Journal article
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2015	Muresherwa, G.	The media impact of the 2014 FIFA World Cup in selected tourism markets -	Journal article
2015	Ezeuduji, I.O.	Strategic event-based rural tourism development for sub-Saharan Africa.	Journal article
2015	Ezeuduji, I.O.; de Jager, K.	Choice of Intermediary for Leisure Travel Arrangements	Journal article
2015	Molose, T. Ezeuduj, I.O.	Knowledge sharing, team culture, and service innovation in the hospitality sector: the case of South Africa	Journal article

2015	Ezeuduji, .o.	Brand Positioning for Sub-Saharan Africa's Rural Tourism Development	Journal article
2015	Zondo, P.K.; Ezeuduji, I.O.	Comparing local and international tourists' perceptions of service experience dimensions of an attraction and a destination: the case of South Africa. African	Journal article
2015	Ezeuduji, I.O	Building capabilities for sub-Saharan Africa's rural tourism services performance	Journal article
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2015	Ezeuduji, I. O.; de Jager, K.	Influence of traveller profile regarding online versus travel agency booking	Conference material
2015	Zondo, P.K.; Ezeuduji, I.O.	Tourists' Perceptions of Service Experience Dimensions: The Case of South Africa.	Conference material
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2015	Venske, E.	Pink tourism in Cape Town: The development of the post-apartheid gay quarter	Book chapter

2015	Swart, K.; Bob, Allen, D.C.	A stakeholder analysis of the governance of the 2010 FIFA world cup: a case study of the city of Cape Town	Book chapter
2015	Molose T.; Ezeuduji. I.O.	Knowledge sharing, team culture, and service ınnovation in the hospitality sector: the case of South Africa	Journal article
2014	Manners, B.; Saayman, M.; Kruger, M.	Managing the “wow factor” at live music performances.	Journal article
2014	Magi, L.M.; Dube, C.N.	Geoparks and national parks in South Africa: Two sides of the same coin.	Journal article
2014	Ezeuduji,I.O.; Lete, P.M. Correia, P.; Taylor, A.M.	Competitive advantage for brand positioning: The case of Sun City in South Africa.	Journal article
2014	Rid,W.; Ezeuduji,I.O.; Pröbstl-Haider, U.	Segmentation by motivation for rural tourism activities in The Gambia	Journal article
2014	Ezeuduji, I.O.	Nigeria as a core regional source market for South African Tourism: a demand analysis	Conference material
2014	Ezeuduji, I.O. Rid, W..	Management implications for rural tourism development in The Gambia	Conference material
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2013	Ezeuduji, I.O.	Event-based rural tourism model for sub-Saharan Africa	Conference material
2013	Manners, B.	Critical assessment of live music performances in creating a memorable experience: A demand and supply perspective	Journal article
2013	Govender, V.; Holomisa, T.; Meyer, B.; Ohlhoff, J.H.S.	Via Afrika Tourism, Grade 12 Learner's	Book
2013	Boekstein, M.S.; Spencer JP.	Activity-based market segmentation of visitors to thermal spring resorts in the Western Cape province, South Africa: Assessing the potential for health tourism development	Journal article
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2013	Swart, K.; Bob, U; Turco, D.M.	Bidding for major international sporting events, sports management in the Middle East: a case study analysis	Book chapter
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2012	Knott, B.;Allen, D.; Swart, K.	Stakeholder reflections of the tourism and nation-branding legacy of the 2010 FIFA World Cup for South Africa	Journal article
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2012	K Swart, E Hardenberg, M Linley	A media analysis of the 2010 FIFA World Cup: A case study of selected international media	Journal article
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2012	Ntloko NJ & Swart K.	Public funds and residents' perceptions of the 2010 FIFA World Cup™: A case study of a non-host area	Journal article
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2012	Swart K & Bob U	Listening to community voices – Athlone and Green Point residents' views on the location of the 2010 FIFA World Cup™ Stadium in Cape Town	Book chapter
2012	Swart K & Bob U	Reflections on developing the 2010 FIFA World Cup™ research agenda. .	Book chapter
2012	Swart K, Bob U & Turco DM.	Reflections on the 2010 FIFA World Cup™ spectator research programme	Book chapter
2012	Turco D & Swart K	International sport tourism International sport tourism	Book chapter
2012	Hendricks N & Swart K	Cape Town businesses' perceptions of the 2010 FIFA World Cup™	Conference material
2012	Knott B , S wart K, Turco DM & Bob, U	Mega-events and football sport tourism: From Beijing 2008 to South Africa 2010	Conference material
2012	Moshoeshoe N, Tichaawa T & Swart K	Assessment of residents' perceptions of the official 2010 FIFA World Cup™ Fan Park in Port Elizabeth	Conference material
2012	Nyikana S, Tichaawa T & Swart K	Mega-events, the environment and responsible tourism practices: The experience of the 2010 FIFA World Cup™ in Port Elizabeth	Conference material
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2012	Nyikana S, Tichaawa T, Swart K, Turco DM & Bob U	Visitor's perceptions of the 2010 FIFA World Cup™: A case study of the host city Nelson Mandela Bay/Port Elizabeth	Conference material
2012	Sayedwa H, Tichaawa T & Swart K	A comparative analysis of visitor profiles from key and emerging tourism markets: A case study of the 2010 FIFA World Cup™ in Nelson Mandela Bay/Port Elizabeth CPUT	Conference material
2012	Stofberg Q & Swart K	Visitors' perceptions of the 2010 FIFA World Cup™ – A case study of the official Fan Park in one of the host cities, South Africa	Conference material

2012	Swart K	Attendees' perceptions of the environmental impacts of the 2010 FIFA World Cup™: Implications for the greening of sport tourism events	Conference material
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2012	Tichaawa T & Swart K	Evidence of emerging tourism markets as a legacy provided by the 2010 FIFA World Cup™ in the Eastern Cape, South Africa	Conference material
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2012	Achu, F.N.; Swart, K.	African immigrants' perceptions of the 2010 FIFA World Cup™ and its "African" legacy	Journal article
2012	Daniels, T.; Swart, K.	The 2010 FIFA World Cup™ and the Eden District Municipality	Journal article
2012	Swart, K .; Bob, U.	Mega sport event legacies and the 2010 FIFA World Cup.™	Journal article
2012	Swart, K.; Jurd, M.C.	Informal residents' perceptions of the 2010 FIFA World Cup™: A case study of an informal settlement in Cape Town.	Journal article
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2012	George, R.; Swart K	International tourists' perceptions of crime-risk and their future travel intentions during the 2010 FIFA World Cup™ in South Africa	Journal article
2012	Daniels, T.; Swart, K.	Tourists' perceptions of London as a safe host city during the 2012 Olympic Games	Conference material
2012	Hardenberg, E.B,; Swart, K.; Allen, D.C.	A media analysis of the 2010 FIFA World Cup™: A case study of selected international media	Conference material
2011	Cornelissen, S., Bob, Swart.	Sport mega-events and their legacies: The 2010 FIFA World cup,	Journal article
2011	Swart, K.; Bob, U.; Knott, B.; Salie, M.	A sport and sociocultural legacy beyond 2010: A case study of the Football Foundation of South Africa	Journal article
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2011	Bama, H.; Swart, K.; Knott, B.; Ntloko, N.	Residents' perceptions of the socio-economic impacts of the 2010 FIFA World CupTM: Pre-and post-event comparisons in a Cape Town suburb	Conference material
2011	Ezeuduji, I.O.; Rid, W.	Rural Tourism offer and local community participation in The Gambia.Tourismos	Journal article
2011	Hattingh, E.C.; Spencer, J.P.; Venske, E.	Economic impact of special interest tourism on Cape Town: A case study of the 2009 Mother City Queer Project: Sport and tourism	Journal article
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2011	Bama, H.; Swart, K.; Knott, B.; Ntloko, N.	Residents' perceptions of the socio-economic impacts of the 2010 FIFA World CupTM: Pre-and post-event comparisons in a Cape Town suburb	Conference material
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2010	Swart, K., Bob, U. and Turco, D.,	Media, crime and the 2010 Soccer World Cup in South Africa: pre-event analysis and perceptions	Journal article
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2010	Strydom, A.J.; Venske, E.	Culture as a marketing mechanism for international tourists to South Africa	Journal article
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2010	Bob U, Cornelissen S & Swart, K.	South Africa	Book chapter
2010	Swart, K.	Hallmark and mega events. In Events management: a developmental and managerial approach. 3rd ed.	Book chapter

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2010	Goba, T.; Swart, K.; Knott, B.	The impact of a sport-based youth development programme in a small community in the Western Cape	Conference material
2010	Knott, B.; Swart, K.; Turco, D.; Bob, U.	Residents' and local businesses' perceptions of the nation branding impact of the 2010 FIFA World CupTM	Conference material
2010	Knott. B.; Swart, K.; Turco, D.; Bob, U.	Resident, local business, and international visitor perceptions of the nation-branding impact of the 2010 FIFA World Cup	Conference material
2010	Knott, B.; Swart, K.; Turco, D.; Bob, U.	The sport tourism legacy of mega-events: From Beijing 2008 to South Africa	Conference material
2010	Swart, K.	2010 FIFA World CupTM research agenda City of Cape Town	Conference material
2010	Swart, K.	The changing relationship between leisure and tourism	Conference material
2010	Swart, K.	The Football World Cup: What is it worth? (African Renaissance Conference, Durban)	Conference material
2010	Swart, K.	The Football World Cup: What is it worth? (CPUT Research Day, Cape Town)	Conference material
2010	Swart, K.; Bob U.	The 2010 FIFA World CupTM research agenda South African Sport and Recreation Conference (SASReCon) Durban	Conference material
2010	Swart, K.; Bob, U.; Chain, D.	Residents' perceptions of the 2010 FIFA World CupTM: A case study of a suburb in Cape Town (South Africa International Summit on Tourism, Johannesburg, 24-26 February	Conference material

2010	Swart, K.; Cornellisen, S.	The impact of mega-sporting events on sport and development: the case of the 2010 FIFA World Cup in South Africa (Mainstreaming Sport in Development Studies (Nova Scotia, Canada, 20 May	Conference material
2010	Swart, K.; Cornellisen, S.	Using sustainability indicators to inform legacy practice – Lessons from South Africa Invitational Think Tank (Sports Mega-Events, Sustainability and Impact Assessment, Vancouver, Canada, 18 February)	Conference material
2010	Tichaawa, T.M.; Swart, K.	South Africa's image amongst African fans and factors that will influence their participation during the 2010 FIFA World Cup (South Africa International Summit on Tourism, Johannesburg, 24-26 February)	Conference material
2010	Daniels, T.; Swart, K.	An investigation into 2010 FIFA World CupTM planning: A case study of the Eden District Municipality, Western Cape, South Africa	Conference material
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2010	Swart K, Knott B, Stofberg Q & Hartenberg E	A profile of the international football tourist at the 2010 FIFA World Cup (CPUT Research Day, Cape Town, 3 December)	Conference material
2010	Bob, U.; Swart, K.	Sport events and social legacies	Journal article
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2009	Swart, K.; Bob, U.	Venue selection and the 2010 World Cup: a case study of Cape Town. In Development and dreams: the Urban Legacy of the 2010 World Cup.	Book chapter
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2008	Ntloko N.J.; Swart, K.	Sport tourism event impacts on the host community-a case study of Red Bull Big Wave Africa.	Journal article
2008	CETRA	Multi-purpose Business Solutions.	Technical report
2008	Ohlhoff, J.H.S.	The Relationship between Employer-Of-Choice Status And Employer Branding	Journal article
2008	Ohlhoff, J.H.S.	A survey of disclosure of compliance with King II by top listed South African companies: an investigative study of the companies listed on the FTSE/JSE top 40	Journal article
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2008	Swart, K.	Achieving total freedom through educational liberation: developing a learner culture through a woman's lifetime (6th Annual Management and Leadership Development for Women in Government Conference Cape Town 15-18 September)	Conference material

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2008	Swart, K.	Sport tourism in SADC Sponsorship Conference: Meeting Changing Expectations Windhoek, Namibia 29-31 July	Conference material
2008	Swart, K.; Bob, U.	Community perceptions of 2010 in Durban, South Africa (8th International Hamburg Symposium: Mega Sport Events: Economic & Socio-economic impact, Hamburg, Germany 4-5 July 2008	Conference material
2008	Swart, K.; Bob, U.	Resident perceptions of the 2010 FIFA World Cup stadia development in Cape Town The impact of Mega Sports Events: The 2010 FIFA World Cups in South Africa and Developmental Goals Cape Town 5-7 March	Conference material
2008	Swart, K.; Turco, D.M.T.	Sport Tourism: developing nations. Legacy Lives 2008 Barbados 28-30 January	Conference material
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2008	CETRA; University of Stellenbosch.	2008. GIS-based GAP analysis	Technical report
2008	CETRA	African Equations. 2008: GAP analysis value addition	Technical report
2008	CETRA; University of Stellenbosch.	2010 FIFA World Cup Research: International football market profiles, Experiences of previous hosts and Western Cape citizens' 2010 expectations	Technical report
2008	CETRA	The economic significance of tourism in the Western Cape Province: a Tourism Satellite Account approach	Technical report
2007	CETRA;Tourism Management Department, CPUT.	Universal accessibility: a tourism perspective.	Technical report
2007	CETRA	A socio-economic impact assessment of the Wacky Wine Weekend	Technical report
2007	CETRA.	A socio-economic impact assessment of the Knysna Oyster Festival	Technical report

2007	CETRA.	A socio-economic impact assessment of the Cape Town International Jazz Festival	Technical report
2007	Swart, K.	Media, crime and the 2010 FIFA World Cup in South Africa. (Safety and security at events and venues Conference, Johannesburg 5 - 6 February).	Conference material
2007	Swart, K.; Bob, U.	Listening to community voices: Athlone and Green Point residents' views on the location of the 2010 FIFA World Cup Stadium in Cape Town. (7th International Hamburg Symposium "Sport and Economics" on the economics of top performance in international sports. Hamburg Chamber of Commerce, Hamburg)	Conference material
2007	Swart, K.	Media, crime and the 2010 FIFA World Cup in South Africa: new rules. New roles and new responsibilities, Conference, Johannesburg 5-6 February 2007	Conference material
2007	Swart, K.; Bob, U.	Listening to community voices: Athlone and Green Point residents' view on the location of the 2010 FIFA World Cup stadium in Cape Town. (7th International Hamburg Symposium on the Economics of Top International Sports Hamburg, Germany 31 August – 1 September).	Conference material
2007	Swart, K.;& Bob, U.	The eluding link: toward developing a national sport tourism strategy in South Africa beyond.	Journal article
2007	Bob, U.; Swart, K.; Okech, R.N.	Local communities and sustainable ecotourism: case studies from South Africa and Kenya. In Local Communities and Participation in African Tourism	Book chapter
2007	Knott, B.; Swart, K.	Maximising the sponsorship impact of sport tourism events. (AHSA International Conference, Cape Town, Cape Town, 11-14 November).	Conference material

2007	Bob, U.; Swart, K.; Turco, D.	Crime and sport tourism events in South Africa: implications for the 2010 World Cup. (Valencia Summit 2006: Major Sport Events and Opportunity for Development, Valencia, Spain, 17-19 October 2006	Conference material
2006	Swart, K.	Sport tourism in South Africa. (Illes Balears Forum: Sport and Tourism Global Network for Development of Regions Mallorca, Spain, 22-24 November).	Conference material
2006	Swart, K.; Bob, U.	Soccer stadium venue selection, city legacies and the 2010 FIFA World Cup: a case study of Cape Town (2010 and the Life of the City, Johannesburg, 4-6 September).	Conference material
2006	Dube, C.N.	Tourism promotion and development among the previously disadvantaged communities in Umkhanyakude Municipality	Book
2006	Ntloko, N.J.	Management and impacts of sport tourism events: a case study of Red Bull Big Wave Africa. (Annual Conference, Cape Peninsula University of Technology, November, 2006).	Conference material
2006	Bob, U.; Swart K.; Turco, D.	D Crime and sport tourism events in South Africa: implications for the 2010 World Cup (Valencia Summit 2006: Major Sport Events and Opportunity for Development: The International Promotion of the Cities Valencia, Spain 17-19 October)	Conference material
2006	Rust, A.A.; Swart, K.	A new era in South African air travel: a suggested labour relations model. (1st International Conference, Faculty of Management, University of Johannesburg 29-31 October)	Conference material
2006	Cornelissen, S.; Swart, K.	The 2010 Football World Cup as a political construct: the challenge of making good on an African promise.	Article review
2005	Swart, K.	Strategic planning – implications for the bidding of sport events in South Africa.	j

2005	CETRA.	Black Economic Empowerment codes accelerate small business support: Challenges for SEDA	Technical report
2005	Swart, K.	Strategic planning: implications for the bidding of sport events in South Africa	j
2005	Swart, K.; Bob, U.	Measuring the social impacts of events? Resident reactions to the North Sea Jazz Festival Cape Town. (3rd IIPT African Conference on Peace through Tourism. Pathway to a peaceful and prosperous Africa. Lusaka, Zambia, 6 – 11 February)	Conference material
2005	Swart, K.; Smith-Christensen, C.	"Contributing towards a research culture in the event tourism industry? A public-private-sector partnership." (3rd IIPT African Conference on Peace through Tourism. Pathway to a peaceful and prosperous Africa. Lusaka, Zambia, 6 – 11 February)	Conference material
2005	Swart, K.; Bob, U.; Moodley, V.	Evaluating socio-economic impacts of sport tourism events: Case studies from Durban, South Africa. (The Impacts of Events Conference. A triple bottom-line evaluation of events. Sydney, 13 – 5 July)	Conference material
2005	Swart, K.; Bob, U.	Leveraging anticipated benefits associated with hosting the 2010 Soccer World Cup in South Africa. (The Impacts of Events Conference. A triple bottom-line evaluation of events. Sydney, 13 – 5 July)	Conference material
2005	Swart, K.; Smith-Christensen, C.	Contributing towards a research culture in the event tourism industry? A public-private-sector partnership. (3rd IIPT African Conference on Peace through Tourism. Pathway to a peaceful and prosperous Africa. Lusaka, Zambia, 6 – 11 February).	Conference material
2005	Swart, K.; Bob, U.; Heath, E.	Game Plan: Developing a strategic framework for leveraging community benefits associated with hosting the 2010 Soccer World Cup in South Africa. (Imbizo Global Alignment Summit, Johannesburg, 28 - 29 July)	Conference material

2005	Swart, K.	Beyond impact: a general model for sport-event leveraging. (CTRU 2010 Tourism and Investment Workshop for Cape Town and the Western Cape, Place: Cape Town, 28th November)	Conference material
2005	Thomas, H.W.	Black Economic Empowerment codes accelerate small business support: Challenges for SEDA	Journal article
2005	Thomas, H.W.	Title of article: the millennium development goals and Nepad	Journal article
2005	Thomas, H.W.	Responding to the challenge posed by South Africa's second economy to the country's growth and development." Africa Institute Conference on the UN Commission Country Assessment of South Africa. Pretoria, 26th October	Conference material

APPENDIX B: SCOPUS' INDEXED RESEARCH ITEMS

Year	Authors	Title	Doc type
2018	Carse, C.; Venske, E.; Steyn, J. N.	Critical factors influencing visitor attendance at a literary arts festival in Stellenbosch	Journal article
2018	Dube, C. N.	Community participation in the management of South Africa's protected areas.	Journal article
2018	Hattingh, C.	Motives for attending live stand-up comedy: an audiences' perspective	Journal article
2018	Hatting, C.; de Waal, A.; Parsons, P.	Assessing high performance: South African case study	Journal article
2018	Hattingh, C.; Spencer, J. P.	Homosexual not Homogeneous: A Motivation-Based Typology of Gay Leisure Travelers Holidaying in Cape Town	Journal article
2018	Iwu, G. C.; Ezeuduji, I .O.; Iwu, I.C.; Ikebuaku, K.; Tengeh, R.K.	Achieving Quality Education by Understanding Teacher Job Satisfaction Determinants	Journal article
2018	Machisa, P.; Muresherwa, G.; Steyn, J. N.	Green Point residents' perceptions of the socio-economic impact of the Cape Town Carnival	Journal article
2018	Makuzva,W.; Ntloko, N. J.	Tourism product as a measure to determine the key elements that influence tourists' decisions to visit Victoria Falls, Zimbabwe	Journal article
2018	Mokoena, P. P.	Analysis of the research design used in a Tourism Management service learning project-	Journal article
2018	Venske, E.	Rising to the Occasion: Experiential Learning Experiences of Event Management Students at a South African University of Technology.	Journal article
2018	Mhlanga, O.; Steyn, J.	Liberalisation initiatives of the airline industry in southern Africa: Progress achieved and hindrances to implementation.	Journal article
2018	Mhlanga, O.; Steyn, J.; Spencer, J.	Impacts of the micro environment on airline performances in Southern Africa: Management perspectives.	Journal article
2018	Mhlanga, O.; Steyn, J.;	The airline industry in South Africa: drivers of operational efficiency and impacts. Tourism	Journal article

	Spencer, J.	Review.	
2017	Engelbrecht, M.; Spencer, J.; van der Bijl, A.	Relevance for work in the Western Cape tourism industry of the National Certificate Vocational in tourism education at TVET Colleges.	Journal article
2017	Ezeuduji, I O.	Change management for sub-Saharan Africa's rural tourism development.	Journal article
2017	Ezeuduji, I. O.; Chibe, M. E.; Nyathela, T.	Hospitality management study programme and students' perceptions: universities in South Africa	Journal article
2017	Ezeuduji, I. O.; Chibe, M. E.; Nyathela, T.	Student profile and perceptions of Hospitality Management education: Universities in South Africa.	Journal article
2017	Ezeuduji, I.O.; Nkosi, G. S.	Tourism destination competitiveness using brand essence: Incorporating the 'zuluness' of the Zulu Kingdom	Journal article
2017	Hattingh, C.; Spencer, J. P.	Salient factors influencing gay travellers' holiday motivations: a push-pull approach. African Journal of Hospitality, Tourism and Leisure	Journal article
2017	Iwu, C. G.; Ezeuduji, I.O.; Iwu, C. I.; Ikebuaku, K.; Tengeh, R. K.	Job motivation and management implications: A case of teachers in Nigeria.	Journal article
2017	Mhlanga, O.; Steyn, J.; Spencer, J.	Good bye Air Zimbabwe ... Hello Zimbabwe Airways: Will re-branding solve Air Zimbabwe's financial woes	Journal article
2017	Mhlanga, O.; Steyn, J.; Spencer, J.	Impacts of the micro environment on airline performances in Southern Africa: Management perspectives	Journal article
2017	Mhlanga, O.; Steyn, J.	Impacts of the macro environment on airline operations in southern Africa.	Journal article
2017	Muresherwa, G.; Machisa, P.; Steyn, J. N.	Residents' perceptions of the impacts of a carnival in Cape Town	Journal article
2017	Mdiniso, J.M.; Ezeuduji,I.O.; Nzama, A.T.	Evaluating nature conservation and tourism development effectiveness: Local communities around Hluhluwe-iMfolozi Game Park, South Africa.	Journal article
2017	Spencer, J.P.; Steyn, J.N.	Logistical management of iconic sporting events	Journal article
2016	Mabinda, B.; Spencer, J.	Risks connected to the work force at the small medium and micro enterprises.	Journal article

2016	Sewell, W.; Steyn, J.N.; Venter, P.; Mason, R. B.	Governance of strategically relevant research in the wholesale and retail sector.	Journal article
2015	Ezeuduji, I.O.	Strategic event-based rural tourism development for sub-Saharan Africa.	Journal article
2015	Manners, B.; Kruger, M.; Saayman, M.	Different venues, different markets, different experiences: evidence from life music performances in South Africa	Journal article
2015	Manners, B.; Saayman, M.; Kruger, M.	Managing a live music performance: A supply-side analysis	Journal article
2015	Swart, K.; Bob, U.; Allen, D. C.	A stakeholder analysis of the governance of the 2010 FIFA world cup: a case study of the city of Cape Town	Book chapter
2015	Venske, E.	Pink tourism in Cape Town: The development of the post-apartheid gay quarter	Book chapter
2014	Bang, H.; Lee, S.; Swart, K.	Predicting volunteers' intention to return: An examination of brand personality, prestige, and identification of sporting events	Journal article
2014	Rid, W.; Ezeuduji, I. O.; Pröbstl-Haider, U.	Segmentation by motivation for rural tourism activities in The Gambia	Journal article
2013	Allen, D. C.; Knott, B.; Swart, K.	“Africa’s Tournament”? The branding legacy of the 2010 FIFA World Cup	Journal article
2013	Ezeuduji, I.O.; Rid, W.	Rural tourism market segmentation: The case of The Gambia	Journal article
2013	George, R.; Swart, K.; Jekins, D. W.	Harnessing the power of football: Safety-risk perceptions of sport tourists at the 2013 FIFA confederations cup™ in Brazil	Journal article
2013	Swart, K.; Bob, U; Turco, D. M.	Bidding for major international sporting events, sports management in the Middle East: a case study analysis	Book chapter
2013	Swart. K.; Linley, M.; Bob, U.	The media impact of South Africa’s historical hosting of Africa’s first mega-event: Sport and leisure consumption patterns	Journal article
2012	George, R.; Swart, K.	International tourists’ perceptions of crime-risk and their future travel intentions during the 2010 FIFA World Cup™ in South Africa	Journal article
2012	Manners, B.; Kruger, M.; Saayman, M.	Managing the beautiful noise: evidence from the Neil Diamond Show	Journal article

2012	Swart, K.; Bob, U.	Reflections on developing the 2010 FIFA World Cup™ research agenda.	Book chapter
2011	Cornelissen, S.; Bob, U.; Swart, K.	Sport mega-events and their legacies: The 2010 FIFA World cup,	Journal article
2011	Ezeuduji, I.O.; Rid, W.	Rural Tourism offer and local community participation in The Gambia.	Journal article
2011	Swart, K.; Bob, U.; Knott, B.; Salie, M.	A sport and sociocultural legacy beyond 2010: a case study of the Football Foundation of South Africa	Journal article
2010	Bob, U.; Cornelissen, S.; Swart, K.	South Africa	Book chapter
2009	Bob, U.; Swart, K.	Residents' perceptions of the 2010 FIFA Soccer World Cup stadia development in Cape Town	Journal article
2008	Ntloko, N. J.; Swart, K.	Sport tourism event impacts on the host community-a case study of Red Bull Big Wave Africa.	Journal article
2007	Swart, K.; Bob, U.	The eluding link: toward developing a national sport tourism strategy in South Africa beyond.	Journal article
2006	Cornelissen, S.; Swart, K.	The 2010 Football World Cup as a political construct: the challenge of making good on an African promise.	Article review
2005	Swart, K.	Strategic planning – implications for the bidding of sport events in South Africa.	Journal article

APPENDIX C: LETTER OF REQUEST – DATA COLLECTION

Cape Peninsula University of Technology

Office of the Director: CPUT Libraries
Dr E.R.T Chiware
E-mail: chiwareE@cput.ac.za
Tel: 021 959-6320/6322
Fax: 021 959-6109

30 May 2018

To whom it may concern

Dear Sir/ Madam

Motivation for Research Data Collection Method

This is to clarify that the following study: *Altmetric analysis of research outputs in the Faculty of Business and Management Sciences at Cape Peninsula University of Technology*, by Ontebetse Patricia Mothopeng, a registered student for the MTech (Business Information Systems) Degree at Cape Peninsula University of Technology (CPUT) will not have Survey Questionnaire as the data gathering tool.

The data will be derived from a sample of Social Media Platforms, Academic Social Networks, CPUT Institutional Repository and Library Subscription-based Databases. The data from these platforms will adequately suffice to answer the research question of the stated study.

I am the supervisor for this research and my contact details are as follows: Telephone (021) 959 6322/ 6320; email: chiwaree@cput.ac.za

Regards

Dr Elisha Chiware
Director: Library Services

APPENDIX D: LETTER OF APPROVAL - DEPARTMENT OF TOURISM AND EVENTS MANAGEMENT

Cape Peninsula University of Technology

To whom it may concern

Dear Sir/Madam

I Cynthia Dube, in my capacity as Head of Department (HoD) of Tourism and Events Management at Cape Peninsula University of Technology hereby give consent to allow Patricia Mothopeng , a student at the Cape Peninsula University of Technology, to collect data from this Department as part of her M Tech (Business Information Systems) research. The student has explained to me the nature of his research and the nature of the data to be collected.

This consent in no way commits any individual staff members' name to be named in the research. I reserve the right to withdraw this permission at some future time.

In addition, the researchers' names will not be mentioned in the:

1. Thesis
2. Conference paper
3. Journal article
4. Research poster

Best Regards

Cynthia Dube
Acting HoD: Tourism and Event Management
School of Sports; Events; Tourism and Hospitality (SETH)
Tel: 021 460 4250
Email: dubec@cput.ac.za

APPENDIX E: LETTER OF APPROVAL - RESEARCH ETHICS COMMITTEE

P.O. Box 1906 • Bellville 7535 South Africa •Tel: +27 21 4603291 • Email: fbmsethics@cput.ac.za
Symphony Road Bellville 7535

Office of the Chairperson Research Ethics Committee	Faculty: **BUSINESS AND MANAGEMENT SCIENCES**

At a meeting of the Faculty's Research Ethics Committee on **19 June 2018**, Ethics **Approval** was granted to **Ontebetse Mothopeng (216298431)** for research activities of **MTech: Bus. Info. Systems** at Cape Peninsula University of Technology.

Title of dissertation/thesis/project:	ALTMETRIC ANALYSIS OF RESEARCH OUTPUTS IN THE FACULTY OF BUSINESS AND MANAGEMENT SCIENCES AT CAPE PENINSULA UNIVERSITY OF TECHNOLOGY Lead Researcher/Supervisor: Dr. E. Chiware

Comments:

Decision: APPROVED

Signed: Chairperson: Research Ethics Committee	**25 June 2018** **Date**

Clearance Certificate No | 2018FBREC548

APPENDIX F: LETTER OF GRAMMARIAN

Epsilon Editing

314 Grosvenor Square
21 College Road
Rondebosch
7700

dgncornwell@gmail.com

tel. 084-9897977

27 August 2020

TO WHOM IT MAY CONCERN

This serves to confirm that the M Tech thesis by Ontebetse Patricia Mothopeng, "Altmetric analysis of research outputs in the Faculty of Business and Management Sciences at the Cape Peninsula University of Technology," has been proofread and edited to my satisfaction for English idiom and correctness of expression. The referencing has been checked against the CPUT Harvard-style standard.

Professor D G N Cornwell (PhD)

DATASET 1

Annual generation of resource outputs

YEAR	FREQUENCY					
	Bibliographic list	CETRA reports	Google Scholar	Institutional repository	Research directorate reports	Scopus
2018	16	0	3	13	13	
2017	24	0	16	9	12	
2016	17	0	9	7	3	
2015	19	0	2	4	4	
2014	9	0	8	11	2	
2013	14	0	12	13	5	
2012	40	0	14	34	3	
2011	12	0	3	5	3	
2010	28	1	12	24	1	
2009	13	9	1	3	1	
2008	27	33	16	29	1	
2007	12	11	2	8	1	
2006	10	1	6	6	1	
2005	19	20	4	0	1	
Total	260	75	108	166	51	

Annual output per item type and source

Annual output per item type in CETRA reports

YEAR	ITEM TYPE					
	Books	Book chapters	Conference Material	Journal Articles	Reviews	Technical reports
2018	0	0	0	0	0	0
2017	0	0	0	0	0	0
2016	0	0	0	0	0	0
2015	0	0	0	0	0	0
2014	0	0	0	0	0	0
2013	0	0	0	0	0	0
2012	0	0	0	0	0	0
2011	0	0	0	0	0	0
2010	0	1	0	0	0	0
2009	0	8	0	1	0	0
2008	0	0	16	12	0	5
2007	0	0	3	1	0	7
2006	0	1	0	0	0	0
2005	0	2	16	2	0	0
Total	0	12	35	16	0	12

DATASET 1

Annual output per item type in Google Scholar

YEAR	ITEM TYPE					
	Books	Book chapters	Conference Material	Journal Articles	Reviews	Technical reports
2018	0	0	5	0	0	0
2017	0	1	19	1	0	0
2016	0	0	8	5	0	0
2015	0	2	13	2	0	0
2014	0	0	5	4	0	0
2013	0	1	4	2	0	0
2012	0	3	11	1	0	0
2011	0	1	7	0	0	0
2010	0	2	4	1	0	0
2009	0	3	1	2	0	0
2008	0	0	7	1	0	0
2007	0	0	1	0	0	0
2006	1	0	0	3	1	0
2005	0	0	0	3	0	0
Total	1	13	85	25	1	0

Annual output per item type in Institutional Repository

YEAR	ITEM TYPE					
	Books	Book chapters	Conference Material	Journal Articles	Reviews	Technical reports
2018	0	0	3	0	0	0
2017	0	0	14	2	0	0
2016	0	0	9	0	0	0
2015	0	0	1	1	0	0
2014	0	0	7	1	0	0
2013	1	1	9	1	0	0
2012	0	4	10	0	0	0
2011	0	0	3	0	0	0
2010	0	6	3	3	0	0
2009	0	1	0	0	0	0
2008	0	0	5	11	0	0
2007	0	0	0	2	0	0
2006	0	1	0	5	0	0
2005	0	0	0	4	0	0
Total	1	13	64	30	0	0

DATASET 1

Annual output per item type in Research Reports

YEAR	ITEM TYPE					
	Books	Book chapters	Conference Material	Journal Articles	Reviews	Technical reports
2018	0	0	11	1	1	0
2017	0	1	8	0	0	0
2016	0	1	5	1	0	0
2015	0	2	2	0	0	0
2014	0	1	4	6	0	0
2013	1	1	9	2	0	0
2012	1	4	15	14	0	0
2011	0	1	2	2	0	0
2010	0	3	6	15	0	0
2009	0	1	0	2	0	0
2008	0	0	8	14	0	7
2007	0	0	1	3	0	4
2006	0	1	2	3	0	0
2005	0	0	0	0	0	0
Total	2	16	73	63	1	11

Annual output per item type in Scopus

YEAR	ITEM TYPE					
	Books	Book chapters	Conference Material	Journal Articles	Reviews	Technical reports
2018	0	0	12	0	1	0
2017	0	0	12	0	0	0
2016	0	0	3	0	0	0
2015	0	2	2	0	0	0
2014	0	0	2	0	0	0
2013	0	1	4	0	0	0
2012	0	1	2	0	0	0
2011	0	0	3	0	0	0
2010	0	1	0	0	0	0
2009	0	0	1	0	0	0
2008	0	0	1	0	0	0
2007	0	0	1	0	0	0
2006	0	0	0	0	1	0
2005	0	0	1	0	0	0
Total	0	5	44	0	2	0

Research outputs of Department of Tourism and Events Management

The frequency of item types of research outputs by source

ITEM TYPE	FREQUENCY					
	Bibliography list	CETRA reports	Google Scholar	Institutional repository	Research directorate reports	Scopus
Books	2	0	1	1	2	0
Book chapters	24	12	13	13	16	5
Journal articles	123	35	85	64	73	44
Conference material	95	16	25	30	63	0
Reviews	2	0	1	0	1	2
Technical reports	14	12	0	0	11	0
Total	260	75	125	108	166	51

NB: The item types frequencies of sources overlap therefore ther grand total will be more than Bibliographic list total

DATASET 2

ACTIVITY DATA OF DEPARTNMENT OF TOURISM AND EVENTS MANAGEMENT IN SCHOLARLY PLATFORMS

	Academic.edu			Google Sch	Mendeley				LinkedIn	ORCID	ResearchGate			
	Followers	Following	Output	Output	Followers	Following	Output	Reads	Followers	Output	Followers	Following	Reads	Output
Staff member A	0	0	0	0	0	0	0	0	0	0	2	1	98	1
Staff member B	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Staff member C	3	6	0	0	0	0	0	0	0	0	0	0	0	0
Staff member D	0	6	0	0	0	0	0	0	0	0	9	21	0	0
Staff member E	0	0	0	0	0	0	0	0	0	0	11	20	14	1
Staff member F	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Staff member G	1	2	0	0	0	0	0	0	0	0	3	16	0	0
Staff member H	0	0	0	0	0	0	8	47	434	10	109	43	7081	17
Staff member I	0	0	0	0	0	0	0	0	0	0	1	29	0	0
Staff member J	0	0	0	0	0	0	0	0	80	0	0	0	0	0
Staff member K	0	0	0	3	0	0	0	0	120	0	0	0	0	0
Staff member L	13	12	0	0	0	0	0	0	126	0	0	0	0	0
Staff member M	392	78	0	5	0	0	0	0	112	0	1	2	411	4
Staff member N	0	1	0	0	0	0	0	0	144	0	6	1	0	1
Staff member O	0	0	0	0	0	0	0	0	300	0	0	0	0	0
Staff member P	0	0	0	0	0	0	0	0	10	0	0	0	0	0
Staff member Q	0	0	0	0	0	0	0	0	6	0	0	0	0	0
Staff member R	0	0	0	0	0	0	0	0	42	0	0	0	0	0
Staff member S	23	11	7	12	0	0	0	0	0	0	0	0	0	0
Staff member T	0	0	0	0	0	0	0	0	204	0	10	34	0	0
Staff member U	0	30	0	0	0	0	0	0	9	0	0	0	0	0
Staff member V	7	9	0	4	0	0	0	0	0	0	0	0	0	0
Staff member W	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Staff member X	0	0	0	0	0	0	0	0	0	0	2	20	0	0
Staff member Y	0	0	0	0	0	0	0	0	3	0	0	6	629	7
Staff member Z	1	22	1	2	0	0	0	0	39	0	0	0	0	1

DATASET 3

Altmetric indicators of the Department of Tourism and Events Managemement by output's year of publication

YEAR OF PUBLICATION	USAGE METRICS			CAPTURE METRICS		SOCIAL MEDIA METRICS			TOTAL
	Abstract views	Full views	Link-outs	Saves	Reads	Likes	Tweets	Commments	
2018	1258	1065	110	165	23	0	0	0	2621
2017	1251	418	168	90	89	0	0	0	2016
2016	1454	647	43	170	5	0	0	0	2319
2015	550	0	48	19	82	0	0	0	699
2014	4999	4342	76	530	118	0	0	0	10065
2013	0	0	0	0	0	0	0	0	0
2012	5281	2067	30	281	96	0	0	0	7755
2011	1303	855	152	158	114	0	0	0	2582
2010	2308	848	499	215	105	0	0	0	3975
2009	1084	48	248	59	262	0	0	0	1701
2008	16	0	3	14	61	0	0	0	94
2007	12	1	0	27	32	0	2	0	74
2006	557	59	90	21	155	0	0	0	882
2005	150	58	59	50	98	2	0	2	419
GRAND TOTAL									30 702