



**AN EXPLORATION OF ENVIRONMENTAL MANAGEMENT ACCOUNTING  
POLICIES AND PRACTICES AT A HIGHER EDUCATION INSTITUTION IN  
KWAZULU-NATAL**

**by  
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Master of Commerce in Accounting**

**School of Accounting, Economics and Finance  
College of Law and Management Studies**

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## **DEDICATION**

I dedicate this research work to my family, friends and colleagues.

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## **ABSTRACT**

Universities have a role to play in the preservation of the environment and this study attempted to evaluate the environmental management accounting processes at the University of KwaZulu-Natal (UKZN). UKZN, a South African university generates the same direct and indirect environmental impacts as the higher education sector worldwide. This is significant within the context of the South African environment which is constantly plagued by having to effectively manage the already scarce resources of water and energy, evident through imposition of water and energy restrictions over the recent years.

The study's aim is to increase awareness of having a structured approach to environmental management, in order to achieve the strategic environmental goals of the university. The research studied the experiences of key managers within UKZN, with the purpose of exploring the potential factors which influence the decision to adopt and apply environmental management accounting (EMA) within the higher education sector. The study comprised two objectives, namely understanding the current state of accounting practices for managing major environmental costs and identifying factors influencing EMA adoption within the university. The study adopted a case study approach, comprising semi-structured interviews of key personnel involved in Management Accounting, Environmental Management and Academic Schools within the university. Content analysis was performed on the transcribed interview data. A theoretical framework derived from literature was adopted to guide data collection and focus the study. Contingency and institutional theory was the resultant basis of the derived framework.

The findings of the first objective revealed that there is a distinct lack of EMA utilisation within the university. There is no distinct policy on EMA, resulting in minimal environmental cost information being brought to the attention of senior management. The university embraces the principles of environmental sustainability however efforts to improve internal environmental accountability primarily from an accounting perspective are absent.

The findings of the second objective revealed that five key barriers contributed to the lack of EMA utilisation within the university. The barriers are attitudinal, informational,

institutional, technological, and lack of incentives (financial). The results and findings of this study supported the use and application of EMA, within the higher educational sector. Participants concurred that EMA is underutilised and if implemented would realise significant benefits for both the university and environment.

Environmental management accounting is being widely acknowledged as a key management tool that can facilitate improved financial and environmental performance via the concept of enhanced environmental accountability. Historically, research has been concentrated primarily on the manufacturing industry, due to it generating the greatest proportion of environmental impacts. Service industries are also an integral component of environmental management as they contribute significant environmental impacts, both direct and indirect. Educational institutions such as universities form part of the service sector and directly impact on the environment through the consumption of paper, energy and water, as well as solid waste generated, with the associated demands.

**Keywords:**

Environmental management accounting, environmental impacts, higher education, Southern Africa.

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## **LIST OF ACRONYMS AND ABBREVIATIONS**

EMA	environmental management accounting
EMS	environmental management system
EPIs	environmental performance indicators
GL	general ledger
IASB	International Accounting Standards Board
IFAC	International Federation of Accountants
ISO	International Organization for Standardization
OECD	Organisation for Economic Co-operation and Development
UCDP	University Capacity Development Programme
UK	United Kingdom
UKZN	University of KwaZulu-Natal
US	United States



# CHAPTER 1

## INTRODUCTION

### 1.1. Background

Accounting is broken down into two components, financial accounting and management accounting. Financial accounting comprises the preparation of financial information for use by external stakeholders. This financial information is presented in the form of financial statements. Management accounting on the other hand is the presentation of information, both financial and non-financial, for the internal stakeholders, namely management (Schaltegger, Bennett, Burritt, & Jasch, 2010; Schaltegger & Burritt, 2017). Management accounting provides the individuals responsible for running an entity, with the necessary information required in the decision-making process.

The role of accounting has evolved over time and at present we see the birth of a secondary role, namely the management of environmental performance.

Firms are currently under pressure to assure future sustainability and growth. As such, many firms have focused attention and resources toward environmental aspects, with the intention of reducing environmental impacts and improving environmental performance (Kopinina & Blewitt, 2018). Strict environmental regulations and market pressures require that organisations adopt quality and environmental management as part of their strategic management. Adoption and implementation of environmental management can result in significant savings (Schaltegger & Burritt, 2017).

Traditionally, the focal point of accounting was the reporting on financial information, but the emergence of environmental accounting means that accounting now should focus on providing detail regarding environmental performance of an entity to its various stakeholders.

Environmental accounting focuses on the monetary implications of the environmental aspects of an organisation (Schaltegger & Burritt, 2017). Environmental accounting came to fruition because of limitations within conventional accounting (Bartelmus & Seifert, 2018). Scrutiny of the conceptual

framework developed by the International Accounting Standards Board (IASB) showed that the conventional accounting practices failed to duly provide for environmental impacts and account for the use of natural resources (Deegan, 2017). The environmental costs incurred by organisations were not accounted for by conventional accounting. These costs were accounted for as overhead costs, and as such were unable to provide management with sufficient information as required for strategic decision making (Uwalomwa, 2011). Environmental accounting therefore facilitates the process of managing and accounting for environmental resources utilised as outputs costs for enhancing the overall strategic decision-making process.

Environmental management accounting is viewed as a management instrument that utilises environmental accountability to enhance financial and environmental performance of an entity. It encompasses both the monetary and physical aspects of environmental impacts generated by organisations (Christ & Burritt, 2013).

Environmental management and environmental management accounting have been the focus point of many industries, both locally and abroad. Historically, research has been concentrated primarily on the manufacturing industry. Manufacturing industries generate the greatest proportion of environmental impacts, and hence have been the primary focus of research.

Service industries are also an integral component of environmental management as they have significant impacts, both direct and indirect (Bennett, Hopkinson, & James, 2006). Educational institutions such as universities form part of the service sector. The direct impacts on the environment are those related to the use of paper, and solid waste generation along with the associated energy and water demands. Indirect impacts stem from changes in environmental behaviour via education and research (Chang, 2007).

The universities have a role to play in the preservation of the environment and this study evaluated the environmental management accounting processes at UKZN.

UKZN, like most universities, also has the same direct and indirect environmental impacts. The South African environment is constantly faced with having to effectively manage the already scarce resources of water and energy. Over the last

two years this has been very evident through load shedding and the imposition of water restrictions. UKZN operates out of five campuses which face the same energy and water shortages prevalent within the South African environment. The institution, being the largest university in the province of KwaZulu-Natal, has an indirect environmental impact via changing environmental behaviour through education and research. By the creation of awareness and improving environmental performance on the campuses, the university capitalises on the prospect of raising awareness and imparting knowledge relating to environmental issues to students. Per the 2007–2016 UKZN Strategic Plan Document (UKZN Strategic Plan 2007–2016, revised June 2012), the university has endeavoured to manage and run itself in an environmentally conscious way, whereby it fosters a culture of responsible, ethical and sustainable use of natural resources. The Westville campus is situated upon a conservatory and this itself imposes an environmental duty on the institution.

This study aims to create awareness of having a structured approach to environmental management to achieve the strategic environmental goals of the university.

## **1.2. Problem statement**

Modern day greenhouse gas emissions are a significant contributor to global warming and severe environmental problems. Such gas discharge arises partly because of the combustion of oil, gas or coal. Most of today's discharges originate from rich countries. Environmental problems such as drought, floods and other natural disasters have the greatest impact on the poor and developing countries (Abotnes, 2015). In such countries, emissions and poor air quality have become a major issue due to an increase in industrial activity, electricity demand and transportation (Marchi, Maria, & Micelli, 2013). The modern day environmental challenges include scarcity of water and energy and have a significant impact on future organisations (both service and manufacture). This is compounded in South Africa due to the energy crisis and drought experienced.

Having a breakdown of its energy use and costs is important for an entity to achieve sustainable production. Environmental management accounting systems provide such a breakdown and if implemented correctly, can manage and monitor energy consumption and related costs. This in turn will contribute to an environmental-

cognisant operation with reduced greenhouse gas emission, and create an environmentally conscious reputation for the organisation in addition to the monetary benefits achieved.

It is not just the manufacturing sector that is responsible for pollution of the environment. The service sector contains some of the most unsuspecting organisations such as universities which can be significant polluters. Therefore, the responsibility for environmental management does not rest solely with the manufacturing sector (Chang, 2007). Examples of some of the environmental impacts arising at a university are the production of chemicals and toxins arising from chemical experiments conducted at universities. A university also produces a significant amount of water, paper, plastic, chemical and other waste, and in most scenarios the university is located in close proximity of and has a natural environment of trees and other greenery to preserve and protect. UKZN's Westville campus is situated on a conservatory and thus it is an ideal candidate for an environmental management system.

UKZN has over the last three years implemented several initiatives that have positive environmental management attributes; however, it has been done in such a way that the institution has not received the requisite recognition for the initiatives. One such initiative is the decision for the university to move to a paperless environment. This decision may not necessarily have been taken solely for its environmental benefits but paper is a resource that is extensively utilised by universities, and the decision to move to a paperless environment reduces the amount of waste generated and consequently has a positive effect on the environment. This initiative will also result in a cost saving associated with the university's paper consumption.

### **1.3. Aim and research objectives**

#### *Aim of the study:*

Investigate environmental management accounting within the service sector, namely at universities. A very limited degree of research has been conducted on the service sector, including universities, which presents an opportunity to investigate

environmental management at universities with the objective of managing environmental costs and improving the environmental performance of universities.

Objectives of the study:

- 1) To understand the existing environmental management accounting policies and practices that UKZN employs.
- 2) To establish the barriers and facilitators of EMA adoption at UKZN.

#### **1.4. Research design and methodology**

The study was an exploratory study which comprised two objectives as previously outlined. The research design adopted to achieve the research objectives was a qualitative approach, using a case study methodology. A very limited number of studies have attempted to unpack why environmental management accounting is either adopted or rejected by universities, which form part of the service sector. Qualitative research is suitable in this situation to understand management's awareness of EMA and their views regarding its adoption (Chang, 2007). The study comprised an exploratory nature as environmental management accounting at universities is a relatively unexplored area of research. A descriptive analytical approach was followed which dealt with the objectives outlined below.

As this study is qualitative, data was collected using interviews, direct observation and review of written documents. The interviews were in-depth interviews so as to facilitate a more comprehensive understanding of the world within which the interviewees' operate (Chang, 2007).

##### **1.4.1. Research objectives**

- 1) To understand the existing environmental management accounting policies and practices that UKZN employs.

Research to address the objective was conducted via a document/textual review of the policies and practices employed, the financial statement, and using transcribed interviews.

The interviews were focused on key level management within the following operational areas of the university:

Upper executive level management  
Environmental management  
Management accounting.

Research questions 1-3 sought to address this objective.

2) To establish the barriers and facilitators of EMA adoption at UKZN.

Research to address this objective was conducted using transcribed interviews and potentially using a focus group. The intention was to achieve this by developing propositions using secondary data regarding general barriers and facilitators for environmental management accounting, and comparing this to the responses received from key management regarding UKZN specific barriers and facilitators.

Research question 4 was included to address this objective.

#### **1.4.2. Research questions**

Research questions which formed the theoretical basis of this study were developed. These questions primarily focused on the research objectives.

The extension of environmental management accounting to universities is relatively uncharted research territory, and it was therefore essential to direct the study towards environmental costs (Deegan, 2017). As environmental management accounting is a system that encompasses accounting for managing and reporting on environmental costs, the following research questions were utilised:

1. Does the university's accounting system separately identify and measure specific types of the major environmental costs? If not, what is the reason?
2. How are the major monetary and physical environmental costs being captured into the current accounting system?
3. How are the major environmental costs used to promote external environmental reporting and internal management of the environment?
4. What considerations would influence EMA adoption within universities?

### **1.4.3. Research instrument**

A thematic analysis was the method utilised to analyse the data. The following themes formed the basis of the interview questions:

#### Objective 1

Management of major environmental costs  
Accounting for major environmental costs.

#### Objective 2

Management's attitude towards and views regarding EMA adoption  
Environmental accountability  
Institutional pressure regarding awareness and communication of major environmental costs.

### **1.5. Research contribution**

The research contributions are linked to the research objectives, and as such contributions are described in terms of the objectives.

The intention was that fulfilling the research objectives would generate the following contribution, specifically in regard to the higher education sector, which remains relatively unexplored:

#### Objective one

The outcome of the study will be able to inform the higher education sector as to the accounting and management of the major environmental costs. This information will facilitate the identification of the limitations within the existing management information systems currently in place at universities, specifically concerning the management of environmental costs. The higher education sector can be provided with information on how environmental costs can be better accounted for and managed. EMA can be extended to the higher education sector.

## Objective two

The provision of a theoretical framework, which will assist in explaining the higher education sector's lack of EMA utilisation, and the facilitation of universities' recognition of the benefits of EMA, and its implementation in some capacity.

### **1.6. Research limitations**

Due to resource constraints, namely cost and time limitations regarding collection of data, and the qualitative nature of the research, only one university within KwaZulu-Natal was selected. This limitation was marginalised due to the University of KwaZulu-Natal being the largest tertiary institution within KwaZulu-Natal.

The research comprised a descriptive exploratory nature, and as only one university was studied, care must be exercised when generalising the finding and results for other universities. A comparison of results of studies conducted on universities operating within different provinces or countries could be an area for further research. Certain provinces within South Africa face different environmental challenges and as such this may impact the university's decision to embrace EMA.

The theoretical propositions used could cause the researcher to make inferences as to relationships that may exist; however, to test such a relationship may prove challenging. In addition, because the research focused primarily on the theoretical propositions, certain other factors falling outside of this theoretical framework, which may have influenced the decision to adopt EMA, were not considered.

This being a qualitative study, the views and perceptions of the interviewed individuals were most relevant. This resulted in subjectivity being a limitation. Information which is subjective is open to interpretation, and as such the interview data was subject to bias, due to the differing levels of awareness and insight of the participants. In addition, the outcomes were also subject to partiality arising from interpretation by the researcher. It should be noted that measures to reduce the subjectivity levels were implemented by the researcher.



## **1.7. Thesis structure**

The thesis is structured as per the following chapters:

Chapter 1 – Introduction

Chapter 2 – Literature review

Chapter 3 – Research methodology

Chapter 4 – Data analysis and interpretation of results

Chapter 5 – Summary, conclusion and recommendations

## **1.8. Conclusion**

This chapter served to provide a background to the study, along with the underlying reasons for conducting this research. The service sector generates its own set of environmental impacts and this study highlights the sector in the form of universities. This study has helped identify EMA's integration into the higher education sector, thereby helping to improve financial and environmental performance through increased accountability for the environment.

A literature review follows in Chapter 2.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1. Introduction**

This chapter is intended to provide a broad-spectrum understanding of environmental management accounting, which will include a description of the relationship with EMA. Thereafter, the focus of the chapter encompasses a detailed discussion on environmental management accounting. The background regarding the growth and development of EMA is outlined, together with the types of information that are included in EMA. A review of the use and application of EMA is presented, together with EMA-related research.

The significance of EMA within the education sector is examined, which incorporates a discussion of the major environmental impacts of the sector. Environmental management and accountability within this sector are explored, in which the environmental responsiveness required to achieve sustainability at universities is discussed. The barriers facing environmental accountability at universities are introduced. The use and application together with the resultant implications of EMA for universities are discussed, followed by a theoretical framework for environmental management accounting at universities. Factors related to EMA implementation remain less explored, hence a theoretical framework is required to understand the barriers and facilitators of EMA adoption at universities. The theoretical perspectives allow for the development of propositions which are used to address the second objective of the study.

#### **2.2. Environmental management and accountability**

The turn of the twenty first century has brought with it an increased awareness of environmental preservation. The importance of environmental preservation has filtered through to the business environment. Environmental management has become a priority for big business and is a term that is frequently used in environmental management accounting. The reason for big businesses prioritising environmental management is as a result of environmental accountability, which holds decision makers within an organisation responsible for environmental

performance, which in turn drives continuous environmental improvement within the organisation.

### **2.2.1. Environmental management**

According to Gray, Adams and Owen (2017), environmental management is defined as “the range of responses by companies to environmental issues in reviewing their environmental position, developing and implementing policies and strategies to improve that position and in changing management systems to ensure ongoing improvement and effective management”. Environmental management is becoming a higher priority for big business, as managers are being held accountable for the environmental impacts that are generated (Schaltegger, *et al.*, 2010). Organisations are currently under pressure to assure future sustainability and growth. As such, many have focused attention and resources toward environmental aspects, with the intention of reducing environmental impacts and improving environmental performance (Guenther, Endrikat, & Guenther, 2016). Strict environmental regulations and market pressures require that organisations adopt quality and environmental management as part of their strategic management. Adoption and implementation of environmental management can result in significant savings (Schaltegger, *et al.*, 2010).

The emphasis placed on environmental management has been the catalyst in the development of standards to facilitate growth and development of environmental management systems. These standards were developed to bring about uniformity regarding environmental management by ensuring that the environmental objectives are measurable and achievable (Chang, 2007).

### **2.2.2. Environmental accountability**

Environmental accountability imposes an environmental responsibility on organisations to account for both the financial and non-financial environmental impacts arising from their operation (Chang, 2007). In South Africa, this accountability is further emphasised by the King code on corporate governance. King formalised an approach to corporate governance by recommending a code of corporate practices and conduct to be adopted by big business. Compliance to the King code on corporate governance later became a requirement for all companies

listed on the Johannesburg Stock Exchange. King highlights the principle of the triple bottom line, and integrated reporting which encompasses reporting on economic, social and environmental performance of the entity. An integrated report should detail the organisation's performance and include information on the impacts of the organisation on the economy, society and environment.

Environmental accountability is dependent on management accounting, with a strong focus on environmental accounting. Environmental accounting focuses on the monetary implications of the environmental aspects of an organisation (Bailey & Soyka, 1996; Schaltegger & Burritt, 2017). Environmental accounting came to fruition because of limitations within conventional accounting (Deegan, 2017). Scrutiny of the conceptual framework developed by the International Accounting Standards Board showed that the historical accounting failed to duly provide for environmental impacts and account for the use of natural resources (Deegan, 2017). The environmental costs incurred by organisations were not accounted for by conventional accounting. These costs were accounted for as overhead costs, and as such were unable to provide management with sufficient information as required for strategic decision making (Uwalomwa, 2011). Environmental accounting therefore ensures that environmental resource consumption and use are accounted for as output costs for strategic decision-making purposes. Thus, this internally compiled information has two distinct purposes, namely to support decision making and to monitor environmental management performance (Crowther, 2018).

### **2.3. Environmental management systems**

Environmental management systems have been developed to aid in the environmental management process. An environmental management system (EMS) is a tool that can assist an entity in improving its environmental performance. The environmental elements of the entity's operations are managed by EMS, which is the synergy effect of the various components of that organisation. This system interrelates the organisational structure, planning activities, responsibilities, resources, practises, procedures and processes towards the development, review, implementation and maintenance of its environmental policy (Inno, 2005).

EMS is aimed at increasing the efficiency of using natural available resources, and reducing their impact on the environment (Abotnes, 2015). Control over

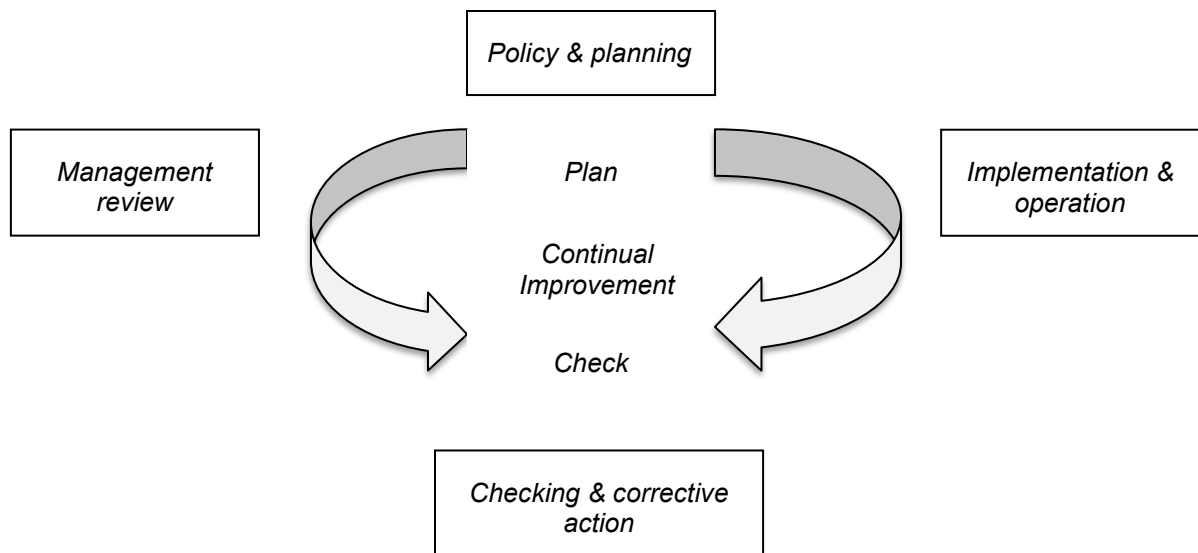
environmental related matters should be the cornerstones of EMS use and implementation. There are several approaches and choices an entity has in regard to EMS. It may choose to gain certification through an independent certification agent, or it may operate an uncertified system incorporating elements of ISO 14001 EMS. Certified systems are formally set up and are subject to ISO 14001 regulations and requirements. Certain entities choose to run their internally developed EMS commonly known as health and safety systems which have environmental objectives built into them. Such systems are classified as non-certified systems; however; they are none the less based on certified standards like ISO 14001 (Adhikari, 2010).

### **2.3.1. Background**

The first environmental standard, BS7750, was developed in 1992 in the United Kingdom (UK) (Inno, 2005). Since then, the number of international standards on environmental management has grown, which has also triggered greater interest in terms of compliance and implementation to minimise the effects on the environment by corporates. By embracing environmental preservation through improved levels of environmental management, organisations will reap the benefits complying with legislation, reduction of costs and an enhanced public image (Charles Jr, Schmidheiny, & Watts, 2017). As such, market demand drives entities to subscribe to ISO 14001.

Organisations are required to commit to pollution prevention and continual improvement as a component of the normal management cycle per the requirements of ISO 14 001 (Inno, 2005).

The environmental management system is a continuous cycle that follows the “Plan, Do, Check, Act” Model. The model is broken down into four stages, as illustrated in Figure 2.1 below.



**Figure 2.1: EMS Model**

Inno, 2005.

**The plan stage:** Comprises the identification of environmental problems and the creation of an environmental policy specifying its purpose.

**The do stage:** Involves the implementation and operation of its environmental plan. This includes specification of the various EMS participants and reporting lines necessary.

**The checking stage:** Involves the monitoring of the EMS system and measurement of its performance.

**The act stage:** Involves the periodical review of the system, by upper management, whereby the information obtained from the checking stage is evaluated against the goals and objectives and the necessary revisions.

### 2.3.2. ISO 14001

The International Organisation for Standardization (ISO) is a non-governmental organisation, which is situated in Geneva, Switzerland. It was established in 1946 for the purpose of facilitating the global synchronisation and unification of international standards. ISO consists of 163 national standards bodies, each representative of a country, with the aim of designing, developing and endorsing standards that are adequate and appropriate to every global entity (Inno, 2005), and

has been responsible for the preparation and promotion of the standards for standardisation (ISO). In the early 1990s, the ISO commenced with developing a series of environmental management standards.

After consultation with SAGE, ISO published ISO 14001 and ISO 14004 in 1996 (Adhikari, 2010). ISO 14000 is the environmental management series of standards. This series specifies the framework for developing an environmental management system via ISO 14001, which is one of these standards. The ISO 14001 series environmental management standards were introduced following the success of ISO 9000, a series of quality management system standards. It was first circulated in September 1996 and has evolved over the years, with the most recent version – ISO 14001: 2004 – being releasing in November 2004. This standard allows an organisation to concentrate on matters most relevant to its business, and requires entities to engage in continual improvement and eliminate pollution as part of the normal management cycle (Inno, 2005).

ISO standards function as technical agreements that facilitate a framework for compatible global technology. It comprises 18000 international standards and related documents that are applicable to both the business and service sectors. These standards aid in the provision of technological, societal and economic guidance which is essential in the betterment of the world (Adhikari, 2010). One of the benefits of the ISO standards is the assistance provided to governments regarding the provision of technical support in the area of health, safety and environmental legislation.

#### **2.4. Environmental management accounting**

Environmental management accounting (EMA) is an instrument that is used to assist entities to recognise and account for environmental implications associated with their activities by emphasising the actual significance of environment-related costs, and providing opportunities for improved economic and environmental performance.

Conventional management accounting techniques often result in a distorted image being presented, leading to managers making incorrect decisions that negatively impact both the business and the environment (Schaltegger & Burritt, 2010). Hence,

costs are overestimated and benefits are underestimated – cost-benefit analysis is incorrect. To address this problem, EMA must be used to accurately track and trace environmental costs to products or processes that are responsible for these costs, providing managers with information needed to manage environmental costs and use this information in strategic decision making, enabling the organisation to yield superior environmental and economic performance (Heal, 2008; Raar, 2011; Le & Nguyen, 2019).

ISO 14001 has attracted substantial attention in the last few years, with researchers eager to analyse the purpose of the standard, and the difficulty experienced in its implementation. EMS as with ISO 14001 is frequently criticised for not driving the environmental awareness and realising its intended benefits (Inno, 2005).

Initiatives for environmental management presently do not solely realise environmental performance benefits; in addition to the environmental benefits they have multiple financial benefits (Doorasamy, 2015). EMS and EMA were subject to scrutiny with regard to their increased recognition as a management tool to help improve financial and environmental performance through enriched environmental accountability. Research and case studies related to EMA have been carried out in different industries. EMA has received a greater focus as substantial environmental incidents have created considerable financial consequences for various organisations, and these consequences need to be managed. EMA research has been conducted primarily on the manufacturing sector, with very limited attention being directed to the service sector. It is not just the manufacturing sector that is responsible for pollution of the environment. The service sector contains some of the most unsuspecting organisations such as universities which can be significant polluters. Therefore, the responsibility for environmental management does not rest solely with the manufacturing sector (Chang, 2007).

#### **2.4.1. Information included in EMA**

Environmental management accounting encompasses both the monetary and physical aspects of environmental accounting, hence information on material uses, labour hours and other costs is required for both these elements (Chang, 2007). This distinction between monetary and physical enables management to manage and measure the non-financial environmental performance as well.



Efforts to promote EMA focus on developing tools to help identify or define environmental costs and explain how EMA is used and applied within organisations

Environmental costs are the environment-related costs that an organisation incurs. They are broken down into two cost categories, namely internal and external costs. The internal costs are those that have a direct impact on the organisation's profitability, and for which the organisation is directly accountable, whereas the external costs are those costs that the society bears. It is the cost that society pays as a result of an organisation's operation within that society (Deegan, 2017).

#### ***2.4.1.1. Physical environmental information***

EMA underlines the physical information associated with the use of energy, water, minerals and waste generation. This is according to the International Federation of Accountants (IFAC) and is due to material costs being a significant cost driver, along with the fact that many of the impacts on the environment are directly linked to the use of these resources and waste generation. Physical environmental information thus becomes relevant to an organisation in the identification of environmental costs, and the resultant assessment and reporting that is required in terms of the physical aspects of its environmental performance.

The physical environmental information is not just relevant for the manufacturing sector, it is also applicable to the service sector. Organisations in the service sector consume resources such as water, energy, and other materials that are critical to their operations and activities. Physical environmental information required and produced by EMA makes it possible for an organisation to account for inputs and outputs of resources/materials to ensure that these inputs and outputs are not left unaccounted. This process facilitates the tracking, or monitoring of resources utilised, and wastes generated by an organisation, which in turn enables the organisation to manage its environmental impacts. The physical environmental information generated by an organisation can then be used to assist in setting environmental targets and goals, and in reporting environmental performance, as this data can be used to create environmental performance indicators (EPis).

### ***2.4.1.2. Monetary environmental information***

Monetary environmental information refers to the monetary environmental costs incurred by an organisation. These are the costs that are associated with an organisation's initiative to control or prevent environmental damage arising from its operations. Per the IFAC, environmental costs included in EMA are made up of monetary information that is required to efficiently manage an organisation's environmental performance. This monetary information includes the purchase cost of natural resources, namely energy and water, and other materials which used that eventually become wasted. As these costs provide information on the financial elements of an organisation's use of resources and materials, required in terms of environmental management, they are also deemed to be environment related.

Physical and monetary EMA can be linked by providing and evaluating the required information about the quantities of resources/materials used and the wastes generated to evaluate the purchase costs incurred.

### ***2.4.1.3. EMA use and application***

EMA has several uses in both the manufacturing and service sectors of industry. The primary purpose behind EMA has been to hold organisations accountable for their environmental impacts, and to simultaneously link environmental performance to real incentives (Chang & Deegan, 2010). These incentives can be both financial and non-financial.

The specific uses of EMA can be classified as follows:

Decision support

Assessing of environmental performance against pre-set targets

Improvements to environmental accountability, by holding decision makers accountable and responsible for both their management and initiatives to enhance environmental accountability

Greater external environmental reporting, through the provision of physical and monetary information required by stakeholders.

A more detailed discussion on the specific uses of EMA follows.

#### ***2.4.1.4. Decision support***

The deteriorating environment, coupled with the resultant pressure from governments and communities alike, has forced managers within business to prioritise accounting for the environment. This change has complicated the decision-making process, as not all environment-related costs were accounted for and classified as such for the purpose of decision making within organisations.

Decisions were often made in the past without knowledge and understanding of all the relevant environmental-related costs (Clayton & Radcliffe, 2015; Bennett & James, 2017). Results of studies revealed that significant environmental costs are not recognised as such for decision-making purposes. The aggregated environmental costs in certain instances proved highly significant (Singh, Murty, Gupta, & Dikshit, 2012).

#### ***2.4.1.5. Measuring environmental performance***

The primary purpose of environmental cost information is to support strategic decision making; however, it is also a useful tool, which can be used to assist in achieving and monitoring progress toward environmental targets. The mapping of environmental targets and the subsequent measurement and reporting of progress towards mapped targets are essential elements required for environmental management systems and EMA to be successful (Guenther, *et al.*, 2016).

As mentioned above, the physical environmental information generated by an organisation can be used to assist in setting environmental targets and goals, and in reporting environmental performance. Further, as this data can be used to create EPIs, this process can then aid monetary environmental information and enable measurement of environmental performance against the EPIs.

As far as environmental management is concerned, physical environmental information is essential to reflect the use of natural resources, such as material, waste and emission generation in reducing the environmental impact of an organisation.

#### ***2.4.1.6. Improving environmental accountability***

The usefulness of EMA for decision support and the measurement of environmental performance has been detailed above. The EMA-related information flows along the decision chain to managers that are ultimately held accountable for their management and performance. Being held accountable for performance implies that managers have a right to receive environmental-related information together with a responsibility to discharge such information. Thus, it is essential for environmental information to be compiled into reports which can be utilised by both internal and external stakeholders (Chang, 2007).

Concerning an organisation's reporting of environmental information, external environmental reporting has been the primary focal point of research. However, very limited research has been conducted on improving environmental accountability through internal reporting (Parker, 2011). In theory, organisations which report on environmental information would develop internal control systems to improve environmental performance via enhanced decision making to facilitate cost savings. These systems focus on accounting for environmental performance, and while accounting is essential for external environmental reporting, it is often undervalued regarding its impact on the decision-making processes pertaining to the management of environmental impacts and improvement to environmental performance.

EMA facilitates the provision of environmental information, which is used in the generation of environmental reports. These reports can then be utilised in the decision-making process and thereby enable an organisation to discharge its environmental accountability. Internal reports can also be used for environmental management as they provide environmental cost breakdowns to managers. These breakdowns can be used to set realistic environmental targets, facilitate environmental performance measurement, and ultimately hold environmental performance managers accountable. The culmination of this would lead to better financial and environmental performance (Garcia, Cintra, Torres, & Lima, 2016).

#### ***2.4.1.7. Greater external environmental reporting***

As highlighted above, external environmental reporting has been the primary focal point of EMA research. EMA supports external reporting through the production of a number of reports that can be used to disclose environmental information. Through the use of EMA, environmental information can now be found in financial statements, annual reports, and sustainability reports.

EMA is vital for the provision of both physical and monetary environmental information used for external reporting. Organisations tend to include monetary and physical environmental cost information within their external reports that are presented to stakeholders. This is mainly due to compliance with regulations; however, many organisations elect to voluntarily provide this information (Chang, 2007).

Organisations must provide environmental information to both internal and external stakeholders. This process will strengthen environmental accountability. With the increasing concerns over the environment, community members and other external stakeholders show a much greater interest in environmental management and performance of affected organisations. Environmental accounting and reporting is an essential element as regards an organisation's fulfilment of its environmental accountability (Gray, *et al.*, 2017).

Environmental reporting has become essential in providing to stakeholders the relevant information of an organisation's corporate environmental performance. The manufacturing sector has historically been a primary focus for the provision of environmental information to stakeholders, and this is a sector with the highest level of environmental impacts. Currently, environmental information is not only reported by the manufacturing sector, but also by service sector organisations. The increasing number of organisations presently reporting this information puts greater emphasis on EMA to support the process of providing the required environmental related information.

#### **2.4.2. Empirical evidence of EMA implementation**

As detailed above, the use and application of EMA assists organisations to discharge their environmental obligations via environmental accountability. The use,

application and implementation of EMA has gained interest by organisations with higher levels of perceived environmental impacts, namely organisations within the manufacturing sector (Phan, Baird, & Su, 2018). The manufacturing sector generates significant environmental impacts and is rightfully the primary focus of research related to the uses, application and implementation of EMA within the sector. However, based on a review of literature regarding EMA, it is evident that EMA application within the service sector is lacking (Rawhouser, Cummings, & Newbert, 2019). This is due to the reduced level of natural resources consumed by, and the lower level of environmental impacts generated by this sector, when compared to the organisations operating within the manufacturing sector. In terms of the service sector's consumption of natural resources, although not as large or significant as that of the manufacturing sector, its consumption of resources and environmental impacts generated still affect the environment. These impacts still need to be managed and controlled.

## **2.5. EMA and the higher education sector**

The service sector has been underrated in terms of the attention it has received regarding environmental management research. As discussed in the sections above, service sector organisations do contribute to environmental wastes and do generate environmental impacts. Although these impacts are not as significant as those from the manufacturing sector, they still do need to be managed and accounted for. The higher education sector falls within the umbrella of the service sector.

From a financial perspective, this section of the chapter discusses the major environmental impacts of the higher education sector. The discussion includes both the direct and indirect impacts generated by the sector. The role and importance of environmental management within the higher education sector are explored, together with the relationship between environmental management and accountability within the sector. The barriers facing environmental accountability within the sector are introduced, and the implications for EMA at universities are discussed.

### **2.5.1. Role and importance of EMA in higher education sector**

Environmental management and environmental management accounting have been the focus point of many industries, both locally and abroad. Historically, research has been concentrated primarily on the manufacturing industry. Manufacturing industries generate the greatest proportion of environmental impacts, and hence have been the primary focus of research.

However, it is not just the manufacturing sector that is responsible for pollution of the environment. The service sector contains some of the most unsuspecting organisations such as universities which can be significant polluters. Therefore, the responsibility for environmental management does not rest solely with the manufacturing sector (Chang, 2007). Examples of some of the environmental impacts arising at a university are the production of chemicals and toxins arising from chemical experiments conducted at universities. A university also produces a significant amount of water, paper, plastic, chemical and other waste, and in most scenarios the university is located in close proximity of and has a natural environment of trees and other greenery to preserve and protect.

Universities comprise a cross section of the community in which they operate. This cross section consists of students, academics, administrators, and researchers. Although universities do not produce the same apparent direct impacts as the manufacturing industry, they do produce a vast array of both direct and indirect impacts on the environment.

Service industries are also an integral component of environmental management as they have significant impacts, both direct and indirect (Alshuwaikhat & Abubakar, 2008; Jakobsen & Clausen, 2016). Educational institutions such as universities form part of the service sector. The direct impacts on the environment are impacts related to the use of paper, and solid waste generation along with the associated energy and water demands. Indirect impacts stem from changes in environmental behaviour via education and research (Chang, 2007). Regarding a university's direct impacts, substantial demand is placed on electricity and water, which are two significant environmental-related resources, and as such a university can consume a very large proportion of these resources in the community or geographical location

where it is situated (Mtutu & Thondhlana, 2016; Bricca, Gimber, Martin, Rollings, Schwartz, & Smith, 2017).

Due to the modern day demands on natural resources imposed by the growing technological needs, universities have significant energy-related needs. These costs which form part of the operation and upkeep of university facilities comprise a major component of a university's budget (Bennett, *et al.*, 2006).

Managing the demands on energy consumption is becoming an increasingly difficult problem facing universities (Bricca, *et al.*, 2017). Effective and efficient identification and accounting of energy consumption can create an opportunity whereby costs can be managed better. Although consumption of the natural resources, namely energy and water, has received some scrutiny by researchers there is little known regarding the waste generated by a university as this data is seldom collected by universities (Rossi, Lipsey, & Henry, 2018). As this data is unavailable, the universities lose the opportunity to reduce or better manage their costs. EMA has a critical role in bridging the information gap, thereby providing the information necessary to facilitate better management of costs and preservation of the environment through improved environmental management.

The higher education sector has a role to play in sustainable development through education and internal practices. This lends itself to EMA in the sense that the direct impacts on the environment are impacts related to the use of paper, and solid waste generation along with the associated energy and water demands, which fall under the umbrella of internal practices. On the other hand, the indirect impacts stem from changes in environmental behaviour via education and research, which forms part of education (Chang, 2007).

### **2.5.2. Environmental management and accountability within the sector**

Environmental management as defined earlier in the chapter, according to Bebbington, Russell and Thomson (2017), comprises “the range of responses by companies to environmental issues in reviewing their environmental position, developing and implementing policies and strategies to improve that position and in changing management systems to ensure ongoing improvement and effective management”.



The term environmental accountability, also defined earlier in the chapter, imposes an environmental responsibility on organisations to account for both the financial and non-financial environmental impacts arising from their operation, namely provide accounts of their environmental responsiveness and associated performance (Chang, 2007).

It is not just the manufacturing sector that is responsible for pollution of the environment. The service sector contains some of the most unsuspecting organisations such as universities which can be significant polluters. Therefore, the responsibility for environmental management does not rest solely with the manufacturing sector (Chang, 2007). Examples of some of the environmental impacts arising at a university are the production of chemicals and toxins arising from chemical experiments conducted at universities. A university is also producing a significant amount of water, paper, plastic, chemical and other waste, and in most scenarios the university is located in close proximity of and has a natural environment of trees and other greenery to preserve and protect. As such, environmental management and accountability within the higher education sector is important (Ceulemans, Lozano, & Alonso-Almeida, 2015).

#### ***2.5.2.1. The current state of environmental responsiveness***

Many industries have embraced social responsibility, whereby policies and practices have been implemented to reduce the extent of environmental impacts that arise as a result of daily activities (Crane & Matten, 2016). The educational sector has also accepted this social responsibility as it has an ethical obligation toward the environment. This ethical obligation coupled with the pressure on senior management of universities as regards its social responsibility has incentivised universities to assume environmental initiatives to decrease their environmental impacts. This is evident by the increasing number of universities that have demonstrated environmental responsibility through some form of environmental management.

Some examples of the initiatives implemented by universities are analysing of their ecological footprint, in line with sustainability principles (Jorge, Madueño, Cejas, & Peña, 2015), undertaking of waste reduction and energy efficiency projects (Bennett

& James, 2017), and obtaining a better understanding of environmental impacts through performing environmental audits (Schaltegger & Burritt, 2017).

Ever since environmental sustainability has become a priority, a larger cross section of universities has started to implement environmental reporting as a means to demonstrate commitment to and show progress toward environmental sustainability. Despite the various forms of environmental responsive initiatives undertaken by universities, literature still suggests that environmental initiatives are lacking at a strategic level.

In regard to the higher education sector in the United Kingdom (UK), the initiatives aimed at environmental sustainability have only realised limited impacts to improve environmental performance (Schaltegger & Wagner, 2017). Although universities in Northern America report on environmental information, they only report on what has been done on the physical campus. Information related to actual environmental performance, environmental goals and strategies remains silent within the reports.

A strategic perspective can greatly enhance a university's environmental management function; however, based on literature, it can be argued that this strategic perspective falls short due to the lack of involvement from members of the accounting function within universities. The means of measurement, reporting and management of environmental impacts is relevant to both the accounting and environmental-related divisions within an institution (Bennett & James, 2017). Implementing EMA is a means of promoting universities' environmental accountability, as accounting is a key driver of improving environmental management. It is therefore important to involve individuals from the accounting function in environmental management. EMA for universities provides the link between accounting and environmental management (Chang & Deegan, 2010).

#### ***2.5.2.2. EMA linking accounting and environmental management***

In order for management accounting practices to improve financial and environmental performance in terms of environmental management, it is essential to establish the link between environmental management and accounting. A review of available literature suggests a clear lack of research detailing the current state of the relationship between accounting and environmental management practices at

universities. It is thus apparent that not many studies have been conducted. Based on the limited research on the aforementioned areas, this study was split into two primary objectives as outlined below:

- 1) To understand the existing environmental management accounting policies and practices that UKZN employs.
- 2) To establish the barriers and facilitators of EMA adoption at UKZN.

Establishing the link between accounting and environmental management from a systems point of view can result in significant organizational benefits, with minimal associated financial or personnel costs. This will also create improved lines of communication between affected personnel (Schaltegger & Burritt, 2017).

The commonly noted barriers of EMA adoption have been identified as financial/resource constraints; however, there are other barriers that have not been highlighted by research. Environmental management is a key point of EMA and as such, the barriers and facilitators affecting EMA implementation could potentially affect the use and application of EMA. It is therefore important to delve deeper into the barriers and facilitators of EMA adoption, with the aim of providing a basis for exploring factors that may impact the establishment of EMA within universities. These factors could be positive or negative in nature.

### **2.5.3. Barriers and facilitators facing environmental accountability**

The various industries face several barriers concerning the introduction and implementation of environmental initiatives. Literature has several documented studies in this regard. Universities are no different and face challenges similar to those of other industries; however, as universities operate within their own specific environments, they may face certain barriers specific to the education sector. The same can also be said regarding the facilitators in improving environmental management within universities. This section deals with the factors which may affect EMA at universities. These factors are discussed in turn.

#### ***2.5.3.1. Barriers facing environmental accountability***

Empirical research has suggested various barriers faced by universities regarding the introduction and implementation of environmental initiatives. The initial

researchers identified certain key barriers faced by the sectors. With a university, the stakeholders have a key role to play and a lack of interest and commitment by stakeholders is a barrier faced by universities (Leal Filho, Morgan, Godoy, Azeteiro, Bacelar-Nicolau, Avila, Mac-Lean, & Hug, 2018). A general lack of information and communication regarding environmental issues has also been a challenge faced by the sector. This shortcoming, coupled with ignorance as to the incentives that can be obtained, has impeded the growth and development of environmental initiatives at universities

During a study conducted by Dahle and Neumayer (2001) in a UK-based survey, several barriers emerged. The barriers identified were a –non-environmental attitude on campus, lack of financial resources and lack of environmental awareness. Universities face a long list of competing priorities of which environmental management was not viewed as one demanding attention. Although these barriers emerged, Dahle and Neumayer (2001) argued that the underlying reason behind the barriers was in part as a result of ignorance among university management regarding the extent of cost savings that could be achieved through green initiatives, coupled with the institution's reluctance to change. Resistance to change is a key impediment to introducing and implementing environmental initiatives (Amoako, Marfo, Gyabaah, & Owiredu-Ghorman, 2017). Within the higher education sector, the information required to implement an environmental management system is not readily available, and as such the difficulty experienced in gathering the required data constitutes yet another barrier to the process (Guenther, *et al.*, 2016).

The barriers revealed in the literature appear to interrelate and make it difficult to jointly introduce and implement environmental initiatives. In 2001, the United States (US) convened a meeting of higher education stakeholders. The National Wildlife Federation, the Camps Ecology program and University Leaders for a Sustainable Future were invited to discuss barriers, opportunities and incentives for continued progress in raising environmental sustainability as a primary concern in universities and colleges. The key outcomes of the stakeholder meeting are summarised as follows:

*Institutional and management barriers:* The distinct lack of mechanisms for setting objectives coupled with insufficient incentives to minimise waste.

*Cultural barriers:* The belief amongst managers that someone else should do it. The culture of only performing that which is within your portfolio and nothing else.

*Financial barriers:* Lack of accountability – centralised accounting systems (e.g. waste management costs not allocated to academic departments).

*Informational barriers:* Lack of the benefits associated with having environmental information made available to decision makers (Chang, 2007).

### ***2.5.3.2. Facilitators to environmental accountability***

According to the literature, there are many stakeholder groups that are relatively active as agents of change in improving environmental accountability and sustainability at universities. This is so despite the complexities that arise due to the influences of the various barriers to environmental sustainability initiatives at universities.

The term stakeholder as defined by Gray, Owen and Adams (1996), is “any human agency that can be influenced by, or can itself influence, the activities of the organization in question.” In terms of a university, it can be argued that everyone is a stakeholder, albeit with varying degrees of interest and power or control. University students are included in the definition of stakeholders and literature has demonstrated the impact that student activism has had on environmental initiatives. The appointment of recycling coordinators by universities is an environmental initiative, and has achieved success in enhancing environmental accountability and sustainability. According to Lounsbury (2001), the creation and filling of a full-time position for a recycling coordinator has been primarily due to student activism. In many instances, the individual appointed to the position of recycling coordinator is in fact part of the university’s former student body (Shriberg, 2002).

Students are stakeholders; however, their influence over the significant initiatives for environmental accountability is very limited. Students often embark on certain environmental-related issues, thereby sparking interest, but do not have the required influence to escalate these initiatives to something meaningful (Shriberg, 2002). Students can be agents of change; however, due to their lack of influence

and in most instances a lack of time, they are not regarded as being dominant stakeholders in driving change.

To successfully drive environmental initiatives, a leader or champion is necessary – the literature eludes to the necessity of having such an individual to initiate environmental programmes. Such leaders can be staff member of the university, but they must be influential enough to source the necessary resources and to inspire participation by others (Lozano, Lukman, Lozano, Huisingh, & Lambrechts, 2013). Therefore, in order to successfully implement environmental initiatives, the champion has to be a strong enough stakeholder with the requisite degree of influence.

At Monash University in Australia, the establishment of environmental reporting is attributable to the backing from these champions (Brown, Farrelly, & Loorbach, 2013). These champions are also members of staff with the authority to engage both staff and students for the purpose of generating environmental reports. These champions therefore have access to staff and information necessary to successfully drive the process. At Monash, the initiatives were propelled by the university's Chancellor and Vice Chancellor, and it can be seen that committed support by champions at these levels facilitated the success of the environmental reporting initiative implemented (Brown, *et al.*, 2013). The involvement of top-level management can indeed advance green initiatives at universities, and their support is crucial to environmental sustainability at their universities (Ceulemans, *et al.*, 2015).

Stakeholder pressure and top management commitment and support, as explained above, are key facilitators to environmental accountability and sustainability, but a strong outside influence is still required for the higher education sector to progress significantly and rapidly transition towards environmental sustainability (Lozano, *et al.*, 2013). Government pressure is thus required to speed up the progress toward implementation of environmental initiatives, with this pressure not necessarily being a success factor, but acting as a catalyst in the process (Chang, 2007). Multiple case studies conducted within the higher education sector in the UK suggest that the sector is further ahead in implementing environmental initiatives, largely as a result of pressure from the government.

#### **2.5.4. Implications for EMA at universities**

The barriers and facilitators facing environmental accountability at universities have been explained above. The limitations arising from management accounting practices at universities contribute significantly toward the barriers faced. These limitations can be summarised as monetary bias of information, lack of or inadequate communication between members of staff, including managers, from the accounting and environmental management functions within a university. EMA can facilitate improved flow of information between environmental management and management accounting. This will harmonise the functions creating a common language between individuals within the two departments, with the requisite skills needed for strategic environmental management. Further to this, the use and application of EMA in the provision of the necessary environmental information, as required to create incentives, thereby incorporating environmental management into the ongoing business processes, is supported by available literature on EMA within business organisations (Bennett & James, 2017).

EMA, can thus act as the tool needed by universities to overcome the barriers that are currently faced within the sector in regards to environmental accountability and sustainability. Universities produce both direct and indirect environmental impacts that require management. EMA-related studies have produced several insights and learning opportunities, which if extended to the higher educational sector, could aid in managing its environmental impacts. It should be noted that the university-specific facilitators of stakeholder pressure together with top management commitment and support would have to be taken into account for the diffusion of EMA practices within universities.

#### **2.6. A theoretical framework for EMA**

There have been a limited number of cases studied involving EMA at universities and within the higher education sector. Consequently, EMA-related factors and influences remain less explored. A theoretical framework is needed to address the second research objective in order to understand the barriers and facilitators that may influence the decision on whether or not EMA is being adopted within universities. The literature reveals that the majority of EMA studies that have been carried out have focused on obtaining an understanding of the existing EMA

processes adopted, if any, within the various sectors. The educational sector has not been a dominant sector for research, nor has much research been directed toward understanding why organisations chose to either adopt EMA or not.

Two theoretical perspectives that have been derived from the requisite literature are reviewed next, in order to explain EMA adoption within the higher education sector. The perspectives come from the following theories:

Contingency theory

Institutional theory.

A discussion on the theories follows, and propositions are developed to inform the study.

### **2.6.1. Contingency theory**

The contingency theory suggests that the design of organisational structures is dependent on the influence of certain environmental contingencies that may be present within the organisation (Otley, 2016). The definition of a contingency advocates that the effect of an organisational characteristic on the performance of that organisation is regulated by any internal or external variable (Dubey, Gunasekaran, Childe, Papadopoulos, Hazen, Giannakis, & Roubaud, 2017).

The success of implementing a high level management accounting strategy may depend on the surroundings under which the strategy is to be used and implemented or the environment in which the organisation operates (Appelbaum, Kogan, Vasarhelyi, & Yan, 2017). The design of an effective management accounting system should depend on the particular environment and operating conditions of the company for which the system is required, these circumstances should include the necessary variables that contribute to the understanding of the management accounting system to be designed. There have been a significant number of contingency variables that have been proposed for incorporation into the design of management accounting systems. Certain of these propositions can be linked to EMA adoption and were used in the development of propositions to guide and inform the second research objective of this study.



### **2.6.1.1. Contingency variables**

There are three groups of variables that frequently appear in EMA-related research – these are environment, organisational structure, and technology (Gilley, McGee, & Rasheed, 2004). Business strategies also play a role in the design of accounting systems, and a large amount of research focuses on the contingency relationships between the design of accounting systems and the performance of an organisation (Agbejule, 2005).

Uncertainty is another variable that impacts on the contingency theory. The uncertainty that arises from the changes in accounting practices has an impact on the accounting function. Uncertainty is explained in the business context as the lack of information about future events faced by decision makers (Otley, 2016). In the contingency theory literature, uncertainty is generally referred to as environmental uncertainty.

Environmental uncertainty is a specific variable that can be linked to EMA and the decision to adopt its practice; however, accounting and management conventions that deal with environmental uncertainty generally relate to environmental matters that exclude nature (Osborn, 2005; Amoako, *et al.*, 2017). The term physical environmental uncertainty is used to describe environmental uncertainty that relates to environmental matters that exclude nature (Chang, 2007).

The natural environment does play a role in impacting the concerns of management within an organisation, as there is a relationship that exists between everything in the ecology. This relationship is a major source of uncertainty for the natural environment (Lewis & Harvey, 2001; Latan, Jabbour, De Sousa Jabbour, Wamba, & Shahbaz, 2018). There are several natural environment-related matters that organisations, governments and the public face, such as global warming, the increase in natural disaster and the growing shortage of natural resources. These represent a significant threat to human life on the planet. It is this environment-related uncertainty that can sometimes create a barrier when integrating the natural environment into strategic management and decision making. Physical environmental uncertainty can therefore be considered as a possible variable of contingency affecting the decision to adopt the EMA (Lewis & Harvey, 2001).

### ***2.6.1.2. Contingency framework***

A simplified contingency framework was applied to this study. It utilised the relevant contingency variables and illustrated the impact that these variables have on the decision to adopt EMA or not. In combination with the related contingency relationships, these variables were used to develop contingency theory propositions for this study.

### ***2.6.1.3. Propositions relating to contingency theory***

In order to explore the factors influencing EMA adoption related to this study, three propositions specific to contingency theory were developed. Certain areas of concern emerged during this stage, which include the following:

How are environmental-related costs accounted for and managed in terms of current environmental management practices employed?

How is environmental performance measured?

The propositions were developed taking the areas of concern into consideration, and were based on environmental strategy, physical environmental uncertainty, and efficiency considerations, to be factors influencing EMA adoption.

#### **2.6.1.3.1 Environmental strategy**

The design of management accounting systems is influenced by the contingency relationship between business strategy and environmental uncertainty. This relationship suggests that changes in the environmental strategy would result in a change in the accounting management system so that decision makers within the organisation can receive more relevant information about environmental costs.

Environmental strategy can be classified as either proactive or reactive. Proactive strategies are where the organisation takes the initiative with environmental factors. They are voluntary strategies that are employed to improve environmental performance. Where organisations implement proactive strategies, they are highly likely to change the accounting management system to align accounting practices with the strategy to ensure better integration of both. Reactive strategies on the other hand are in response to some event or environmental pressure that the organisation faces. It is generally a strategy that is pressure imposed on the

organisation. Where a reactive strategy is implemented it is very unlikely that this will result in any change to the existing management accounting system.

For the purpose of this study, environmental strategies (proactive or reactive) were measured by outcomes based on actions that the organisation undertakes to reduce its environmental impact.

Within the higher education sector there is an increasing trend in universities becoming signatories to environmental-related declarations, as a way of embracing their commitment toward environmental responsiveness amidst escalating environmental concerns. Most universities include environmental responsiveness as part of their strategic plan and as such it is relevant to investigate the following areas in establishing factors that impact EMA adoption:

The environmental strategy undertaken

The role of management accounting in implementing the strategy.

The environmental strategy embraced by the university could be a factor that impacts the decision to adopt EMA. Thus, in this study, the following was proposed:

*P1. Universities that are party to environmental-related agreements, and endeavour towards compliance, would prioritise the minimisation of environmental impacts and the management of environmental costs.*

#### 2.6.1.3.2 Contingency relationship between physical environmental uncertainty and information processing

Information provision is a key function of management accounting, and as the business environment becomes more unpredictable, organisation decision-makers need more information to implement strategies to address the uncertainties (Grant, 2016). Where the uncertainty arises from the natural environment, EMA can assist in the provision of environmental cost information (Lewis & Harvey, 2001; Latan, *et al.*, 2018). Due to the increased levels of environmental uncertainty faced by organisations, conventional management accounting systems do not provide the necessary environmental cost information, and as such a need arises to improve the conventional system (Grant, 2016). This improved system design concentrates

on providing environmental information which will reduce environmental impacts and manage the resultant environmental costs.

Environmental uncertainty places pressure on senior management. It is in essence senior management that take the decisions relating to the organisational culture, and to the design and implementation of policies and practices, accounting included. With regards to achieving the organisation's environmental targets, senior management is able to determine the requisite improvements to the systems to be able to receive the necessary environmental-related information. Therefore, it is the support of senior management and their perceptions of physical environmental uncertainty that can be seen as driving the adoption of EMA. Where an organisation faces elevated levels of physical environmental uncertainty, senior management would require the necessary information to respond to the uncertainty and make decisions.

The physical environmental uncertainty that senior management faces could be construed as a factor that impacts the decision to adopt EMA. Thus, in this study, the following was proposed:

*P2. The likeliness that EMA systems will be adopted to provide the necessary environmental information to address the uncertainties is proportionate to the level of physical environmental uncertainty perceived by senior management.*

#### 2.6.1.3.3 Contingency relationship between physical environmental uncertainty and measurement of environmental performance

Greater levels of environmental uncertainty would require additional information to be processed as a means of reducing the uncertainty. This would require a broader interrogation of the information by managers in their assessment and measurement of environmental performance. Financial information may not be sufficient or appropriate to assess performance or efficiency of management. This is compounded further under uncertain conditions (Schaltegger & Burritt, 2017). Thus, greater levels of environmental uncertainty require the processing of environmental information, for managers to evaluate environmental performance within the organisation. This consequently would encourage the adoption of an EMA system, as EMA facilitates the provision of such information. It can be eluded to that when

managers perceive greater levels of physical environmental uncertainty, an EMA system would be adopted.

The need for measuring –non-financial performance also depends on the organisation's financial position. Managers are constantly faced with adverse financial conditions and these conditions impose pressure on decision makers to improve profitability, thereby shifting the focus away from improving and being able to measure non-financial performance (Hussain & Gunasekaran, 2002).

EMA can improve both financial and environmental performance within an organisation; however, it receives less emphasis when the organisation experiences adverse financial operating conditions.

Environmental performance measurement is an area covered by this study, but as a possible factor that impacts the decision to adopt EMA, financial implications had to be taken into account when conducting the research. Thus, in this study, the following was proposed:

*P3. Adverse financial conditions lead to prioritising of financial performance at universities and therefore an EMA system that includes environmental cost information as part of performance measurement would be of secondary concern.*

### **2.6.2. Institutional theory**

The institutional theory focuses on understanding why there is consistency in organisational forms and practices across organisations that result in organisations displaying similarities between each other (DiMaggio & Powell, 1991; Boxenbaum & Jonsson, 2017). Regarding this study, the institutional theory displays relevance, as its use has been supported by previous EMA researchers. These researchers argued that homogeneity arises in organisations subject to changes within their institutional environments, which can either contribute positively or negatively to the adoption of new organisational practices, including accounting (Bouma & Van der Veen, 2002).

Isomorphism is the process of becoming homogeneous, which is explained as "a restrictive process that forces a unit in a population to resemble other units facing the same environmental conditions."(DiMaggio & Powell, 1991 as cited in Chang,

2007). Isomorphism takes place where organisations facing institutional pressures adopt organisational change towards homogeneity (Boxenbaum & Jonsson, 2017). For the purpose of this study, institutional isomorphism was used, as in the modern era organisational changes are based on the need to gain legitimacy and secure future survival of enterprises (Boxenbaum & Jonsson, 2017). Accounting has been utilised as a means to legitimise organisation operations, thereby increasing the chances of survival. Many studies have revealed that institutional theory is key in providing critical information and views related to accounting and sustainability research.

### ***2.6.2.1. Institutional isomorphism***

Institutional theory can be used to understand the factors that lead to an organisation's decision regarding EMA adoption, via three suggested mechanisms (DiMaggio & Powell, 1991). Organisations may in response to institutional pressure resolve to adopt some form of EMA. Where institutional pressure is not present, EMA may not be embraced, especially where the organisation is ignorant to the benefits of adopting EMA. Since the government does not require universities to provide environmental information, the universities do not regard it as urgent to adopt EMA. Instead, the adoption of EMA would be prioritised if a threat existed that government would withdraw funding due to the lack of environmental information provided by a university. The three suggested mechanisms are explained below:

***Coercive pressure:*** This arises because of pressures imposed upon organisations by other organisations. The organisation that faces such pressure is generally dependent on the imposing organisation for resources or support. From an EMA perspective, coercive pressure can be seen as being applied by governments. Conforming to government policies and regulatory requirements is a priority to universities, as they are reliant on government funding for survival.

***Mimetic pressure:*** This arises when organisations are faced with uncertain conditions. Under such circumstances, organisations tend to copy other organisations that currently face or once faced similar uncertainties. As EMA starts to become a norm within the higher educational sector, more universities will be motivated to change accounting systems toward EMA as a result of mimetic pressure.

**Normative pressure:** This arises out of professionalisation, which occurs because of formal education or the creation of professional associates. These two elements of professionalisation are significant drivers for change in organisational practices (DiMaggio & Powell, 1991). Within a university context, a lack of focus by professional bodies on the potential of service sector organisations' adoption of EMA provides less incentive for a university to embrace EMA.

The following sections provide a more detailed outlook regarding the influence of institutional isomorphism on the decision to adopt EMA, via coercive, mimetic, and normative mechanisms. Based on the institutional theory, further propositions were developed to aid the study in its exploration of the factors that influence EMA adoption.

#### ***2.6.2.2. Propositions relating to institutional theory***

For the purpose of exploring factors influencing EMA adoption related to this study, three propositions specific to institutional theory were developed. Certain areas of concern emerged during this stage, which include the following:

The coercive pressure that universities face to account for the environment

Recognition of the importance of universities' environmental costs

Clear lines of communication and a willingness to work together between key individuals from the environmental management and management accounting functions in a university.

The propositions were developed, taking the areas of concern into consideration, and are based on: coercive pressure, mimetic pressure and normative pressure to be factors influencing EMA adoption.

##### **2.6.2.2.1 Impact of coercive pressure**

Coercive pressure forces organisations to modify their policies and practices so as to achieve compliance with the mandates of institutions (Granlund & Lukka, 1998, 2017). Government agencies are the stakeholder that have the greatest effect on corporate environmental practices, as demonstrated by a review of literature. In Europe, ISA14001 certification is more common amongst organisations than in the US, because of the more substantial incentives provided by European governments.

Organisations comply with the formal regulations and mechanisms that governments impose on them, so that they can survive and prosper (DiMaggio & Powell, 1991).

In the higher educational sector, universities are heavily dependent on government funding for survival. Funding from the government represents a large component of a university's financial resources.

Universities are required to report on their financial position, so that government may assess their financial sustainability, but universities are not required to report on environmental performance and as such, minimal to no emphasis is placed on accounting for the environmental resources consumed or waste generated. The number of universities that generate data regarding the use of paper and quantity of waste generated is minimal (Bennett, *et al.*, 2006). Providing an account of environmental costs would not become a priority for universities without the establishment of laws and regulations requiring the universities to do such.

Government pressure would thus be necessary in making universities accountable for the funding received, inclusive of the funding that was utilised for environmental costs. Coercive pressure of accounting for the environment is relevant to the study, and government pressure may be construed as a factor that impacts the decision to adopt EMA. Thus, in this study, the following was proposed:

*P4. The likelihood that universities would implement EMA systems to account for environmental costs is proportionate to the government pressure imposed on the universities to provide an environmental account in relation to the use of funding.*

#### 2.6.2.2.2 Impact of mimetic pressure

Where organisational practices have a certain recognised value, or are regarded to be an industry norm, mimetic pressure leads organisations to imitate each other's practices and policies as opposed to questioning the value added by the policies and practices (Chang, 2007).

Universities do employ certain environmental management practices, such as the appointment of energy managers, office automation systems, energy reduction and recycling programmes (Ryan-Fogarty, O'Regan, & Moles, 2016; El Hajj, Chlouk, &



Moussa, 2017). Although these programmes and practices are implemented by certain universities, a vast majority of universities do not implement environmental initiatives at a strategic level, thus despite having environmental initiatives, very few improvements in environmental performance have been achieved.

Research conducted within the manufacturing sector revealed that when environmental costs are effectively managed and accounted for, environmental impacts are reduced, and financial benefits are generated. This is more prevalent in situations where stricter environmental regulations are imposed. The design of EMA systems is such that it is intended to improve environmental management and assist in the management of environmental costs. The use and application of EMA systems attracts a high level of priority within the manufacturing sector, but within universities its emphasis is negligible. The reasoning behind this type of attitude can be attributed to the mistaken perception that the financial impact of university-generated environmental costs is not sufficiently significant to manage. As these costs are not considered significant, a decision would not be made at a strategic level to account for and manage them. Therefore, EMA is less likely to be adopted for environmental cost management purposes.

Due to the lack of knowledge and understanding of the benefits of EMA by senior management, some universities would not generate recognised value from EMA and other universities would not imitate best management practices. Mimetic pressure would not take place in such circumstances.

Recognising the role and importance of environmental costs in the higher education sector is important for university adoption of EMA, and mimetic pressure can be interpreted as a factor affecting the decision to adopt EMA. Thus, in this study, the following was proposed:

*P5. The decision to mimic best practice for managing environmental costs is dependent on recognising the significance of environmental costs within the sector. If environmental costs are not regarded as significant, mimetic pressure would be absent, decreasing the likelihood of EMA being adopted.*

#### 2.6.2.2.3 Impact of normative pressure

Normative pressure arises out of professionalisation, which occurs because of formal education or the creation of professional associates. These two elements of professionalisation are significant drivers for change in organisational practices (DiMaggio & Powell, 1991). Within a university context, a lack of focus by professional bodies on the potential of service sector organisations' adoption of EMA provides less incentive for a university to embrace EMA.

A major contributor to the successful implementation of environmental management initiatives is collaboration between individuals involved in various functions (Wiengarten & Pagell, 2012). Since EMA focuses on environmental management and accounting management, its adoption and implementation requires the cooperation of individuals directly involved in environmental management. Thus, collaboration and communication between decision makers from the environmental management and management accounting functions is an area that would require investigating.

EMA has received attention and has been promoted by professional associations and certain accounting bodies. This has generated a certain degree of normative pressure for organisations to provide environmental reports or implement EMA in one way or the other. This normative pressure is greater within the manufacturing than in the service sector. EMA research and EMA guidelines, proposals and documents have been designed to cater for the manufacturing sector. There is very limited influence by normative pressure on EMA adoption within the service sector, particularly related to universities.

Therefore, because of a lack of normative pressure, universities are less likely to adopt EMA. Normative pressure, or rather a lack of normative pressure, can be interpreted as a factor affecting the EMA decision. Thus, in this study, the following was proposed:

*P6. The extent of normative pressure imposed on decision makers within universities, to account for the environment, would influence the likelihood that a university would implement an EMA system to manage environmental costs.*

## **2.7. Empirical evidence of EMA implementation**

Many organisations are geared toward initiatives that are directed at reducing the environmental impacts related to their business activities. However, at the same time, organisations are facing many constraints in the transformation into environmentally conscious and responsible organisations (Doppelt, 2017). Implementation of EMA systems is a means for organisations to achieve their environmental objectives.

Management systems within most organisations often rest with the manager concerned. However, to ensure the longevity of the organisation and effective use of resources, primarily natural resources, a system that is well designed and managed is essential (Harizanova, 2015; Kopnina & Blewitt, 2018). EMA is a system that can ensure the organisational objectives are met, in particular relating to environmental preservation. While organisations are significant contributors to causing and potentially controlling ecological problems, they could also obtain various benefits from practices that have a positive impact on the environment. EMA helps firms to work toward those potential benefits and to face their environmental responsibilities (Henri & Journeault, 2006).

The primary objective of EMA is to navigate through and control significant environmental impacts, which should be regarded as a foundation for EMA implementation (Welford, 2016). The introduction and implementation of environmental standards such as ISO 14001 has prioritised organisational concerns aimed at reducing global pollution via the control of environmental impacts produced (Harizanova, 2015).

The use and application of EMA is constantly growing, and a review of literature displays a greater emphasis on the manufacturing sector than the service sector. This is due to the fact that fewer natural resources are used by the service sector and they have less environmental impact than the manufacturing sector. EMA implementation has been successfully applied, within both sectors, with the manufacturing sector showing a greater level of implementation due to the greater emphasis it receives.

### **2.7.1. The manufacturing sector**

Within the sector, market demand is one of the dominant drivers of EMA implementation. This can be attributed to customer demand and business competition (Lieder & Rashid, 2016; Naidoo & Gasparatos, 2018). Improved environmental management can be beneficial to the sector with some of the perceived benefits of EMA implementation being: cost reduction; establishment of processes and procedures necessary for legislative compliance; and improved public persona and increased market opportunities (Santos, Rebelo, Lopes, Alves, & Silva, 2016; Bennett & James, 2017). The lack of finances is not perceived to be a problem for EMA implementation, as evidenced by a study on Estonian construction companies. This study highlighted the primary reasons for implementing EMA systems as being maintaining a competitive edge, and improving the image of the organisation by dealing with environmental issues (Inno, 2005). Some of the factors influencing organisations within the manufacturing sectors to adopt and implement EMA are age, education level and tenure in position of management staff (Garcia, *et al.*, 2016). It is the high level management that drives the decision and provides the momentum required to introduce an EMA system. As such, these characteristics would influence the decision to implement and how implementation is to take place.

The process of implementing an EMA system can be facilitated through the use of an outside specialist regarding system implementation and training. Engaging a specialist can be costly but could be regarded as essential due to time constraints. Training is also essential and can be provided by the specialist through educating employees such as would-be managers within the company (Santos, *et al.*, 2016). An effective and efficient management system is required within an organisation as it aids in the implementation process of EMA, thereby allocating sufficient time and resources toward implementation. This ensures that employees and managers are given ownership of the system, and have a detailed overview of the implementation process (Schaltegger & Burritt, 2017). Therefore, organisations often strive to implement an environmental management system (EMS) in order to achieve organisational guidance when establishing, developing and reviewing their business practices for both corporate and environmental goals. For the successful implementation of an EMS a cultural revolution is often required within

organisations, which can be quite challenging particularly relating to organisations operating in developing countries where environmental issues are generally marginalised due to low levels of environmental awareness (De Jossineau, 2012).

When implementing a new system involving EMA, the relevant industry needs to comply with the requisite regulatory guidelines and the users of such system must know the guidelines and abide by them. Becoming aware of the environmental aspects associated with an organisation's products, services, and activities will be a new area of attention for many users and they will have to become familiar with the importance of this matter before they commit to it (Schaltegger & Wagner, 2017). Implementation of an EMA system can be very time consuming and involve significant costs

The integration and implementation process is very industry specific and in certain circumstances more information is required on the intricacies of processes aimed at covering all possible outcomes. This makes the implementation of EMA via an EMS very unique to that area of operations as no two implementation and integration strategies are the same (Santos, *et al.*, 2016). Studies conducted on small/medium sized companies in the chemical industry revealed that these organisations adopted a wait and see attitude toward EMA implementation (Barmasse, 2002). A study conducted with the construction industry in Estonia found that some of the problems encountered with EMA implementation centred around human resources, mainly related to areas of working habits, employee awareness and their attitudes toward environmental-related issues (Inno, 2005). The results also showed that Libyan firms in the selected industries were dominated by a defender strategy and hierarchy culture, which favoured a centralised management style. However, these practices had a negative influence on firms' intention to adopt EMA. Furthermore, the results also revealed that organisational, environmental and technological variables significantly influenced firms' intention to adopt EMA.

### **2.7.2. The service sector**

The service sector faces very much the same implementation issues as the manufacturing sector. As its impacts are not seen as being as dominant as those within the manufacturing sector, the service sector is relatively unexplored. The factors which influence the decision to implement EMA within the service sector

stem from competition, and measures to achieve environmental compliance, the availability of leadership, expertise, resources and environmental support (Adams & Simnett, 2011; Gunarathne & Lee, 2015).

A study conducted at a university teaching hospital in Ireland revealed that despite the provision of healthcare generating significant environmental impacts, their environmental performance has been largely enhanced through the implementation of environmental programmes. The implementation of the environmental system not only achieved the mitigation of existing environmental impacts, but also cemented a commitment to continued development (Ryan-Fogarty, *et al.*, 2016).

Another key factor in the implementation of EMA within the sector is training and education. Training has the effect of changing the attitudes of managers and employees. One of the greatest barriers that implementation of EMA faces is the resistance to change. Appropriate training and education demonstrate to the parties concerned that change can in fact be positive, thus breaking down the barrier presented by change (Santos, *et al.*, 2016).

Literature indicates that there is a general lack of EMA utilisation at universities; however, it must be noted that when EMA is utilised, its implementation does create both financial and environmental benefits for the organisation in question (Chang, 2007).

## **2.8. Conclusion**

This chapter has described environmental management and defined the relationship between management accounting and the environment. Then EMA was introduced and its relevance to environmental accounting was highlighted, introducing and explaining the two types of information included under the EMA (monetary and physical). The use and application of EMA were also discussed. The environmental management practices relevant to the higher education sector were highlighted, along with the use and application of EMA, specifically within this sector. The barriers and facilitators of EMA within the sector were identified and explained. This information is relevant in exploring the factors that the sector faces in their decision on EMA adoption. A theoretical framework for EMA adoption was provided, in which the literature surrounding the applicable theories was examined and used

to develop research propositions. These propositions were then used to identify areas of concern, which then form the basis of investigating the barriers and facilitators faced by universities regarding EMA adoption. Further, empirical evidence regarding EMA implementation was presented as a means to reinforce the information that emerged regarding the barriers and facilitators to EMA adoption in both the manufacturing and service sectors. The following chapter elaborates on how the research objectives were achieved through the use of the appropriate research methodology, research design and research methods.

## **CHAPTER 3**

### **RESEARCH METHODOLOGY**

#### **3.1. Introduction**

While the first chapter briefly introduced the details and goals of the research study and its problem statement, a further review of the environmental management accounting-related literature was required. The second chapter of this study examined service organisations' adoption and application of EMA, especially within the higher education sector, and further proposed the adoption of a theoretical framework to explore the adoption and application of EMA in universities.

This chapter provides a detailed outline of the research methodology, research methods, and research design adopted for this study. Foremost, the exploratory nature of this study is explained, thereby justifying the suitability of a qualitative research approach. Thereafter, the appropriateness of a case study as the research method as well as in-depth interviews as the principal data collection technique are further discussed.

Subsequently, the hierarchical research design of the study comprising the research objectives, the research design, research hypotheses, and the structure of the questionnaire as well as the scope of the study are clarified in line with the methodology and methods of the study.

Lastly, the latter sections of this study provide details on the field surveys, data analysis and how the anticipated research limitations were minimised through the use of validity and reliability checks.

#### **3.2. Justification for adopting qualitative research**

Over the years, emphasis on EMA reporting has been more prominent amongst manufacturing industries than service-based organisations. While this has been the general narrative in the corporate world, it is not so different in academia. Based on the literature review detailed in the previous chapter, it is clear that only a fraction of empirical studies on EMA adoption focused on service-based organisations, particularly universities. Whilst several attempts have been made to justify this



oversight/perceived lack of attention focused on this area of research, it is necessary to commend the efforts of the few studies done. However, the few studies conducted hitherto have not sufficiently covered this topical discourse of modern research in management accounting.

Notably, among the dearth of existing literature is a lack of an EMA theoretical framework for universities that addresses the African context, particularly universities within South Africa. In order to fill this dearth in literature, a need exists to explore the subject matter's environment as well as the necessary participants and their views within this environment.

Therefore, a qualitative research approach using a case study and in-depth interviews for data collection was selected as the most suitable approach to explore this discourse.

A qualitative research approach can be described as a research plan that is more flexible and circular (Bless, Higson-Smith, & Kagee, 2012). These authors further clarified that the reasoning behind a qualitative research approach is to understand the phenomenon being examined from the sample selected. This inductive approach allows for the emergence of theories and propositions as the study continues. At the inception of a qualitative study, the choice of the research topic, research design and methods of data collection are often considered concurrently (Bryman & Bell, 2017).

Bless, *et al.* (2012) opined that research can traditionally be classified based on the nature of the research questions. In their view, exploratory research seeks to determine the breadth and scope of a particular subject matter via the use of questions and hypotheses for deeper inquiry and understanding.

In essence, this type of research approach is beneficial in shaping and conceptualising the topical issues and helpful in the development of theories or hypotheses for future studies (Chang, 2007). This research study therefore used a case study research strategy and in-depth interviews as the primary method of data collection to effectively address the exploratory nature of this qualitative study.

### **3.2.1. Case study as a research strategy**

Using a case study research strategy is quite challenging as it requires careful study and keen attention to details (Remenyi, 2012; Yin, 2012).

Yin (2012) described the distinctiveness of a case study strategy by defining it as “An empirical inquiry about a contemporary phenomenon (e.g. a “case”), set within its real world context – especially when the boundaries between phenomenon and context are not clearly evident” (Remenyi, 2012; Yin, 2012). Due to this distinctiveness, a case study research strategy has been reputed for its flexibility to help a researcher uncover salient issues and controversies that emerge from real-life paradigms that cannot be directly manipulated (Chang, 2007). Hence, this study adopted a multiple case study design, as it is proven that this design provides compelling evidences that makes the research study more robust (Chang, 2007; Yin, 2012). Furthermore, it allows the researcher flexibility to discover issues arising from real life content that cannot be influenced.

### **3.2.2. In-depth interviews as the main data collection procedure**

In a quantitative study, data is accumulated when the researcher probes the informant during an interview. In-depth interviews provide meaningful information which in addition to generating data, minimises the researcher’s own perceptions from coming into play. However, it often only becomes functional for the study after it has been transcribed to text (Remenyi, 2012).

Remenyi (2012) noted that qualitative data is variable in nature and the required data can be acquired via a range of sources. Bryman and Bell (2017) suggested the following seven broad sources of data for a qualitative study:

- i) Direct observation
- ii) Participant observation
- iii) Qualitative interviews
- iv) Surveys
- v) Focus groups
- vi) Language based methods
- vii) Content analysis.

Yin (2012) ranked open-ended interviews as the second most widely used source of evidence for case study research. Also referred to as non-structured interviews (Yin, 2012; Bryman & Bell, 2017), these interviews are deemed to be more beneficial than surveys as they offer “richer” and more extensive material for the research study than even the open-ended sections of survey instruments (Yin, 2012). Bryman and Bell (2017) asserted that open-ended interviews allow research subjects to freely provide responses on the subject matter during semi structured/ unstructured interview sessions, as the interviewer probes and explores the topic in depth. This approach enables questions of deep knowledge to put forward to the participants, which enables the researcher to better understand the concepts and constructs used by participants as a basis of further views and opinions.

This study adopted open-ended interviews as the primary source of collecting the required data for the study, but this was augmented with informal interviews with individuals conversant with the research issue. Furthermore, additional relevant documents obtained during the course of this study were analysed.

### **3.3. Research design and hierarchy**

This research study followed a case study research design that was structured in a hierarchical approach from the research problem statement to specific research questions.

Bryman and Bell (2017) asserted that a research design provides a framework for the collection of data and the analysis thereof. Furthermore, the choice of research design reflects the researcher’s decision about the importance attached to various perspectives of the research process, which relates to the following:

How the causal relationship between variables will be defined.

The extent of generalisation of the research findings to a larger group outside the sample being studied.

How to evaluate and explain meanings of observed behaviours within social constructs.

How to explain the social phenomena, their interactions and changes over time.

Hence, the hierarchical approach of this study commenced with the outline of the EMA problem statement in Chapter 1. Upon this, the two main research objectives were determined, alongside with the research questions and hypotheses necessary for the achievement of the predetermined objectives. For further clarity on the alignment of the research objectives and the research questions, this section succinctly discusses the research objectives, questions and hypotheses in line with the proposed theoretical framework, interview themes and interview questions.

### **3.3.1. Research objectives**

To understand the existing environmental management accounting policies and practices that UKZN employs

To establish the barriers and facilitators of EMA adoption at UKZN.

### **3.3.2. Scope of the study**

The first objective of this study was devoted to understanding the current policies and practices that are being adopted in accounting for the major environmental costs. Furthermore, objective two was to assess the barriers and facilitators of EMA adoption via considering the inclusion of the four major environmental costs for both internal and external applications. Whilst the external application was to consider the adoption of EMA in external reporting, the internal applications were further considered in the perspectives of capital budgeting, cost allocation and performance measurement.

### **3.3.3. Research questions**

Four research questions were highlighted based on the scope of this study to help achieve the two goals of this study. These are the questions:

Does the university's accounting system separately identify and measure specific types of the major environmental costs? If not, what is the reason?

How are the major monetary and physical environmental costs being captured into the current accounting system?

How are the major environmental costs used to promote external environmental reporting and internal management of the environment?

What considerations would influence EMA adoption within universities?

#### **3.3.4. Questionnaire design for the interviews**

It is believed that the design of the questionnaire used in an interview largely affects the effectiveness and extent of information obtained from the interview (Bless, *et al.*, 2012; Bryman & Bell, 2017). Bryman and Bell (2017) suggested three general rules of thumb applicable when considering the content of a questionnaire design. These rules are: Always bear in mind the research questions of the study, be sure of what you (interviewer) want to know from the respondent during the interview, and how you would answer the questions being asked if you (interviewer) were the respondent.

For this research study, two questionnaires were developed to collect the data necessary to achieve the research objectives. These questionnaires were designed to comprise interview questions that relate to the broad research questions and research objectives of the study. An expansive review of interview questions used in previous EMA studies was done to address the second objective, with an intent to find relatively useful interview questions for the study. Upon this, interview questions that were deemed useful for the study were adapted, modified and contextualised to suit EMA inquiry within UKZN.

Tables A.2 and A.3 (see Appendix A) illustrate the interview questions for achieving the two research objectives of the study. A thematic approach was used for the presentation of the tables, which highlights the underlying rationale that links the interview questions to research questions and guiding propositions via suggested research themes in the theoretical framework as well as related literature on EMA. Whilst the first questionnaire utilised themes that consider EMA from a management and accounting perspective, the second questionnaire assessed the subject matter from an attitudinal perspective by considering themes relating to attitudes of key players in the implementation of EMA within UKZN. Hence, the suggested research themes include the following:

Management of the major environmental costs of EMA adoption in the University of KwaZulu-Natal.

Major environmental costs of EMA adoption in the University of KwaZulu-Natal.

Management's attitude to EMA adoption in the University of KwaZulu-Natal.

Management's view to EMA adoption in the University of KwaZulu-Natal.

Environmental accountability of EMA adoption in the University of KwaZulu-Natal.

Institutional pressure of EMA adoption in the University of KwaZulu-Natal.

The guiding propositions are tools used to develop the interview questions, thereby allowing the researcher to search for patterns. The propositions may be discarded should fieldwork produce more relevant phenomena. This process allows the research to retain flexibility and to facilitate evolution of the research. The guiding propositions allow for a superior exploration and generation of interview questions, providing the researcher freedom to discover and explore other patterns that emerge.

In this context, this study explored EMA practices and policies in UKZN via specific propositions to be tested for rejection. These propositions developed and outlined within the literature review are outlined in Table A.1 (see Appendix A).

Remenyi (2012) suggested that although research propositions cannot be proved or confirmed, they can be rejected based on adequate information that shows otherwise.

Tables A.2 and A.3 in Appendix A further present the interview questions for achieving the research objectives of the study, as discussed below.

The study categorised the interview questions under several research themes which was necessary to ensure a comprehensive and adequate coverage of each theme being considered in the study (Chang, 2007; Remenyi, 2012; Yin, 2012). The adoption of research themes allowed for the questionnaire design to utilise the theoretical framework, research questions and research propositions to act as a blueprint, whilst providing flexibility for respondents to express views on EMA issues relevant to the study. Furthermore, this approach provided a solid basis for data collection and analysis as discussed in subsequent sections of the study.

### **3.4. Conduct of the research**

The research study was conducted in three phases. The first phase, also known as "Phase One", considered the selection of research participants. The second phase

of the study, also known as the “Phase Two”, focused on the data collection. The third phase of the study, also known as the “Phase Three”, dealt with the transcription and translation of the collected data.

#### **3.4.1. Phase One – Selection of research participants**

This study explored the practices and policies of environmental management accounting within the service sector, specifically the university environment in South Africa. This novel study examined the practices and policies of EMA in UKZN. The case study for this research study was restricted to UKZN due to challenges such as access, time, and cost constraints concerning other universities within South Africa. Hence, the research participants for the study comprised relevant staff members and officials of UKZN who were instrumental in the provision of data required to achieve the pre-set research objectives.

This study's first research objective focused on understanding the current accounting policies and practices in UKZN for environmental management. Questions for participants from the environmental management function and questions for participants from the management accounting function were captioned in two categories of questions in the questionnaire. It was therefore necessary to select at least one participant from the Division of Management Accounting / UKZN Finance and Environmental Management / Institutional Planning and Governance to address the first research goal. The second research objective considered factors influencing EMA adoption within universities. This objective was to understand attitudes and viewpoints of key persons and role players regarding the adoption of EMA practices in UKZN. Hence, the study considered viewpoints of key persons across four different cadres of managerial decision making within the university. These cadres included: senior management level, deans of schools, management level with direct involvement in the environmental management function, and accounting managers. To address the second research objective, participants were selected from management roles within the university. Management level participants were selected from senior management, management accounting, and environmental management and from academic schools. The academic school selected was the School of Accounting, Economics and Finance. Environmental management accounting is a subject area that falls within this school and as such

the participants from this school were seen to add greater value than other schools as they have a deeper understanding of accounting-related concepts.

At the inception of the selection of research participants for the study, necessary departments as detailed above, and key persons within said departments, were identified and contacted for the purpose of the study.

Participants were selected as follows:

*Finance Division*

Director Financial Reporting

Financial Manager

*Institutional Planning and Governance Division*

Executive Director

Director IPP

*University management/Academic Schools*

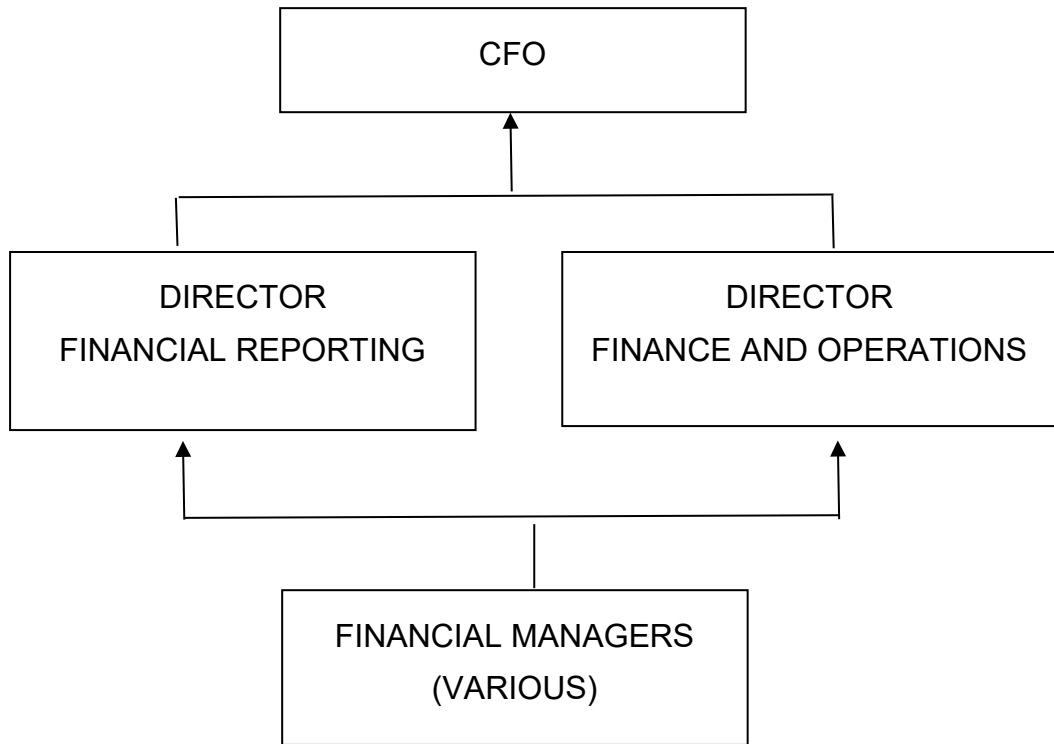
Acting DVC

Dean: Accounting Economics and Finance

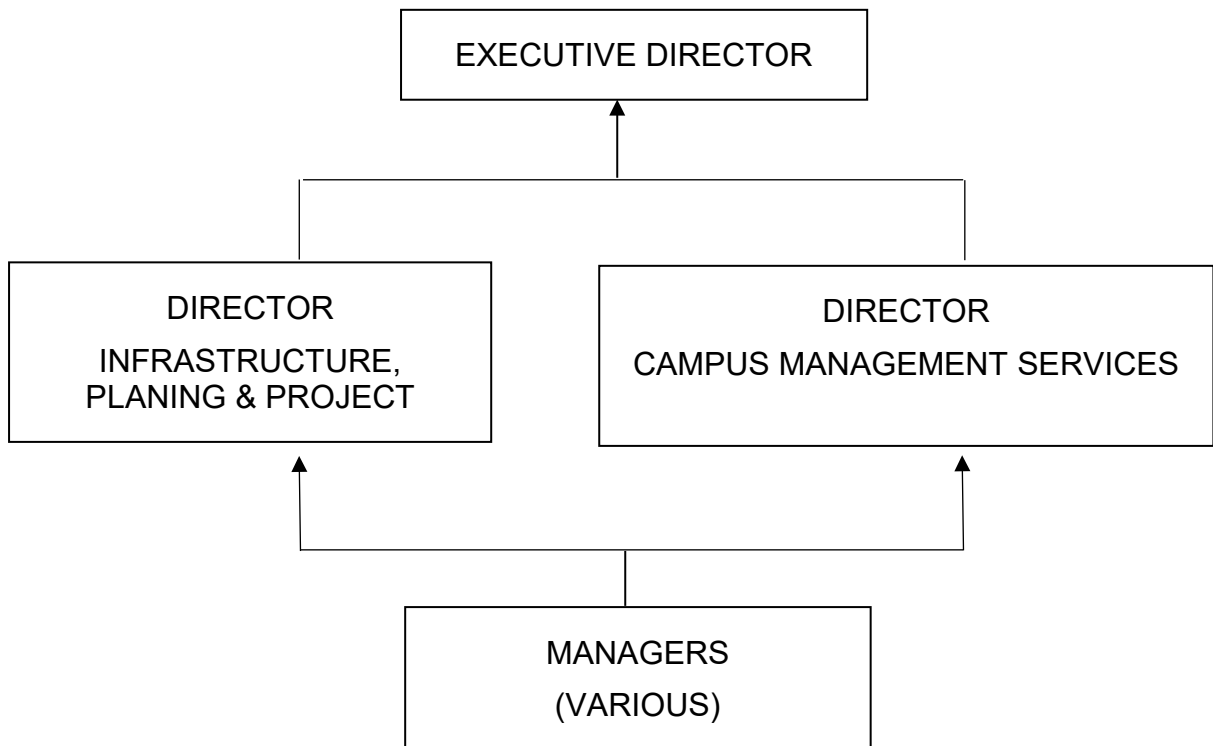
Operations manager : Accounting Economics and Finance

Figure 3.1, Figure 3.2, and Figure 3.3 display the chain of command within the Finance and Institutional Planning and Governance divisions and the overall university management levels of the participants selected.

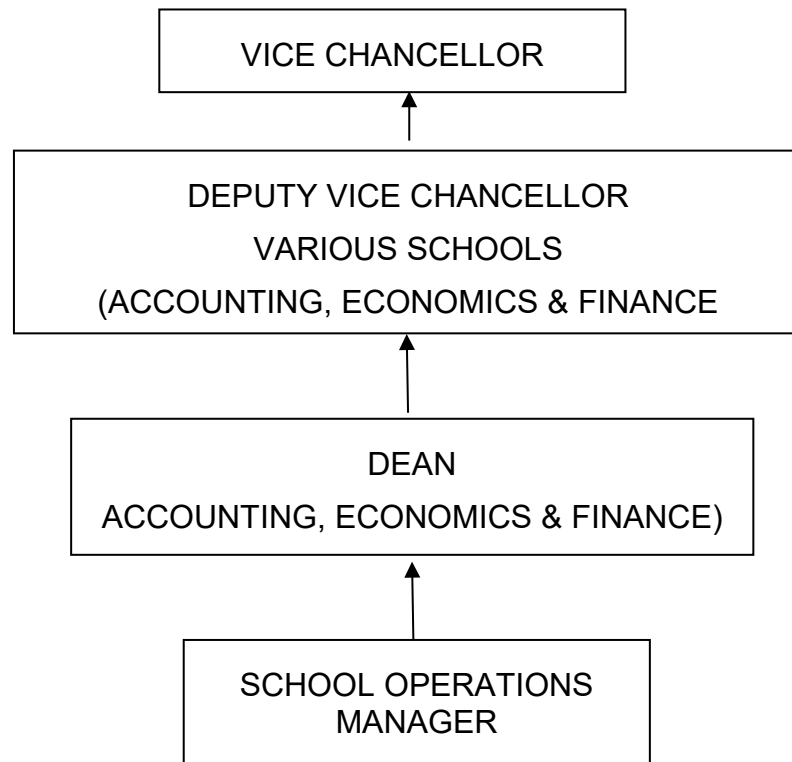




**Figure 3.1: Finance Division**



**Figure 3.2: Institutional Planning and Governance**



**Figure 3.3: University Management**

### 3.4.2. Phase Two – Data collection

In-depth interviews were adopted as the primary source of data collection, as described earlier. This method of data collection allowed for the perceptions of the participants to be obtained regarding the two research objectives. The interviews were conducted between August and September 2018. Participants were contacted telephonically after their contact numbers had been obtained via the UKZN website. The study was explained to each participant after which they agreed to participate in the interview. Participants were informed that the duration of the interviews would be approximately an hour long, and that the interview could be confidential if so required by them. The requisite consent forms were prepared and completed by participants who agreed to participate in the research. Prior to conducting the interviews, the participants were informed that they had the option not to answer any question or stop the interview if they felt uncomfortable. Participants were also informed that the interviews would be recorded and they consented to this. All participants answered all questions willingly.

As described earlier, two questionnaires were utilised to obtain data based on the two research objectives. The interviews were open ended and the resultant information obtained from the interview questions was used to perform further enquiries. This facilitated the collection of further information, enabling a deeper understanding to be obtained.

### **3.4.3. Phase Three – Transcribing and translating data**

The interview recordings were transcribed by an independent person using Microsoft Word. Clear and concise instructions were provided to the individual regarding the required output of the interview data (in terms of the structure, time stamps, use of quotes, etc.). This enabled the researcher to reconcile the transcribed data back to the actual recording, if the need arose in future. After the interviews had been transcribed they were reconciled back to the recording to ensure that all data was accurately and completely transcribed.

### **3.5. Data analysis**

Upon transcription and translation of the data obtained via interviews, the translated data was further analysed using a holistic, single-case study research approach. Yin (2012) opined that a case study design consists of a single or multiple case, whereby either of these could be a holistic case or have embedded sub-cases. A “case” which is basically a bounded entity, could be a person, organisation, behavioural condition, event or social phenomenon. However, the boundary between the case and its contextual conditions may be blurred in both spatial and temporal dimensions (Yin, 2012). Remenyi (2012) suggested that a case study research allows challenging research questions to be addressed using multiple sources of data or facts. This perspective of case study research was inspired by Yin (1989) who defined a case study research as:

*an empirical enquiry that investigates a contemporary phenomenon within its real-life context, when the boundaries between phenomenon and context are not clearly evident, and in which multiple sources of evidence are used (Remenyi, 2012).*

For this study, the choice of a holistic single case study design for the data analysis was motivated by the focus of the study on a single case holistically, i.e. EMA at

UKZN. A holistic single case study seeks to explore a subject matter from a broad perspective on a singular case. It is also referred to as “one holistic case study” and Remenyi (2012) opined that this type of case study design can either be used for theory creation or for hypotheses testing. When being considered for theory creation, the one holistic case study could be applied via a hermeneutic approach, content analysis approach or a correspondence analysis approach to extensively explore a subject matter on a single case to create and develop theories (Remenyi, 2012).

### **3.5.1. Unit of analysis**

Yin (2012) posited that a case serves as the main unit of analysis in a case study. This is so, as the unit of analysis determines what data is necessary for consideration in the study. Neuendorf (2016) described the unit of analysis as the individual “thing” or phenomenon that is the subject matter of the “what or whom” being studied. Yin (2012) suggested that what makes a case or unit of analysis special lies in the research interests and objectives which inform the research questions that the study seeks from the unit of analysis.

The first objective of this study was to understand the current accounting policies and practices of environmental management used by UKZN. Three research questions (R1, R2, and R3) emerged from this keen interest of the study. These research questions thus helped to define the study's analytical unit as "UKZN" itself.

Conversely, the second research objective was to establish the barriers and facilitators of EMA adoption at UKZN. This objective relates to the attitudes and perceptions of participants toward EMA adoption in UKZN. Hence, the unit of analysis for the objective comprised the “individual participants” who are staff of UKZN.

### **3.5.2. Content analysis as mainly qualitative**

This study utilises a content analysis approach to analyse the collected data. The objective of content analysis is to list concepts in the primary narrative, to ascertain the importance of each section of content via how frequently they are mentioned in the primary narrative (Remenyi, 2012). These sections of content/concepts are then

further analysed under themes and sub-themes for interconnectedness and disparities.

Kumar (2011) described content analysis as a procedural means of analysing the content of interviews or observational field notes in order to identify the main themes that appear from the responses provided by participants or observations made by the researcher.

Neuendorf (2016) emphasised the growing popularity of content analysis as a method of data analysis, with its importance being widely acknowledged in diverse fields of study. Whilst there are several definitions of content analysis, Neuendorf (2016) defined it as follows:

*A data analysis technique for summarizing, quantitative analysis of messages that follows the standards of the scientific methods (including attention to objectivity-intersubjectivity, a priori design, reliability, validity, generalizability, replicability, and hypothesis testing based on theory) and is not limited as to the types of variables that may be measured or the context in which the messages are created or presented.*

Kumar (2011) further highlighted the procedural steps in content analysis to include the following:

Identifying the main themes

Assigning codes to the main themes

Classification of responses under the main themes

Integration of themes and responses into reported text.

Whilst content analysis can be applied to both quantitative and qualitative research, Neuendorf (2016) opined that the basis of distinction between both contexts lies in their underlying focus. For a quantitative content analysis, the underlying focus is to produce numbers of key categories and amounts of variables. However, qualitative content analysis focuses on providing a vast amount of detailed information about a text. Hsieh and Shannon (2005) noted three distinct approaches to qualitative content analysis to be conventional, directed or summative. The underlying distinctions amongst these approaches are attributable to major differences among coding schemes, origins of codes as well as threats to trustworthiness.

For conventional content analysis the coding categories are directly derived from the text, while for the directed approach initial coding is guided by theories and existing relevant research findings. The summative content analysis involves observing frequencies of occurrences and comparing keywords and contents, followed by interpretation of the underlying context. This study adopted summative content analysis for coding of the data. This is further discussed in the subsequent section.

### **3.5.3. Coding the data**

Bless, *et al.* (2012) emphasised data coding as a critical aspect of qualitative analysis. Coding of data is a clinical process that involves breaking up original transcripts and classifying all the fragments into categories represented by distinct codes. The central idea for development of codes is to identify themes and patterns within the dataset. It is necessary to organise codes in a hierarchical order from high level codes – broad theme, to lower level codes – narrow scope. For this, each code must be clearly defined for consistency in application and clarity in explanation to others. Hence, it is imperative for a code definition to include at least a title and a description of what type of data is categorised under it.

In the context of this study, the initial codes signify the sub-categories of the research themes which were classified as either substantive sub-category or theoretical sub-category (Glaser, 1978). While the theoretical coding follows the substantive coding (Tacer & Ruzzier, 2015), this code serves as the relational model that links all substantive codes to the main category (Hernandez, 2009). Substantive coding comprises selective coding, which is a first level of abstraction whereby the transcripts and field notes are being coded (Tacer & Ruzzier, 2015). It is necessary to create more substantive codes for more data collected, especially when the newly collected data does not fit in existing substantive categories. This is necessary to avoid loss of vital data during the coding process. Table 3.1 shows the initial coding structure, consisting of both substantive and theoretical groups used to address the study's research goals.

In addition, the validity of the construct was clearly defined for both theoretical and substantive codes. These definitions were adapted or based on a specific theory on which the codes were developed from previous relevant literature. Table 3.2 further

illustrates definitions, sources and concise comments to illustrate how they were applied for coding purposes.

**Table 3.1: Initial coding structure**

Hierarchy	Codes		Purpose
	Substantive	Theoretical	
<b><i>Accounting and management of the major environmental costs</i></b>			<b>To address the first research objective:</b> To understand the existing environmental management accounting policies and practices that UKZN employs.
<i>How UKZN's accounting systems account for major environmental costs</i>	X		
<i>How major environmental costs are managed</i>			
Capital budgeting	X		
Cost allocation	X		
Environmental performance measurement	X		
Environmental reporting	X		
<b><i>Factors influencing EMA adoption</i></b>			<b>To address the second research objective:</b> To establish the barriers and facilitators of EMA adoption at UKZN.
Environmental strategy		X	
Physical environmental uncertainty		X	
Efficiency or financial considerations		X	
Government pressure		X	
Mimetic pressure		X	
Normative pressure		X	

**Note:** 'X' indicates the nature of codes that are either substantive or theoretical.

Chang, 2007.

**Table 3.2: Measurement for the codes**

CODE	MEASUREMENT	ILLUSTRATIVE QUOTE
Capital budgeting	<p>This study examined the capital budgeting of the university to establish if a provision is made for EMA by the university management.</p> <p>The capital budgeting has three dimensions, namely approval by finance to raise awareness, environmental costs accountability and provision of EMA system.</p>	<p>“Given what I found here, and the fact that we're starting to just talk about these issues, I don't think they are tracking these things I mean, certainly they track the overall rates and utilities and all that stuff, but it's not classified as environmental costs, obviously broken down into your energy costs, your waste disposal, your water. Environmental and safety issues are part and parcel of management. However, when it comes to the broader environmental elements in the institution, that responsibility rests with the Vice Chancellor and then delegated accordingly to all the executives. My office on environmental issues will be responsible for when we are doing, New Project, there are many instances where you've got”.</p>
Cost allocation	<p>The code captures the processes of environmental cost allocation. It has sub-codes which depict the dimensions of cost allocation.</p>	<p>“If the executives were to be provided with this information, I'm sure they'll find a way to deal with the environmental issues and a contentiously improve the university in environmental standing. So, we have separate General Ledger (GL) accounts for each of the different types of expenses, for example, electricity. And then in some instances, we also have separate cost settings. Environmental costs are not separately identified. They are treated as component of the expenses”.</p>



CODE	MEASUREMENT	ILLUSTRATIVE QUOTE
Environmental performance measurement	This code examines the tools put in place by the university for environmental performance measurement.	“No, the university does not produce report. Yeah but what I'm trying to say is that as an institution we have this committees which, seeks to make sure that the affairs of the environment are well managed”.
Technological innovation	Technological innovation is used to capture the adoption of technology in the management of environmental costs and environment performance of the university will help reduce costs and make the environmental performance of the university more effective. Some of the comments are shown below.	“That's my understanding. Just of interest in raising the environmental costs I'm looking at the amount of sewer that we produce as a University, It's a lot. Why don't we have... gas plans as a University just to show that we are creative and innovative in this fourth industrial revolution that we turn the sewer into gas which can be used for cooking and other things which is more sustainable. There are other things that we can also implement as a University rather than just use of solar”.
Informational barrier	The code captures the informational barrier hindering the implementation of EMA.	“The current barrier is that I don't think there's a system in place.... a proper system in place to monitor, so you have to get a system to monitor before you can report them. Internal barriers are more about data capture, I don't see that they will be resistance from any parties or any lacking or even the students or the staff I can't see or hear that they will be resistant”.
Attitudinal barrier	This captures the level of management awareness of EMA. The code produced two sub-codes (sub-themes), namely low	“We as a University, are supposed to drive social change and I think issues like environmental costs would actually interest quite a lot of

CODE	MEASUREMENT	ILLUSTRATIVE QUOTE
	priority of accounting for environmental costs and resistance to change.	staff and students who want to reduce the costs. Just awareness, via emails, having communities, or even having champions maybe training”.
Institutional barrier	The code for institutional barrier captures the policy framework used by government to enforce the adoption of EMA.	“I think this strategy is providing that pressure, because it is one of the things that would be assessed on, as you can see, it's clearly one of the things that we are being assessed on from the APP, which is one of the indicators. I would not...I'm not sure I won't be able to answer that I think that will be at the higher level I'm sure there are pressures in terms of funding. A lot of funding is externally sourced and stuff like that”.
Lack of incentives	The code on financial incentives captures both the financial and non-financial incentives in EMA.	“No, there's been absolutely, virtually, no incentives, and that is because of the centralized nature of those costs. If it were to go back to the school, then obviously, they could be incentives provided to the schools based on the savings they achieve.so I think it's just the way that it's structured. Also, there's no strategy, clear strategy, coherent strategy. And yeah, I mean, we are a bit far away from that point, but I think that we will get there. But that's the way that we should do. Incentives...can't think of any...”.
Technology barrier	The code on technological barrier captures the role of	“We don't have the technologies in place to be able to pull it at that level, we're not tracking and monitoring

CODE	MEASUREMENT	ILLUSTRATIVE QUOTE
	technology in the adoption of EMA.	environment. We may need to look at a better system to be able to manage the environment because one of the things that we trying to do this year is to put in place annual performance indicators for the institution. So, if we take that indicator, the natural thing is, we know, we need to be able to track that at the school level. And to do that we need the system (technologies) in place. So, it's a natural sort of evolution of that process. But it will come with time".

The semi-structured questionnaire was useful in gathering the qualitative data. The data displayed in the Table 3.2 above was grouped into themes and sub-themes representing a summary of the participants' responses. NVivo 12 was used to code participants' views of and responses to the research question. In NVivo, labels are generated to organise texts into themes and sub-themes.

**Table 3.3: The final coding structure**

Hierarchy	Purpose
<b>Management accounting for the major environmental costs</b>	
How are the major environmental costs accounted for by the university	To understand the existing environmental management accounting policies and practices that UKZN employs.
<ul style="list-style-type: none"> <li>▪ <i>Capital budgeting</i> <ul style="list-style-type: none"> <li>• Approval by finance to raise awareness</li> <li>• Environmental costs accountability</li> <li>• Provision of EMA system</li> </ul> </li> </ul>	
What are the key performance indices used?	
<ul style="list-style-type: none"> <li>▪ <i>Environmental performance measurement</i> <ul style="list-style-type: none"> <li>• Environmental reporting</li> <li>• Key indices for environmental performance assessment</li> <li>• Sustainability committee</li> </ul> </li> </ul>	
<b>Factors influencing EMA adoption</b>	

Hierarchy	Purpose
<ul style="list-style-type: none"> <li>▪ <i>Attitudinal barrier</i> <ul style="list-style-type: none"> <li>• Low priority of accounting for environmental costs</li> <li>• Resistance to change</li> </ul> </li> </ul>	To establish the barriers and facilitators of EMA adoption at UKZN.
<ul style="list-style-type: none"> <li>▪ <i>Informational barrier</i> <ul style="list-style-type: none"> <li>• Difficulty in allocating environmental costs</li> <li>• Low priority for environmental uncertainty</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>▪ <i>Institutional barrier</i> <ul style="list-style-type: none"> <li>• External pressures</li> <li>• Institutional pressure (no accountability)</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>▪ <i>Lack of incentives</i> <ul style="list-style-type: none"> <li>• Financial incentives</li> <li>• Non-financial incentives</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>▪ <i>Technological barrier</i></li> </ul>	

#### 3.5.4. Structured display of the coded data

Structural display of coded data refers to illustration of data in a manner that is succinct and efficient, depicting information provided by study participants (Verdinelli & Scagnoli, 2013). In other words, it is a graphic illustration of large amounts of data in a succinct and efficient way. Structural display of coded data is important in a qualitative study of this nature as it enables the reader to gain insight into the outcome of the study in a simplistic way through graphic representation of the most vital information with unnecessary and ambiguous details omitted. The qualitative data collected were analysed using thematic and content analyses.

For this study, data were collected using Audio recorder. The recorded data were subsequently transcribed in Microsoft word documents in preparation for uploading into NVivo 12 software. NVivo 12 software was employed to conduct thematic and content analyses. The NVivo 12 software enabled the transcribed data to be coded by organising texts into themes and sub-themes. Codes representing the barriers to EMA were displayed representing the responses and views of the study participants. In addition, quotes from the participants were provided to support the various codes and provide more information on the themes that emerged.

### **3.6. Revisiting the research methods**

The research design for this study proved to be adequate to achieve the two research objectives of this study. However, this design is not void of inherent limitations such as cost, access, scope etc. Two particular limitations are discussed below.

#### **3.6.1. Subjectivity**

Subjective bias remains an inherent feature of every human. This bias can be further compounded by situation factors and circumstances that are prevalent in the life of the respondent at a particular point in time. This study adopted in-depth interviews as the principal means for data collection. While this method has been widely adopted by similar studies, it is susceptible to subjective bias. However, the researcher ensured that adequate safeguards were in place to proactively reduce this limitation by seeking elaborate and follow-up responses from participants. This was further augmented by clinical documentation of responses, as well as ensuring consistency throughout the conduct of the interviews.

#### **3.6.2. Generalisation**

The issue of generalisation relates to the extent to which the findings of the study can be inferred in other similar contexts. This research study considered EMA practices and policies within the service sector, using UKZN as the case study. While this research study succinctly considered the subject matter within this context, it is however difficult to generalise that EMA practices and policies within UKZN are the same at other universities worldwide or are applicable to other service industries.

### **3.7. Validity and reliability tests**

Bless, *et al.* (2012) emphasised that different criteria must be used to assess the quality of data collection and analysis in a research study. They noted that the quality of a quantitative research study is assessed via its reliability, validity and objectivity, whilst the quality of a qualitative research study is evaluated based on its trustworthiness, credibility, transferability, dependability and confirmability. They opined that the quality of a qualitative research is primarily based on the trust in the given research process and the findings thereof.

The credibility of a qualitative research study relates to the internal validity of the study, which aims to convince users of the study that the outcome of the study presents the true picture of the subject matter. The dependability of the research study is similar to the concept of reliability. This ideal holds that the researcher critically devises and follows a clear and precise research strategy. The transferability of a qualitative research study relates to the external validity of the study, which considers the extent to which the outcome of the study can be applied to similar scenarios and contexts. The confirmability of a qualitative research study relates to the replicability of the study which expects similar research outcomes by other research if similar research methods are applied in similar contexts.

### **3.7.1. Construct validity**

Construct validity was achieved through the use of multiple sources of information to obtain data. The annual reports and annual financial statements of the university were reviewed, along with the university's strategic plan. A theoretical framework by triangulation resulted in the development of guiding propositions which informed the design of the questionnaire for interviews. A clear audit trail was maintained through NVivo, and the transcripts were reviewed and reconciled back to the interview recordings to ensure that the transcriptions had been accurately performed.

### **3.7.2. Internal validity**

Triangulation was used to ensure internal validity. This was done by cross checking the transcribed data. A sample of participants reviewed the transcribed data to ensure that the transcriptions were accurate and complete. The data was also reconciled back to the recordings by the researcher. The coded data was analysed using NVivo.

### **3.7.3. External validity**

The theoretical framework used to develop the propositions comprised two theories and was literature based. This facilitated generalising to new cases. The analysis of the results yielded conclusions consistent with other studies on EMA performed within the service sector.

#### **3.7.4. Reliability**

A case study approach ensured that a case study database was created and maintained separately in NVivo. This database facilitated reconciling conclusions derived back to their source, namely the transcribed data, which was stored within the database.

#### **3.8. Conclusion**

This chapter provided a detailed explanation of the research methodology used to achieve the study's research objectives. A case study research methodology was adopted, hence the required data was collected through in-depth interviews with relevant UKZN staff.

The broad research design further highlighted links between the research objectives, research questions, and the research hypotheses. This necessitated for flexible interview questions that were consistent with relevant literature and helpful to achieve the research objectives. The researcher further deemed it necessary to adopt several safeguards to ensure the reliability and validity of the data collection and analysis. The next chapter focuses on the data analysis and interpretation of the research findings.

## **CHAPTER 4**

### **DATA ANALYSIS AND INTERPRETATION OF RESULTS**

#### **4.1. Introduction**

This chapter focuses on the analysis of data that emerged from the interview participants. The data was collected by means of conducting semi-structured interviews. The interview questions were carefully framed to elicit appropriate responses from the study participants. The questions were categorised into two sections, which reflected the two objectives of study: (1) to understand the existing environmental management accounting policies and practices that UKZN employs; and (2) to establish the barriers and facilitators of EMA adoption at UKZN. The interviewees were drawn from six employees of UKZN cutting across upper executive level management, environmental management and management accounting employees. The interviews continued until data saturation had been attained, after which the interviews were stopped. In a qualitative study, data saturation is attained when adequate data to replicate a study has been collected (Fusch & Ness, 2015). In other words, data saturation implies that on the basis of the information that has been gathered, further information gathering is not necessary (Saunders, Sim, Kingstone, Baker, Waterfield, Bartlam, Burroughs, & Jinks, 2018).

The anonymity of the study participants was ensured in line with the ethical requirements of UKZN. Each interview took approximately 45 minutes. An audio recorder was employed to record the interviews. The recorded interviews were transcribed in a Microsoft Word document before uploading into the Nvivo 12 software. The NVivo software was helpful in coding and organising the transcribed data into themes and sub-themes. Axial coding was valuable to establish the dominant themes and relationships among the open codes through the use of grounded theory as developed by Strauss and Corbin (1998 cited in Lingard, Albert, & Levinson, 2008).

#### **4.2. General description of UKZN**

UKZN is a research base institution, ranked among the top five universities in Africa over the last five-year period. The university was established in 2004 following the



merger of the former Durban-Westville University and University of Natal. The merging of the two universities and subsequent establishment of UKZN resulted in the institution ranking among the top residential universities in South Africa. UKZN has four colleges comprising 19 schools. The 19 schools offer a wide range of courses and funding for various research activities. One of the core values of UKZN is to manage the institution in conscious awareness of the environment, and foster a culture of responsible, ethical and sustainable use of natural resources.

#### **4.2.1. Environmental responsiveness of UKZN**

The UKZN environment policy is anchored on the University Mission Statement, which is to “*conserve the physical environment and foster a culture of responsible, ethical, sustainable use of natural resources*”. Environmental policy at the university involves conscious efforts to protect the integrity of the environment through local, regional and international conservation of natural resources and biodiversity. The University proposed 14 principles upon which the institution’s environmental policy is based. The principles are stated below:

**Principle 1:** University teaching, research, management and community interaction should embody an understanding of nature's intrinsic value, an awareness of possible environmental consequences of any actions, and an awareness of the environmental needs and concerns of the present and future generations of the community served by the university.

**Principle 2:** The University shall endeavour to establish and maintain an environment that is attractive and conducive to sustained excellence in teaching, research, management and community interaction, by valuing both the built and non-built areas on its various campuses.

**Principle 3:** The University shall take all reasonable steps to protect and preserve indigenous fauna and flora on its campuses and remove invasive alien species. The University must also recognise that its properties in larger metropolitan areas may form important conservation links.

**Principle 4:** The University shall encourage the full use of its campuses as sites for all aspects of environmental education and for the benefit of the community it serves

to conduct environmental research. Such education and research may be conventional or interdisciplinary at both the undergraduate and postgraduate levels, or may involve partnerships with the community.

**Principle 5:** Recognising and encouraging creativity within the student body that may be directed to conservation initiatives or programmes for sustainable development. Participation of students in environmentally sound activities at the informal level is also encouraged.

**Principle 6:** The University shall take appropriate steps to minimise the wasteful use of such resources by recognising the direct and indirect costs of land, water, energy and materials.

**Principle 7:** The University shall exercise effective control over any activities on its campuses that may produce harmful waste substances, cause damage to the environment or harm to health, and undertake environmental audits of any such activities taking place on its campuses. Accountability, prevention, treatment and reuse should be emphasised on waste management and pollution control at university campuses.

**Principle 8:** Environmental protection is an integral part of the University campus planning and management of future developments. Environmental impact assessments shall be undertaken, where appropriate, for any proposed activities that may have an environmental impact.

**Principle 9:** To protect the environment, the University shall apply a precautionary approach. If a university activity poses a threat of environmental damage, the lack of scientific certainty shall not be used as a reason for failing to prevent environmental degradation.

**Principle 10:** The University shall cooperate with the community it serves in a spirit of partnership to preserve, protect and assist in restoring the integrity of regional ecosystems where necessary.

**Principle 11:** The University will promote South Africa's principles of conservation while recognising the need for sustained use of natural resources. Through outreach

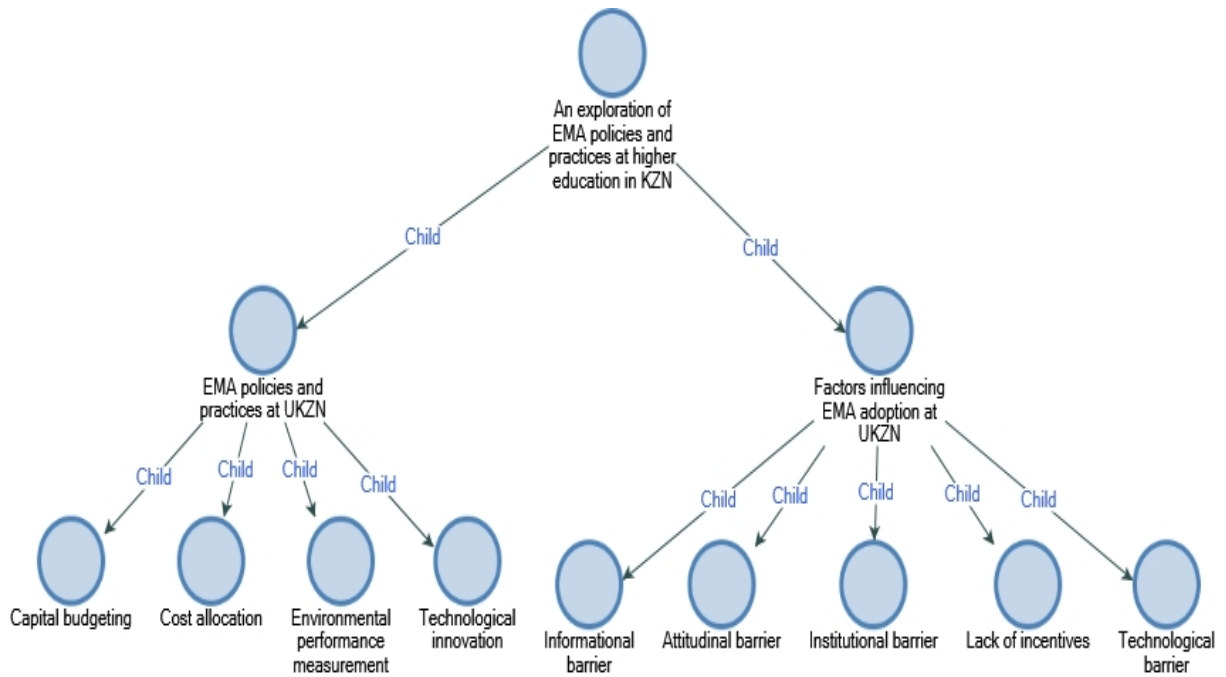
programmes, consultation and extension services, the University shall encourage access to relevant information and transfer of appropriate technology.

**Principle 12:** Environmental policy will be controlled by the Committee on the Environment, which reports to the Committee on Physical Planning, a Resource Planning Committee Subcommittee. The policy will be implemented primarily under the Executive's appropriate member by the Administration and Facilities Management Portfolio. All members of the university community, however, must have access to and be able to be represented in the university's decision-making processes regarding environmental policy.

**Principle 13:** The University shall seek the advice of persons with the appropriate expertise, both within and without the University, in all its dealings with environmental matters.

**Principle 14:** All members of the University shall cooperate in the fulfilment of the principles embodied in this Declaration in good faith and in a spirit of partnership.

As laudable as the fourteen principles are, they have not been properly embraced and implemented by the university management. This makes the environmental responsiveness of the university sub-standard based on the data collected from the interview participants. The project map in Figure 4.1 illustrates the main themes that emerged from the data collected on EMA policies and practices at UKZN.

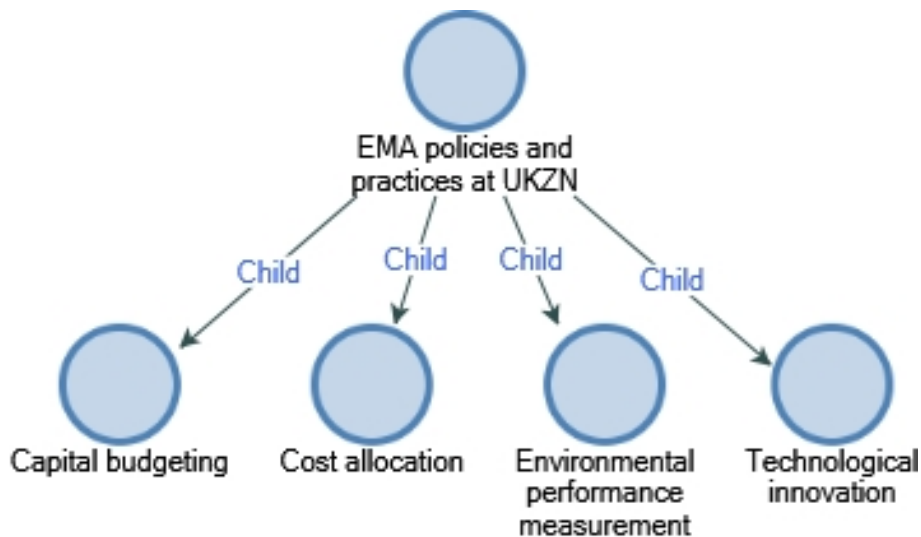


**Figure 4.1: Project map**

The figure above shows the thematic analysis emerging from the responses provided by the interview participants. The interpretations of the themes relating to each objective of study, as generated by the NVivo 12 software, are provided in the sections below.

#### **4.3. Analysis of research objective one**

EMA which is an integral part of the Sustainable Development Goals involves identifying, collecting, estimating, analysing and internal reporting of environmental cost for the environmental decision-making process (Vinayagamoorthi, Selvam, Lingaraja, Karpagam, & Mahalingam, 2012; Damayanti and Pentiana, 2018). Research objective one was aimed at comprehending the existing EMA policies and practices that UKZN employs. The qualitative data collected revealed that UKZN did not have a clear-cut policy on EMA. However, the majority of the interview participants affirmed that provision is made for a distinct general ledger (GL) for cost incurred on environmental management. Figure 4.2 below illustrates the themes that emerged from the study participants with respect to EMA policies and practices at the UKZN. The word “*Child*” as depicted in the figure below does not connote any significant value but is a NVivo software label, which shows the source of data from the “*Parent*” node to the “*child*” node.

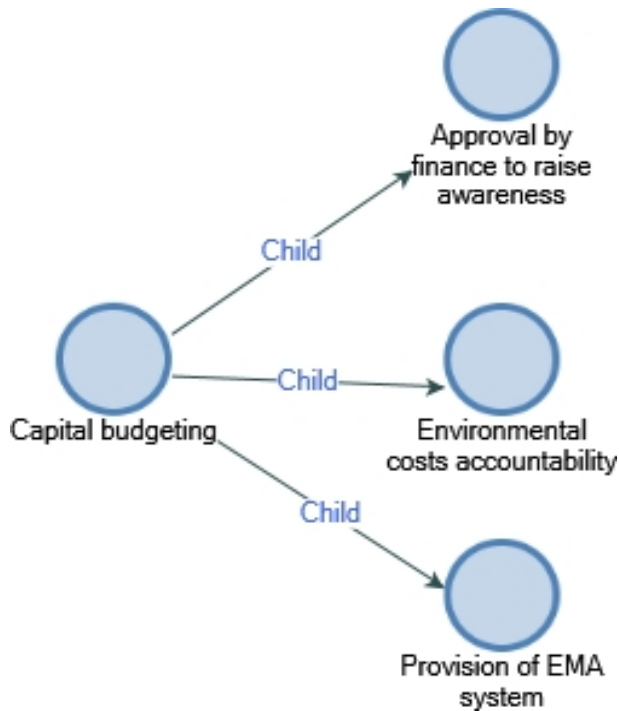


**Figure 4.2: EMA policies and practices at UKZN**

Figure 4.2 above illustrates the themes that emerged from the responses provided by the study participants. The main themes include capital budgeting, cost allocation, environmental performance measurement and technological innovation. The main themes which gave rise to sub-themes are explained below.

#### **4.3.1. Capital budgeting**

The finding from the analysed qualitative data revealed that UKZN does not make provision for environmental management in the institution's capital budgeting. The lack of budgetary provision reduces the opportunity to develop and enhance UKZN green behaviour. The capital budgeting theme has three sub-themes, which are approval by finance to raise awareness, environmental costs accountability and provision of EMA system. The three sub-themes are depicted in Figure 4.3 below:



**Figure 4.3: Capital budgeting**

#### ***4.3.1.1. Approval by finance to raise awareness***

UKZN has an accounting system that caters for the capital budgeting and other finance functions of the institution. Various costs such as electricity, water and waste are provided for and approved by the finance unit of the institution. All the respondents affirmed that costs incurred on the environment are treated as expenses, which may be a contributory factor in the low level of awareness of EMA. One of the interview participants in this line of thought is presented below:

Participant 1:

*Given what I found here, and the fact that we're starting to just talk about these issues, I don't think they are tracking these things I mean, certainly they track the overall rates and utilities and all that stuff, but it's not classified as environmental costs, obviously broken down into your energy costs, your waste disposal, your water.*

The above statement represented the viewpoint of all the interview participants. However, there is a need for special provision to be made for EMA to raise the awareness among the institution stakeholders.

#### ***4.3.1.2. Environmental costs accountability***

Environmental accountability involves a process, which exposes the environmental behaviour of an organisation and individuals to the public, thereby creating a sense of legal obligation to better manage the environment (Paddock, 2003; Abate, 2016). The interview participants held different views on who is held accountable for the major environmental costs incurred by the institution. The differing views may be connected to the lack of clear-cut policy framework on EMA adopted by the institution.

For instance, Participant 3 posited that:

*That as I said, we haven't been doing much more so it's essentially that there is no one person that's responsible, but they are in a different department, such as possible for individual costs, for example, for cleaning, things like that. So, but, you know, the cost basically, it's not like we had driving the use of these various like, for example, chemical, okay, things like that we're not focusing on that at the moment. There is not much being done.*

The participant's testimony represents the lack of priority accorded to EMA by the management of the institution. This position is buttressed by the viewpoint of participant 2 who simply said:

*Hmmm... not that I am aware of.*

The study participants who placed direct responsibilities on individual/group held accountable for major environmental costs incurred commented as follows:

Participant 1:

*The problem is, I don't think there's enough, if there is any accountability to be honest, because the budget sits with me. And so, we just paid. But if I overpay or and no technically, and no one can even hold me accountable. Because it's not within my control to manage this efficiencies on the ground. So, all I'm doing is we're consolidating the*

*accountant, we just paying it there. So, this is the bow and I'm paying. So, nobody's actually interrogating those. Like you said earlier on, if that was done, you can actually see where you are bleeding and you could actually achieve. So, until we start to devolve these things to schools and colleges, we're not going to be able to hold people accountable.*

Participant 5 argued that:

*Environmental and safety issues are part and parcel of management. However, when it comes to the broader environmental elements in the institution, that responsibility rests with the Vice Chancellor and then delegated accordingly to all the executives. My office on environmental issues will be responsible for when we are doing, New Project, there are many instances where you've got.*

#### **4.3.1.3. Provision of EMA system**

Organisations globally are becoming conscious of the impact of their activities on the environment. Therefore, governments and businesses have seen the need to put in place a holistic EMA system to enhance awareness about environmental activities. UKZN does not have any policy on EMA systems as evidenced by the comments of the interview participant stated below:

Participant 1:

*Yeah, I think, this portfolio should be looking at those type of issues, because you have CMS and IPG which are underneath this division. And those two areas between them, we should be dealing comprehensively with all environmental issues within the university. So, the one area that they've sort of focused on in the last couple years has been more on energy management and in fact, we had appointed someone to drive that initiative. But it was a bit of a disaster. So, he was an academic sort of subcontract into the role from engineering, a lot of ideas, but he never really kicked off on many of the initiatives and some of the projected savings and use that we were going to get out of those processes we never really saw. So, we sort of through a legal process and to get rid of him, but whoever's been sitting in this space in this office hasn't really, you know, taken it and ran with it. So, what I'm trying to do now since I've been here a couple of months is to initiate a series of projects. So, we initiated one the first one is waste management where what I'm trying to*

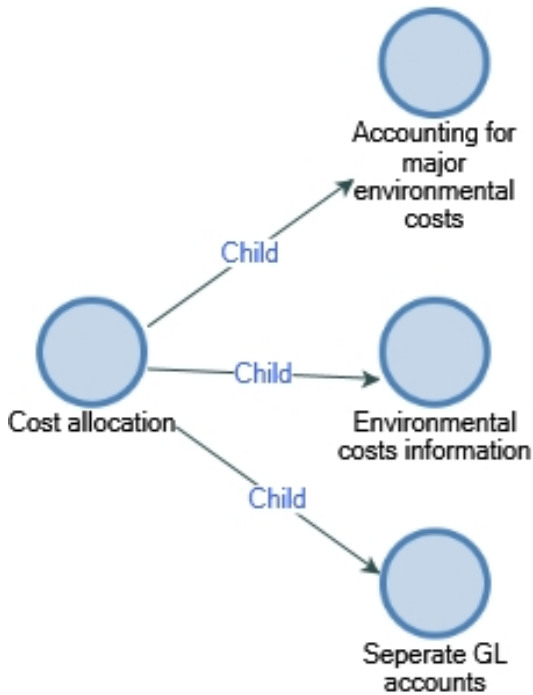


*do is have sort of a collaborative approach with both academic and our department to identify potential, surrealistic the waste management initiatives, and to have an academic slant to it. So, we get students to then either participate in the project through from an income point of view. So, either through our student entrepreneurship program, whatever it is, but also have a research element to it. So, where they will be able to give a masters or PhD student to do some research on our campus, we become a site for research. And then we also initiate some real projects that will then give us savings in terms of not just from a financial point of view, but also just from our carbon footprint point of view. So that's what I'm trying to do. So, the first one I've initiated is the waste, the second one will be the energy and then there'll be a water one. So, there are three links. And these initiatives, what we're trying to do is also link it back to the campus master plan. So, we have a master plan that we've been working on for the last two years that has a huge environmental dimension to it. And In there what we trying to identify new projects and initiatives that we want to roll out that will then you know, improve us going forward. Because really speaking as a big institution as we are, we haven't really been doing much. So, what we started initiating so there's two sorts of approaches, one is new buildings that are coming up, we are making sure that they completely green. So, if you look at the new residents, as a PA, one in Howard, etc., they completely green, we are catching rainwater, harvesting, all that stuff, they're making sure that it's an energy efficient as possible. So similar to this office, you've got sensors and things. So, if you walk out here, let's go office. So, we want to retrofit the existing buildings with some of those technologies, but your new buildings must come already equipped, and all of those things. So, there's been some work that's been done. But I wouldn't say that we have a very tight policy, and we and we certainly don't have a holistic strategy, what I'm trying to do through this sort of projects is to then build up that overarching strategy on what we're going to do around environmental management and the carbon footprint and green energy efficiency.*

Based on the findings from this study, the research objective which aimed to understand the existing environmental management accounting policies and practices that UKZN employs was achieved. The conclusion reached indicates that the existing management accounting practices are below standard, as exhibited by a lack of commitment and accountability for environmental-related issues.

### 4.3.2. Cost allocation

Cost allocation involves the process of identifying and assigning cost to an object (Guajardo & Rönnqvist, 2016; Andersen, Andersen, & Olesen, 2016). Empirical studies on EMA revealed that environmental costs are allocated to overhead accounts which are product specific such as energy costs, water costs and waste management costs (Damayanti & Pentiana, 2018; Le & Nguyen, 2019).



**Figure 4.4: Cost allocation**

The sub-themes emerging from the cost allocation included accounting for major environmental costs, environmental costs information and separate GL accounts.

#### **4.3.2.1. Accounting for major environmental costs**

Accounting for major environmental costs through the traditional function of accounting is a major challenge for accounting professionals and academics. Findings from this study revealed that environmental costs are not separately accounted for. In other words, the university does not make provision within the accounting records for environmental costs. This could only be interpreted to mean that the university management does not place importance on the impact of the university activity on the environment. Studies have shown that various expertise

from the accounting profession is required to manage issues relating to environmental costs (Henri, Boiral, & Roy, 2016; Le & Nguyen, 2019).

#### **4.3.2.2. Environmental costs information**

According to the Organisation for Economic Co-operation and Development (OECD) (2007), environmental costs refer to costs associated with the actual or potential deterioration of natural assets due to economic activities. Environmental costs are considered as “useful tool for collecting, processing and providing information on environmental costs to managers aimed at sustainable development” (Le & Nguyen, 2019). Environmental costs information could be useful to the university management in improving environmental efficiency and responsiveness of the university. Responses from the study participants revealed that the university management does not have access to environmental costs information. For instance, participant 2 commented as follows:

*If the executives were to be provided with this information, I'm sure they'll find a way to deal with the environmental issues and a contentiously improve the university in environmental standing.*

The submission of participant 2 shows the relevance of environmental costs information in making informed decisions on the university environmental related activities. The view of participant 2 is corroborated by the comment of participant 1 provided below:

Participant 1:

*I think at the moment we are okay, we quite decent in terms of providing data, just the raw data (Jing & Songqing, 2011), but it's meaningful management information. So, what I'm saying is that we must be involve in trying to put together formal reports, either quarterly or whatever, that we disseminate to the university to say, this is where we are from a research perspective, from a teaching and learning perspective, from an environmental perspective. So, all of these indicators that we keep tracking, we need to be able to analyse it and send it out, so people can see, okay, what is it that we can do so we can actually assist you in cost reduction and increasing your carbon footprint.*

Consistent with the comments of the study participants, previous studies revealed that environmental costs information could serve as a good proactive measure to improve the gathering and sharing of environmental information and also provide early warning to environmental issues which may demand urgent attention (OECD, 2007; Jing & Songqing, 2011).

#### ***4.3.2.3. Separate GL accounts***

The data collected from the interview participants revealed that no special accounting record is made for environmental costs by the university. Rather, environmental costs are assigned to an overhead account and treated as expenses in the GL. The respondents' views are well captured by the comments from them provided below.

Participants 3:

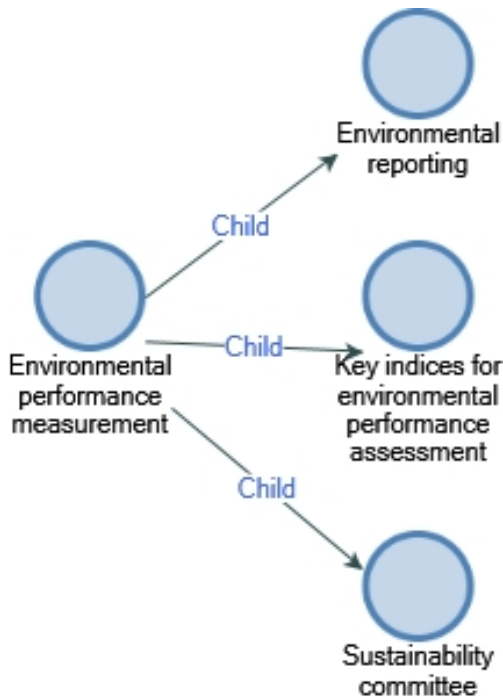
*So, we have separate GL accounts for each of the different types of expenses, for example, electricity. And then in some instances, we also have separate cost settings. Environmental costs are not separately identified. They are treated as component of the expenses.*

In responding to how the major environmental costs are accounted for by the university, participant 5 gave a broad explanation on the steps and initiatives that have been taken by the university management to adopt a green programme. Below is the comment:

Participant 5:

*When it comes to utilities, energy, waste, water, we are now looking if there was a test team in the master plan of what they do. When it comes to the sustainability testing of the master plan that was established by.....I will start with all the utilities. For energy we have adopted UKZN green program, we want to try and put up the solar system as possible way we can reduce our energy consumption and when it comes water, we are installing the smart meters we've done the bunk that works with Edgewood campus we are doing currently the bunk what works with Howard college. You must have seen some digging they are filling there. We are putting the smart meters and record the energy management system all these utilities, water and energy in our ICS, we're*

able to monitor and able to track when the consumption is improving or not. When it comes to waste. In particular, as i have indicated as our main challenge we are still lagging behind there had been some proclaims, where we had some activists who come in and activates and recycling on campus, but then it is faded. So that is one edit it who we are, we don't have anything that we can account to as far as the cost is concerned.



**Figure 4.5: Environmental performance measurement**

### 4.3.3. Environmental performance measurement

Environmental performance measurement refers to the EMA tool used in checking, reviewing, monitoring and evaluating environmental performance of an organisation (Tam, Tam, Zeng, & Chan, 2006; Chang, 2007). Three sub-themes emerged from the theme on *environmental performance measurement*. These sub-themes are depicted in Figure 4.5 above and include environmental reporting, key indices for environmental performance assessment and sustainability committee. The sub-themes are discussed next.

#### 4.3.3.1. Key indices for environmental performance assessment

The key indices for environmental performance assessment are sacrosanct in measuring the performance of the environment. The ISO (2016) defines

environmental performance assessment, otherwise referred to as environmental performance evaluation, as a “process to facilitate management decisions regarding an organization’s environmental performance by selecting indicators, collecting and analysing data, assessing information against environmental performance criteria, reporting and communication and periodically reviewing and improving this process.” This study found that the university has mechanisms in place for assessing the performance of the environment. Below are excerpts from the interview participants on the question whether the university has measures in place to assess its environmental performance.

Participant 1:

*Yes, we do. So, what we've done, if you look at our annual performance plan. I'm not sure if you're familiar with it. But what we do are emanating directly from the strategic plan, and we track these indicators. So, this transformation ones, these things around climate and culture, teaching and learning research. And then when you go down to the enablers, these issues centered around a sustainable future. The one thing that we track specifically is our carbon footprint reduction. And there's a complicated formula on how they are assessed. We have set some targets in terms of what we would like to see over the next five years.*

The response provided by participant 1 is consistent with the argument of Tyteca (1997) which affirmed that

*environmental performance measurement can provide us with tools to study the effectiveness of environmental regulation, taxes, and various other kinds of economic instruments as means to improve the quality of the environment.*

While most of the respondents affirmed that the university has a mechanism in place for assessing environmental performance, participant 6 was not precise in the response provided, as stated below:

*I assume so, as I'm not involved in that aspect.*

#### **4.3.3.2. Environmental reporting**

Environmental reporting is significant in EMA as it is an avenue for providing environmental information for the university stakeholders. The reporting of environmental performance measurement may help to shape the decision-making process concerning the impact of the university activity on the environment. In other words, environmental reporting provides an avenue on how the environmental performance of the institution can be improved based on the environmental performance assessment. However, the qualitative data collected revealed that the university does not produce reports on environmental performance. Some of the comments from the interview participants are provided below:

Participant 5:

*No, the university does not produce report.*

The comment from participant 5 is consistent with the response provided by participant 4 below:

*I have never seen one.*

However, the response provided by participant 6 on whether the university produces any internal report on environmental performance was neither emphatic nor precise:

*I suspect it is the annual report, but I'm not sure.*

#### **4.3.3.3. Sustainability committee**

Information emerging from the qualitative data collected revealed that the university has formed a committee with a mandate for assessing the environmental performance the university.

Participant 3:

*I think last year we formed a sustainability committee with responsibility to assess every second of water and use of solar panels, and to get efficiency on electricity. Although, I know that recording the actual usage or wastage is a recent thing.*

Participant 5 commented as follows:

*Yeah but what I'm trying to say is that as an institution we have this committees which, seeks to make sure that the affairs of the environment are well managed.*

#### **4.3.4. Technological innovation**

Technological innovation was the last theme emerging from objective one which is on EMA policies and practices at UKZN. The study participants posited that the adoption of technology in the management of environmental costs and environment performance of the university will help reduce costs and make the environmental performance of the university more effective. Some of the comments are provided next.

Participant 2:

*That's my understanding. Just of interest in raising the environmental costs I'm looking at the amount of sewer that we produce as a University, It's a lot. Why don't we have... gas plans as a University just to show that we are creative and innovative in this fourth industrial revolution that we turn the sewer into gas which can be used for cooking and other things which is more sustainable. There are other things that we can also implement as a University rather than just use of solar.*

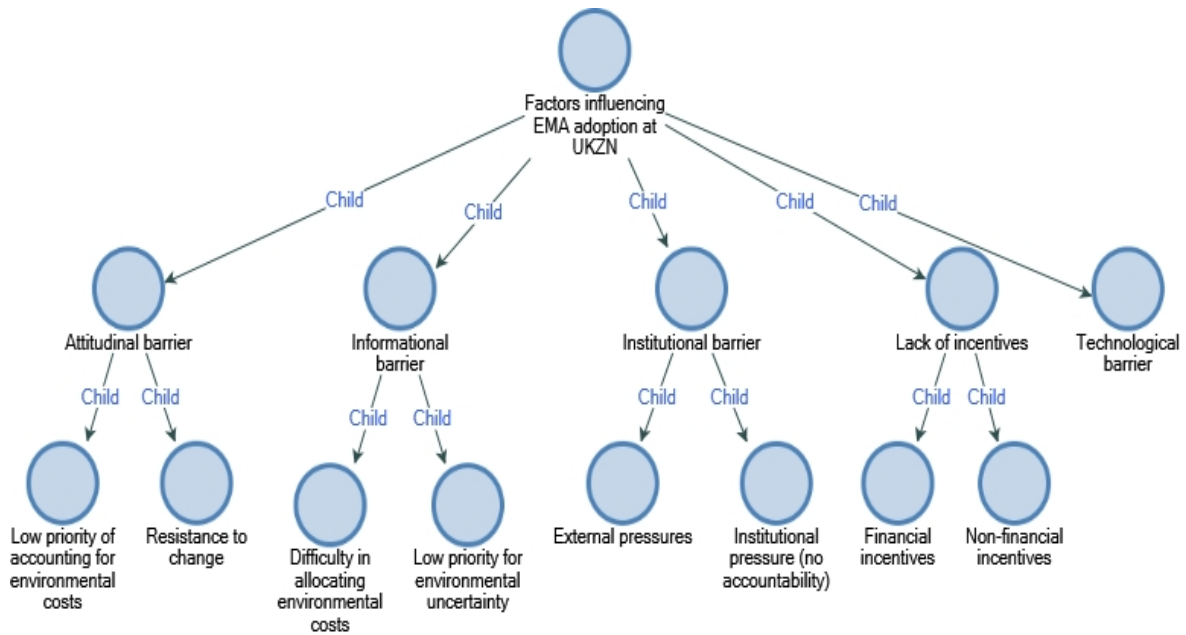
Participant 2 further posited that:

*I think as a university we are trying to move away from paper-based teaching or lecture material, to online in order to save on printing costs which will effectively cover electricity and paper.*

#### **4.4. Analysis of research objective two**

Research objective two aimed to establish the factors influencing EMA adoption at UKZN. Five key barriers emerged as the main themes coded in the NVivo 12 software. These include attitudinal, informational, institutional, lack of incentives and technology barriers. As illustrated in Figure 4.5, each of the barriers (main themes) has sub-themes which are discussed in detail.

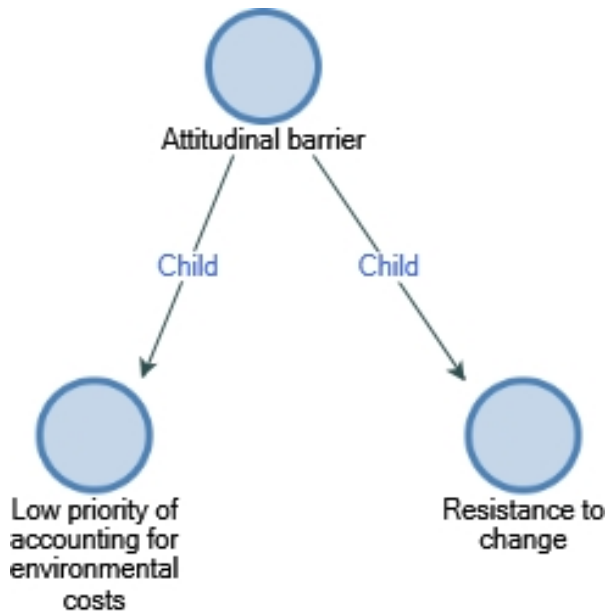




**Figure 4.6: Factors influencing EMA adoption**

#### 4.4.1. Attitudinal barrier

The attitudinal barrier may be connected to the lack of awareness of how EMA adoption could enhance green initiatives and be a cost saving measure in the management of the environment. Previous empirical studies have identified attitudinal barrier as one of the major factors influencing the adoption of EMA (Chang, 2007; Jamil, Mohamed, Muhammad, & Ali, 2015; Iredele & Ogunleye, 2018). Figure 4.7 illustrates the two main sub-themes emerging from the coding on attitudinal barrier.



**Figure 4.7: Attitudinal barrier**

The two sub-themes in Figure 4.7 are *low priority of accounting for environmental costs* and *resistance to change*.

#### ***4.4.1.1. The low priority of accounting for environmental costs***

This is considered a key factor influencing the adoption of EMA at UKZN as evidenced by the following comments from the study participants. The management culture in UKZN does not prioritise EMA. Participant 2 made the following comment:

*That will be good, if information is provided, yes, culture will change, the way we behave change... I'm just thinking out loud here. we have this garbage disposal... garbage disposal areas that university has we have one just as to the GSB and I was wondering why the university can't put some of the garbage or the litter into recycling bins and we have elderly women who I mean, the informal Waste pickers who come to fetch Waste from the university. Why don't we find an environmentally friendly way of storing these materials? I don't know what the use of the litter is for.*

Accounting for environmental costs has not been given the required attention, judging from the comments of participant 2. Although UKZN has various environmental initiatives in curbing environmental challenges as evidenced by the

14 principles in the environmental policy of the university, the much-needed priority has not been accorded to accounting for environmental costs.

#### ***4.4.1.2. Resistance to change***

The university makes provision for environmental costs such as waste disposal, electricity and water in the GL. However, the university accounting systems do not separately account for environmental costs. The study participants were asked what could be done to help facilitate change. Below are the comments provided by some of the participants.

Participant 1:

*We as a University, are supposed to drive social change and I think issues like environmental costs would actually interest quite a lot of staff and students who want to reduce the costs.*

The response by participant 1 captures the views of most of the study participants. However, in response to the same question, participant 2 simply suggested:

*Just awareness...awareness, via emails, having communities, or even having champions maybe training.*

The importance on the provision of accounting for environmental costs was emphasised by participant 3:

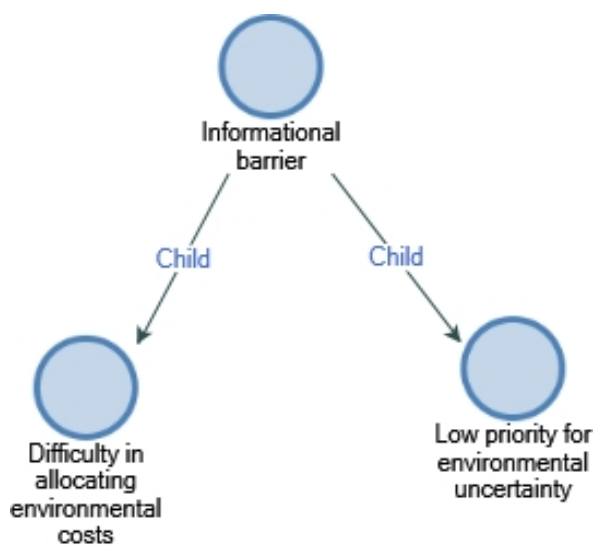
*I do think we need to change the attention of the stakeholders to watch costs, environment cost, and the impact it is having on the environment.*

The resistance to change hinders the university from making provision for accounting for environmental costs. This finding is consistent with the outcome of the study conducted by (Chang, 2007), in which it was revealed that “resistance to change impedes the university from allocating environmental responsibilities to academic schools, or other administrative divisions.”

#### **4.4.2. Informational barrier**

The data collected revealed the lack of information on environmental management as a major barrier affecting the implementation of EMA by the university. This could also be traced to the lack of integration of environmental management in the

strategic plan of UKZN. EMA is linked to information sharing in that EMA is used by organisations to manage environmental performance and report environmental information to all stakeholders (Jamil, *et al.*, 2015). The study participants were asked whether the university should provide major environmental cost information to increase environmental awareness and encourage behaviour change. The two sub-themes emerging from the responses are *difficulty in allocating environmental costs* and *low priority for environmental uncertainty*. The sub-themes are illustrated in Figure 4.8.



**Figure 4.8: Informational barrier**

#### ***4.4.2.1. Difficulty in allocating environmental costs***

The six study participants affirmed the difficulty in allocating environmental costs information as a major factor influencing EMA adoption in the university. Participants were asked to comment on the significant barrier to environmental costs information. The following are some of the comments provided by them:

Participant 6 simply stated that:

*The current barrier is that I don't think there's a system in place.... a proper system in place to monitor, so you have to get a system to monitor before you can report them.*

The comment by participant 6 is affirmed by participant 4 below.

Participant 4:

*Internal barriers are more about data capture, I don't see that they will be resistance from any parties or any lacking or even the students or the staff I can't see or hear that they will be resistant.*

Participant 1's view resonated with the other participants:

*So, we just don't have the information. And that's the biggest barrier.*

The findings from this study as evidenced by the study participants' responses indicate that environmental costs information is a major factor influencing the adoption of EMA at UKZN. The finding from this study is consistent with the outcome of an empirical study conducted by Jamil, *et al.* (2015) which revealed that the information barrier is one of the major challenges to the adoption of EMA. Based on the findings from this study, research objective two which aimed to establish the barriers and facilitators of EMA adoption at UKZN was achieved.

#### ***4.4.2.2. Low priority for environmental uncertainty***

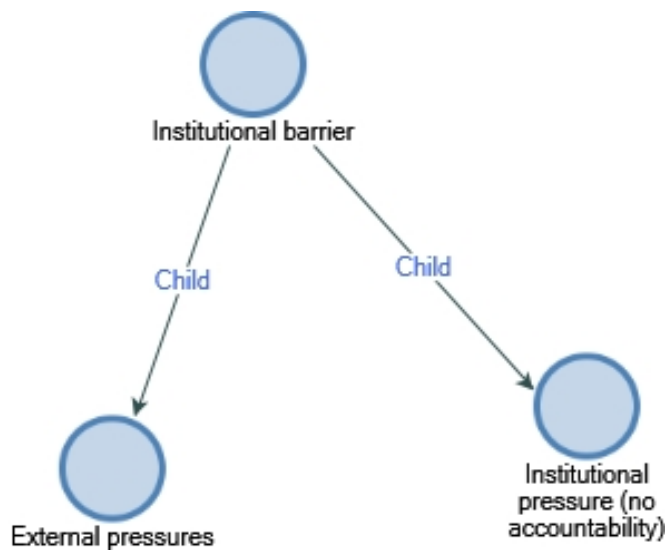
The study found that the major barrier to environmental costs information in the university is the lack of a system to monitor and manage such information. The lack of such a system to manage environmental costs information could be attributed to the low level of importance placed on environmental-related issues by university management. Participants 5 emphasised the importance of environmental costs information to manage environmental uncertainty as follows:

*Information if you don't know, without information, you are not informed, and you would not be able to sort of able to make a decision in respect of environmental issues, they are very serious.*

#### **4.4.3. Institutional barriers**

The institutional barrier is a major factor influencing the lack of EMA adoption within UKZN. The institutional barrier involves coercive pressure (that is the power of the government to enforce the adoption of EMA), mimetic and normative pressure. A similar study conducted by Mumbi (2014) revealed that EMA practices are not given the required attention due to lack of an appropriate framework for the implementation thereof, which justifies why many organisations apply a varied

strategy in the adoption of EMA. The sub-themes emerging from institutional barriers are depicted in Figure 4.9.



**Figure 4.9: Institutional barrier**

The sub-themes emerging from institutional barriers as illustrated in Figure 4.9 include *institutional pressure* (no accountability) and *external pressure* (government, students & staff).

#### ***4.4.3.1. Institutional pressure (no accountability)***

The study participants were asked, “What would encourage the university to consider the major environmental costs when making management decisions? So, in deciding on strategies or whatever to take those costs into account would it perhaps be pressure from providers of Finance?” Below are the comments from the participants.

Participant 1:

*I think this strategy is providing that pressure, because it is one of the things that would be assessed on, as you can see, it's clearly one of the things that we are being assessed on from the APP, which is one of the indicators. So that provides the pressure strategy, because in a way, that one is the indirectly related to this department. And so I would need to make sure that I accept the pressure downwards to make sure that's something that's taken care of, because ultimately, it's going to be a reflection of those divisions performance and on my performance, so, the*

*pressure would be on your division to perform and then obviously, that will be voted down, and it will continue. and also, I think, you know, just the general pressure from I mean, I can tell you from the first workshop that we had around the waist, there's a lot of pressure from academics and staff to say, you know, we need to be more responsible about how we go about these things, we don't seem to be doing too much. And it's not on, you know, from an environment. And remember, we also our campuses are pretty much in you know Conservancy's and all of those type of places, so there's a need for us to be doing more, you know, you don't want to be killing off the environment around us as a result of our negligence.*

The comment from participant 1 affirmed the lack of intuitional pressure as a factor influencing the lack of EMA adoption in UKZN.

Participant 3:

*Well I certainly think I mean, for example, we currently in the process of building residences, near some of the campuses and when those buildings are being built, consideration should be given to make sure that, for example, we use solar panels, and we have Strategies, collecting rainwater capacity, and recycling water and things like that. So, coming if the management had information, they would ensure that either interrupted and as well as your peers going forward and maintenance, it could be geared towards making the university a viable environmental system.*

#### **4.4.3.2. External pressure**

The study participants were asked if there were any external pressures that the university faces to account for any of its impacts on the environment. Below are the comments from the study participants who are principal staff members of UKZN.

Participant 1:

*I haven't seen any to be honest, like you would expect there to be a strong you know, push from maybe there to come across very strongly from those environments? To be honest I think more government departments that are concerned about it, but they certainly haven't pushed it in and we are coming approached us and said, Look, what are you doing, you know,*

*nothing like that. So, it's not like department labour coming in saying, look, what's happening with your transfer.*

Participant 2:

*Not that I am aware of... maybe it's there but at times it comes through cost savings in terms of saving energy and we have our plans, air con plans at certain times that does save the environment.*

Participants 3:

*Most definitely, because the university is under pressure, but financially there a big focus on trying to increase income.*

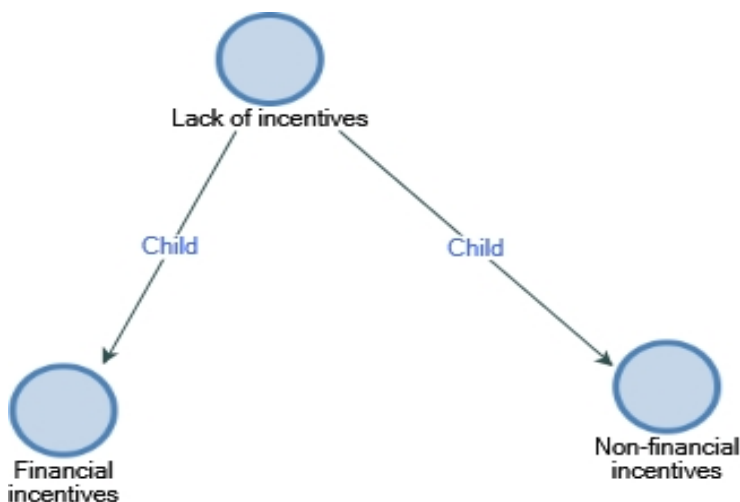
Participant 6:

*I would not...I'm not sure I won't be able to answer that I think that will be at the higher level I'm sure they are pressures in terms of funding a lot of funding is externally sourced and stuff like that.*

The comments highlighted above show that the university is not being pressurised to adopt EMA. The lack of pressure, whether internal or external, is a contributory factor to the lack of priority given to EMA in UKZN.

#### **4.4.4. Lack of incentives**

The two sub-themes emerging from *lack of incentives* are financial and non-financial incentives. Figure 4.10 illustrates the sub-themes.



**Figure 4.10: Lack of incentives**



#### **4.4.4.1. Financial incentives**

Financial incentives are the monetary benefits provided by/to the university or other stakeholders to promote EMA in the institution. The study participants were asked if the university receives financial rebates, which provides incentives to the university to start measuring and classifying environmental costs. The comments from the respondents are provided below:

Participant 1:

*No, there's been absolutely, virtually, no incentives, and that is because of the centralized nature of those costs. If it were to go back to the school, then obviously, they could be incentives provided to the schools based on the savings they achieve. so I think it's just the way that it's structured. Also, there's no strategy, clear strategy, coherent strategy. And yeah, I mean, we are a bit far away from that point, but I think that we will get there. But that's the way that we should do.*

The above response shows the lack of strategy in promoting EMA in the institution. The lack of financial incentives may be a limiting factor in the ability of the university to harness the benefits of EMA.

Participant 3:

*Most definitely, because the university is under pressure, but financially there a big focus on trying to increase income.*

The comment above goes to show that the university management does not place much value on environmental costs, rather the attention is on teaching and research outputs which gives the university a rating as one of the five best universities in Africa. The outcome of this study is corroborated by the finding of a similar study conducted by Iredele and Ogunleye (2018) which affirmed that South African firms are mostly constrained by financial barriers in the adoption of EMA.

#### **4.4.4.2. Non-financial incentives**

The non-financial incentives are the non-monetary rewards put in place to promote the adoption of EMA. The study participants were asked if the university provided sufficient incentives to motivate academic schools or administrative divisions to

control or reduce environmental costs. The comment from participant 2 below captures the views of most of the study participants:

*Not necessarily the only thing we are reducing use of paper, the rest is business as usual.*

Responding to the same question, participant 6 simply replied:

*Incentives...can't think of any.*

Judging from these responses, incentives for EMA implementation by the university will help showcase the benefits of EMA. Previous studies have identified the general lack of incentives and lack of appropriate information as the major barriers to the adoption of EMA (Chang, 2007; Jamil, *et al.*, 2015).

#### **4.4.5. Technological barrier**

The lack of appropriate technology to gather information concerning the environment is also seen as one of the major factors affecting EMA adoption. The basic practice used by organisations in this respect is EMS (Guenther, *et al.*, 2016; Perotto, Canziani, Marchesi, & Butelli, 2008). The EMS is a mechanism for identifying and solving environmental problems based on the concept of continual improvement (Perotto, *et al.*, 2008). The university does not have such system in place which is due to the low priority given to environmental management. The overall view of the study participants is reflected in the comment below.

Participant 1:

*We don't have the technologies in place to be able to pull it at that level, we're not tracking and monitoring environment. We may need to look at a better system to be able to manage the environment because one of the things that we trying to do this year is to put in place annual performance indicators for the institution. So, if we take that indicator, the natural thing is, we know, we need to be able to track that at the school level. And to do that we need the system (technologies) in place. So, it's a natural sort of evolution of that process. But it will come with time.*

#### **4.5. Conclusion**

This chapter presented the analysis of the qualitative data which was gathered by means of semi-structured interviews. NVivo 12 software was employed to code the data and organise the data into themes and sub-themes. The thematic analysis using NVivo was structured in line with the research objectives. Content analysis was used to analyse the pattern of responses provided by the study participants. The general description and environmental responsiveness of UKZN were also presented in this chapter.

The current EMA policies and practices in UKZN were extensively discussed. Objective one of this study, which was aimed at establishing the EMA policies and practices, revealed the themes from the responses provided by the study participants. The outcome of the NVivo generated themes and sub-themes was based on the qualitative data collected which revealed *capital budgeting, cost allocating, environmental performance measurement* and *technological innovation* as the main themes which emerged from objective one. The findings revealed that UKZN did not incorporate environment policies in the strategic plan of 2017 to 2021, which indicates the low priority placed on EMA by the university. This study identified *informational, attitudinal, institutional, lack of incentives* and *technological barriers* as the major factors influencing EMA adoption in UKZN.

The next chapter presents a summary of this study as well as conclusions and recommendations.

# **CHAPTER 5**

## **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

### **5.1. Introduction**

The primary goal of this research study was to explore EMA policies and practices within the service industry. This study considered the adoption of EMA practices as well as barriers that limit the adoption of EMA practices within the educational services industry, specifically higher education institutions. The case study was UKZN, and the study adopted a qualitative research methodology, whereby key stakeholders were interviewed to obtain the necessary data for the study.

This chapter provides a summary, conclusion and recommendations for the research study. This chapter commences by clarifying the issues that initially motivated the inquiry about EMA. Thereafter, a revisit of the research study is necessary to recapitulate the research objectives, the guiding theories, as well as the research methodology. Subsequently, the chapter discusses the key findings, implication and recommendations for the study and further draws a conclusion for the study. Lastly, the research limitations and suggestions for future studies are considered in this chapter.

### **5.2. Motivation for the study**

Modern day greenhouse gas emissions are a significant contributor to global warming and severe environmental problems. Such gas discharge arises partly because of the combustion of oil, gas or coal. Most of today's discharges originate from rich countries, and have a greater impact on developing countries. Environmental problems such as drought, floods and other natural disasters have the greatest impact on the poor and developing countries. In such countries, emissions and poor air quality have become major issues due to an increase in industrial activity, electricity demand and transportation. The modern-day environmental challenges include scarcity of water and energy and have a significant impact on future organisations (both service and manufacture). This is compounded in South Africa due to the energy crisis and drought experienced.

Having a breakdown of its energy use and costs, is important for an entity to achieve sustainable production. Environmental management accounting systems provide such a breakdown and if implemented correctly can manage and monitor energy consumption and related environmental costs. This in turn will contribute to an environmental cognisant operation with reduced greenhouse gas emission, and create an environmentally conscious reputation for the organisation in addition to the monetary benefits achieved. Hitherto, most studies on EMA have been focused on manufacturing industries across South Africa, with only a few considering this issue within the service industry. This study considered EMA issues within the academic environment and therefore this is a premier and novel study in South Africa that hopefully will receive the attention of future research studies.

### **5.3. Revisiting the research study**

Before considering the key findings, implications and recommendations of this research study, it is necessary to recapitulate on the research objectives, theories and methodology that informed the study.

#### **5.3.1. Research objectives**

The following were the research objectives for this study:

To understand the existing environmental management accounting policies and practices that UKZN employs.

To establish the barriers and facilitators of EMA adoption at UKZN.

#### **5.3.2. Guiding theories and role of theories in EMA**

In order to clearly understand this topic and better achieve the highlighted objective of this research study, two theoretical perspectives and six propositions were considered. The theoretical perspectives are the contingency theory and the institutional theory. These theoretical perspectives and propositions were derived upon critical review of literature on management accounting, environmental management, and environmental accounting. The literature review identified both the contingency and the institutional theories as applicable theoretical frameworks to explain EMA adoption within the South African higher education sector. It is necessary to note that the essence of this theoretical framework was to serve as a

guide to direct the focus of the research study in such a way as to maintain flexibility of the research methodology and interview process.

### **5.3.3. Research methodology and method**

This research study utilised a thematic approach to study the issue of EMA within the higher education sector. In this context, this study explored EMA practices and policies in UKZN via specific propositions that were developed and outlined within the theoretical framework and literature. The research study was conducted in UKZN, via a three-step research conduct known as phases. The first phase, also known as the “Phase One”, considered the selection of research participants. The second phase of the study, also known as the “Phase Two”, focused on the data collection. The third phase of the study, also known as the “Phase Three”, dealt with the transcription and translation of the collected data.

Guiding propositions are tools used to develop the interview questions, thereby allowing the researcher to search for patterns. The propositions may be discarded should fieldwork produce more relevant phenomena. This process allows the research to retain flexibility and to facilitate evolution of the research. The guiding propositions allow for a superior exploration and generation of interview questions providing the researcher freedom to discover and explore other patterns that emerge and are necessary to achieve the research objectives.

The first research objective of this study focused on understanding the existing environmental management accounting policies and practices in UKZN. The interview questions in the questionnaire were captioned in two categories of questions, namely: Questions for participants with an environmental management function, and Questions for participants with a management accounting function. Hence, it was necessary to select at least one participant from management accounting/UKZN Finance division and Environmental management/Institutional Planning and Governance divisions to address the first research objective.

The second research objective considered factors that influence EMA adoption within universities. This objective sought to understand attitudes and viewpoints of key persons and role players regarding the adoption of EMA practices in UKZN. Hence, the study considered viewpoints of key persons across four different cadres

of managerial decision making within the university. These cadres included senior management level, deans of schools, management level with direct involvement in the environmental management function, and accounting managers. To address the second research objective, participants were selected from management roles within the university. Management level participants were selected from senior management, management accounting, environmental management and from academic schools. The academic school selected was the School of Accounting Economics and Finance. Environmental management accounting is a subject area that falls within this school and as such the participants from this school were seen to add greater value than other schools as they have a deeper understanding of accounting-related concepts.

Two questionnaires were developed for this research study to collect the required data necessary to achieve the research objectives. These questionnaires were designed to comprise interview questions that relate to the broad research questions and research objectives of the study. In order to achieve the two research objectives of the study, an expansive review of interview questions used in previous EMA studies was done, with the intent to find relatively useful interview questions for the study. Upon this, interview questions that were deemed useful for the study were adapted, modified and contextualised to suit EMA inquiry within UKZN.

Whilst the first questionnaire utilised themes that consider EMA from a management and accounting perspective, the second questionnaire assessed the subject matter from an attitudinal perspective by considering themes relating to attitudes of key players in the implementation of EMA within UKZN. Hence, the following include the suggested research themes:

Management of the major environmental costs of EMA adoption in the University of KwaZulu-Natal.

Major environmental costs of EMA adoption in the University of KwaZulu-Natal.

Management's attitude to EMA adoption in the University of KwaZulu-Natal.

Management's view to EMA adoption in the University of KwaZulu-Natal.

Environmental accountability of EMA adoption in the University of KwaZulu-Natal.

Institutional pressure of EMA adoption in the University of KwaZulu-Natal.

Upon collection of the necessary data via the interview process, the interview recordings were transcribed, coded and analysed using the Nvivo 12 software for analysing qualitative research data. The data analysis process utilised an initial coding structure to categorise the data and further established two sets of coded data based on the two research objectives. A detailed breakdown of the data coding structure is contained in the research methodology section of this study.

#### **5.4. Research findings, implications and recommendations of the study**

In order to improve the adoption of EMA within higher learning institutions, the key discoveries from the case study, UKZN, as well as the implications and recommendations are summarised below.

##### **5.4.1. Summary of results and findings**

###### ***5.4.1.1. Objective one: Adoption of EMA within UKZN***

Research objective one was aimed at comprehending the existing EMA policies and practices that UKZN employs.

It is necessary to reiterate that the UKZN environment policy is anchored in the University Mission Statement, which is to “*conserve the physical environment and foster a culture of responsible, ethical, sustainable use of natural resources.*” Environmental policy at the university involves conscious efforts to protect the integrity of the environment through local, regional and international conservation of natural resources and biodiversity. The university proposed 14 principles upon which the institution’s environmental policy is based.

Despite these 14 principles, the qualitative data collected revealed that UKZN does not have clear-cut policy on EMA in practice. However, the majority of the interview participants affirmed that provision is made for a distinct GL for costs incurred on environmental management.

The study considered the existing EMA policies and practices that UKZN employs under four distinct themes that emerged from the responses provided by the study participants. These themes include capital budgeting, cost allocation, environmental performance measurement and technological innovation.



**Capital budgeting:** The finding from the analysed qualitative data revealed that UKZN has not made provision for environmental management in the institution's capital budgeting. The lack of budgetary provision reduces the opportunity to develop and enhance UKZN's green behaviour. This theme was further analysed under three sub-themes, namely approval by finance to raise awareness, environmental costs accountability and provision of the EMA system. The following discoveries were made:

Although UKZN has an accounting system that caters for the capital budgeting and other finance functions of the institution, while related costs such as the school's electricity, water and waste costs are treated as expenses and approved by the finance unit of the university. This is perceived as a contributory factor to the low level of awareness of EMA.

Also, the study found that there was no congruent perspective amongst the participants on the issue of environmental accountability and who should be responsible for major environmental issues and costs within the university.

Based on the interviews, it was further found that UKZN does not have any policy on EMA systems.

**Cost allocation:** Empirical studies on EMA revealed that environmental costs are allocated to overhead accounts which are product-specific such as energy costs, water costs and waste management costs (Damayanti & Pentiana, 2018; Le & Nguyen, 2019). The sub-themes emerging from the cost allocation include accounting for major environmental costs, environmental costs information and separate GL accounts. Upon this, the following findings were made:

This study revealed that environmental costs are not separately accounted for. In other words, the university does not make provision within the accounting records for environmental costs.

Furthermore, responses from the study participants revealed that the university management does not have access to environmental costs information.

Likewise, the study revealed that no special accounting record is made for environmental costs by the university. Rather, environmental costs are assigned to an overhead account and treated as expenses in the GL.

**Environmental performance measurement:** Three sub-themes emerged from the theme on environmental performance measurement, namely environmental reporting, key indices for environmental performance assessment and sustainability committee, with the following findings:

It was found that the university has mechanisms in place for assessing the performance of the environment

Based on the qualitative data collected, it was revealed that the university does not produce reports on environmental performance.

Information emerging from the qualitative data revealed that the university has constituted a committee with a mandate for assessing the environmental performance of the university.

**Technological innovation:** Technological innovation is the last theme that emerged from objective one. The general finding here was as follows:

The study participants posited that the adoption of technology in the management of environmental costs and environment performance of the university will help reduce costs and make the environmental performance of the university more effective.

#### **5.4.1.2. Objective two: Barriers preventing EMA adoption within UKZN**

Research objective two aimed to establish the factors influencing EMA adoption at UKZN. The findings here are highlighted and discussed under five key barriers that emerged as the main themes. These include attitudinal, informational, institutional, lack of incentives and technology barriers.

**Attitudinal barrier:** The study posited that attitudinal barrier may be connected to the lack of awareness of how EMA adoption could enhance green initiatives and a cost saving measure in the management of the environment. This was evaluated under the two sub-themes of *low priority of accounting for environmental costs and resistance to change* that emerged from the data coding process. The following were discovered:

The management culture in UKZN does not prioritise EMA, as accounting for environmental costs has not been given the required attention.

Casual responses from the participants depicted slight resistance to change in the current status quo on accounting for environmental costs.

**Informational barrier:** The study participants were asked whether the university should provide major environmental cost information to increase environmental awareness and encourage behaviour change. Two sub-themes emerged from the responses, namely *difficulty in allocating environmental costs* and *low priority for environmental uncertainty*. The findings based on these include the following:

Study participants affirmed that the difficulty in allocating environmental costs information is a major factor influencing EMA adoption in the university.

The study found that the major barrier to environmental costs information in the university is the lack of a system to monitor and manage such information.

**Institutional barrier:** The institutional barrier involves coercive pressure (that is the power of the government to enforce the adoption of EMA), mimetic and normative pressure. The sub-themes emerging from institutional barriers include *institutional pressure* (no accountability) and *external pressure* (government, students & staff). Upon these, the following findings were made:

It was affirmed that the lack of institutional pressure is a factor influencing the lack of EMA adoption in UKZN.

The university is not being pressurised externally to adopt EMA. Hence, the lack of pressure, whether internal or external, is a contributory factor to the lack of priority given to EMA in UKZN.

**Lack of incentives:** The two sub-themes emerging from *lack of incentives* are financial and non-financial incentives, with the following findings:

There are no financial incentives for being EMA compliant. Furthermore, the lack of financial incentives may be a limiting factor in the ability of the university to harness the benefits of EMA.

Likewise, it was found that there are no non-financial incentives to encourage EMA compliance.

**Technological barrier:** A lack of an appropriate technology for gathering information concerning the environment can be detrimental to the attainment of

EMA. To correct this, the EMS is the basic practice used by the organisation. In this study, it was found that the university does not have such a system in place which is due to the low priority given to environmental management

#### **5.4.2. Implications of the research findings**

While this study made several discoveries about EMA adoption and barriers for adoption within a university environment, the following are the implications of these aforementioned discoveries:

Based on the findings of the study it was clear that key stakeholders within the university do not consider environment costs incurred by the university as being significant. This was evident in the accounting system and how environmental costs are being treated as expenses. Whilst there is a general awareness of EMA amongst the stakeholders, it was observed that there is a lack of concern and pressure in dealing with EMA issues within the university. This could be a plausible explanation for lack of implementing the UKZN 14-point environmental policy statement. Furthermore, as suggested by the institutional theory, the effectiveness and implementation of EMA often results from institutional pressures and prioritisation. This implies that EMA within UKZN can be largely influenced institutionally.

Also, the poor motivation for improving EMA within the university could be as a result of lack of external pressures from governmental agencies and social groups who are concerned about environmental uncertainties and climate change. The lack of advocacy from these external stakeholders is clearly perceived as the participants and the university were not under pressure to ensure systems are in place for implementing, monitoring and improving EMA concerns. This supports the contingency theory, which posits that the contingency of a situation often drives immediate action and change. This could imply that EMA issues are not well prioritised by external stakeholders to demand action and accountability amongst agents within the society.

Furthermore, the findings of this study suggest that the manner in which EMA costs are being accounted for could play a significant role in drawing attention to EMA concerns within the university. Whilst there is no special record and quantification of EMA costs within the university, it is difficult to measure performance and further

devise strategies and incentives for motivating staff to be more EMA compliant. Hence, this implies that a good accounting system can go a long way in ensuring EMA practices are being encouraged within the university.

#### **5.4.2.1 Results of objective one in relation to existing EMA research**

Many industries have embraced social responsibility, whereby policies and practices have been implemented to reduce the extent of environmental impacts that arise as a result of daily activities (Crane & Matten, 2016). The educational sector has also accepted this social responsibility as it has an ethical obligation toward the environment. This ethical obligation coupled with the pressure on senior management of universities as regards its social responsibility has incentivised universities to assume environmental initiatives to decrease their environmental impacts. This is evident by the increasing number of universities that have demonstrated environmental responsibility through some form of environmental management. Despite the various forms of environmental responsive initiatives undertaken by universities, literature still suggests that environmental initiatives are lacking at a strategic level.

The results are consistent with existing EMA research conducted within the educational sector. A prevalent conclusion of EMA research within the sector indicates that the service sector is not facing much pressure to implement and improve EMA initiatives. The service sector contains some of the most unsuspecting organisations such as universities which can be significant polluters. Therefore, the responsibility for environmental management does not rest solely with the manufacturing sector (Chang, 2007). Regarding a university's direct impacts, substantial demand is placed on electricity and water, which are two significant environmental-related resources, and as such a university can consume a very large proportion of these resources in the community or geographical location where it is situated (Mtutu & Thondhlana, 2016; Bricca, Gimber, Martin, Rollings, Schwartz, & Smith, 2017). The findings of research objective one, clearly concur with the existing EMA literature that measures such as capital budgeting, cost allocation, environmental performance measurement and investment in technology is necessary to manage the rapidly increasing environmental costs.

Managing the demands on environmental costs is becoming an increasingly difficult problem facing universities (Bricca, *et al.*, 2017). Effective and efficient identification and accounting of environmental costs can create an opportunity whereby costs can be managed better. Although consumption of the natural resources, namely energy and water, has received some scrutiny by researchers there is little known regarding the waste generated by a university as this data is seldom collected by universities (Rossi, Lipsey, & Henry, 2018). As this data is unavailable, the universities lose the opportunity to reduce or better manage their costs. EMA has a critical role in bridging the information gap, thereby providing the information necessary to facilitate better management of costs and preservation of the environment through improved environmental management.

#### **5.4.2.2 Results of objective two in relation to existing EMA research**

In regard to the higher education sector in the United Kingdom (UK), the initiatives aimed at environmental sustainability have only realised limited impacts to improve environmental performance (Schaltegger & Wagner, 2017). Although universities in Northern America report on environmental information, they only report on what has been done on the physical campus. Information related to actual environmental performance, environmental goals and strategies remains silent within the reports.

A strategic perspective can greatly enhance a university's environmental management function; however, based on literature, it can be argued that this strategic perspective falls short due to the lack of involvement from members of the accounting function within universities. The means of measurement, reporting and management of environmental impacts is relevant to both the accounting and environmental-related divisions within an institution (Bennett & James, 2017).

With a university, the stakeholders have a key role to play and a lack of interest and commitment by stakeholders is a barrier faced by universities (Leal Filho, Morgan, Godoy, Azeteiro, Bacelar-Nicolau, Avila, Mac-Lean, & Hug, 2018). A general lack of information and communication regarding environmental issues has also been a challenge faced by the sector. This shortcoming, coupled with ignorance as to the incentives that can be obtained, has impeded the growth and development of environmental initiatives at universities

During a study conducted by Dahle and Neumayer (2001) in a UK-based survey, several barriers emerged. The barriers identified were a –non-environmental attitude on campus, lack of financial resources and lack of environmental awareness. Universities face a long list of competing priorities of which environmental management was not viewed as one demanding attention. Although these barriers emerged, Dahle and Neumayer (2001) argued that the underlying reason behind the barriers was in part as a result of ignorance among university management regarding the extent of cost savings that could be achieved through green initiatives, coupled with the institution's reluctance to change. The barriers and facilitators identified in this study are consistent with existing EMA research and reveal the inherent difficulties associated with EMA implementation in general.

Within the higher education sector, the information required to implement an environmental management system is not readily available, and as such the difficulty experienced in gathering the required data constitutes yet another barrier to the process (Guenther, *et al.*, 2016).

To successfully drive environmental initiatives, a leader or champion is necessary – the literature eludes to the necessity of having such an individual to initiate environmental programmes. Such leaders can be staff member of the university, but they must be influential enough to source the necessary resources and to inspire participation by others (Lozano, Lukman, Lozano, Huisingsh, & Lambrechts, 2013). Therefore, in order to successfully implement environmental initiatives, the champion has to be a strong enough stakeholder with the requisite degree of influence. At Monash University in Australia, the establishment of environmental reporting is attributable to the backing from these champions (Brown, Farrelly, & Loorbach, 2013). These champions are also members of staff with the authority to engage both staff and students for the purpose of generating environmental reports. These champions therefore have access to staff and information necessary to successfully drive the process. At Monash, the initiatives were propelled by the university's Chancellor and Vice Chancellor, and it can be seen that committed support by champions at these levels facilitated the success of the environmental reporting initiative implemented (Brown, *et al.*, 2013). The involvement of top-level management can indeed advance green initiatives at universities, and their support

is crucial to environmental sustainability at their universities (Ceulemans, *et al.*, 2015). The general lack of awareness displayed coupled by the distinct lack of isolation of responsibility for environmental initiatives, is a clear barrier in EMA implementation. The introduction of incentives would promote senior individuals within the organization structures of the university to accept responsibility for such initiatives and successfully drive them forward.

Stakeholder pressure and top management commitment and support, as explained above, are key facilitators to environmental accountability and sustainability, but a strong outside influence is still required for the higher education sector to progress significantly and rapidly transition towards environmental sustainability (Lozano, *et al.*, 2013). Government pressure is thus required to speed up the progress toward implementation of environmental initiatives, with this pressure not necessarily being a success factor, but acting as a catalyst in the process (Chang, 2007). Multiple case studies conducted within the higher education sector in the UK suggest that the sector is further ahead in implementing environmental initiatives, largely as a result of pressure from the government. Within the South African context, the lack of government pressure nullifies the major facilitator for EMA implementation.

#### **5.4.3. Recommendations of the study**

This study recommends that the university and internal stakeholders should prioritise EMA within the university. This should be done by being result-oriented rather than adopting a tick-box approach in dealing with EMA matters.

This study also recommends that external stakeholders should prioritise EMA via creating more awareness and using incentive-based approaches/measures to encourage EMA adoption and practices within the society.

Lastly, this study recommends that adequate attention should be given to accounting for EMA costs separately within the university environment. This is necessary to ensure implementation, monitoring and performance measurement of EMA.

EMA policy implementation should be prioritized by the university. The implications of such policy would require the formation of a committee/structure tasked with EMA



policy development and implementation. A senior UKZN executive to be assigned to spearhead the initiative.

### **5.5. Conclusion**

The primary aim of this study was to explore EMA policies and practices within the service sector, particularly the higher educational sector. This led to an outline of two key objectives that are pertinent to the achievement of this aim as well as the determination of UKZN as the case for this study.

The first objective sought to understand the adoption of EMA practices within UKZN, using a set of interview questions posed to a diverse group of stakeholders responsible for policies and practices of EMA within UKZN. Upon a thematic analysis of the responses and systematic discussion of findings, it can be concluded that there is a poor adoption level of EMA practices within the university. This conclusion was made based on thematic EMA across capital budgeting, cost allocation, environmental performance measurement and technological innovation.

The second objective of this study sought to understand the various barriers that impede the adoption of EMA practices within UKZN. This was done via another set of interview questions that were posed to the necessary stakeholders within the university. Upon a thematic analysis of the responses and systematic discussion of findings, it can be concluded that there are several factors that hinder the adoption rate and good practices of EMA within the university. The emergent barriers from the analysis were captioned under broad themes such as attitudinal barrier, informational barrier, institutional barrier, lack of incentives, and technological barrier.

Subsequently, this study highlighted the possible implications of these findings vis-a-vis theoretical perspectives, and further outlined a set of recommendations that can be considered for implementation.

### **5.6. Research limitations**

A key limitation of this study relates to the scope of the study, as the study was conducted within one South African university. Hence, it is difficult to generalise the findings of EMA policies, practices and barriers within higher education institutions

across universities within South Africa. Although several findings were made via this study, there is a possibility that these findings may vary among South African universities or there may be new findings.

Another perceived limitation of this study relates to the focus of this study on the educational sector as a subset of the service industry. Hence, the findings of this study do not necessarily represent EMA policies, practices and barriers across other subsets of the service industry.

### **5.7. Suggestions for future research studies**

This research study explored EMA practices and policies within the higher education sector as a subset of the service industry. This unique study was done in UKZN, a globally recognised university with five campuses in KwaZulu-Natal, South Africa. An exploration of EMA adoption and barriers limiting the practices of being EMA compliant within the university environment in South Africa is a novel study which is crucial at this time considering the global environmental challenges.

Whilst this study is limited in scope and geographical perspectives, it creates possibilities for future studies in this emerging area of research. A possibility for future studies could be to inquire about EMA practices and policies across universities in South Africa or other institutions within the South African service industry such as banks, financial services, hospitality, etc.

Another way of extending this study in future could be via the methodological approach. Whilst this study considered EMA using a qualitative methodology, future studies can consider this phenomenon quantitatively or via a mixed method approach.

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**APPENDIX A:  
INTERVIEW SCHEDULE TABLES**

**Table A.1: Research Propositions**

<b>Propositions</b>	<b>Relevant EMA Factors</b>
<b>Contingency theory</b>	
P1. Universities that are party to environmental related agreements, and endeavour towards compliance, would prioritise the minimisation of environmental impacts and the management of environmental costs.	Environmental Strategy
P2. The likeliness that EMA systems will be adopted to provide the necessary environmental information to address the uncertainties is proportionate to the level of physical environmental uncertainty perceived by senior management.	Physical environmental uncertainty
P3. Adverse financial conditions lead to prioritising of financial performance at universities, therefore an EMA system that includes environmental cost information as part of performance measurement, would be of secondary concern.	Efficiency or financial considerations
<b>Institutional theory</b>	
P4. The likelihood that universities would implement EMA systems to account for environmental costs is, proportionate to the government pressure imposed on universities to provide an environmental account in relation to the use of funding.	Government pressure
P5. The decision to mimic best practice for managing environmental costs is dependent on recognising the significance of environmental costs within the sector. If environmental costs are not regarded as significant, mimetic pressure would be absent, decreasing the likelihood of EMA being adopted.	Mimetic pressure
P6. The extent of normative pressure imposed on decision makers within universities, to account for the environment, would influence the likelihood that a university would implement an EMA system to manage environmental costs.	Normative pressure

Chang, 2007.

**Table A.2: Interview questions for achieving research objective one**

Theme	Question		
	<b><i>Questions for participants with an environmental management function</i></b>	<b>RQ 1-3</b>	<b>P1 &amp; P6</b>
	1. Does the university subscribe to an environmental policy?		
	2. What are the university's major environmental challenges?		
	3. What has the university done to address its challenges? (Please mention		
	4. Does the university have measures in place to assess its environmental performance? If yes, please describe.		
<b>Management of the Major Environmental Costs</b>	5. Does the university record any of the major environmental costs (either physical or monetary)? If yes, what are they and how are they categorised?		
	6. Does the university face any barriers (either technical or political) in the provision of such environmental reporting? If yes, please explain.		
	<b><i>Questions for participants with a management accounting function</i></b>	<b>RQ 1-3</b>	<b>P2 &amp; P6</b>
<b>Accounting for Major Environmental costs</b>	1. How are the major environmental costs accounted for by the university? Are they separately identified, or assigned to an overhead account? Please explain.		
	2. At what levels are the university's environmental performance assessed? What are the key performance indices used, if any?		
	3. In the university, is there anyone who has ever requested any environmental cost information from you?		

Chang, 2007.

**Table A.3: Interview questions for achieving research objective two**

	<i>Questions for all participants</i>	<b>RQ3 &amp;4</b>	<b>P2, P3</b>
<b>Management's attitude to and views on EMA adoption</b>	1. Do you think it would/wouldn't benefit the university to bring the majority of environmental costs to the attention of the decision makers, both academic schools and administrative divisions? What makes you think so?		
	2. In your opinion has the university provided sufficient incentives to motivate academic schools or administrative divisions to control, or reduce, environmental costs?		
	3. Do you think the university should provide major environmental cost information to increase environmental awareness and encourage behaviour change? If not, why not? If so, whom do you think should be provided with this information (consider if your answer both academic schools and administrative divisions)? What do you think would be the significant barriers (ether technical or political) to the provision of such information to Deans or internal managers?		
	4. What is your opinion on the separate identification and allocation of the major environmental costs? Is it possible for the university to achieve this? Why?		
	<i>Questions for all participants</i>	<b>RQ 3 &amp;4</b>	<b>P3 &amp;P4</b>
<b>Environmental accountability</b>	1. Who is currently held accountable for the major environmental costs incurred? How are they held accountable?		
	2. Have you ever requested or been provided with any environmental cost information from accounting, or environmental management related administrative divisions? If yes, what is the purpose of requesting such information? If not, why not?		



	<b>Questions for all participants</b>	<b>RQ3 &amp;4</b>	<b>P2, P3</b>
	3. Does the university produce any internal report on environmental performance? If yes, at what level is the environmental performance assessed and what is the purpose of this report? If not, why not (e.g. not mandatory, not a normal practice in universities, or not cost effective)? Are there any impediments, either technical or political, to provide an internal report on environmental performance?		
	<b>Questions for all participants</b>	<b>RQ 3 &amp;4</b>	<b>P4 – P6</b>
<b>Institutional pressure</b>	1. What would encourage the university to consider the major environmental costs when making management decisions?		
	2. Are there any external pressures that the university faces to account for any of its impacts on the environment? Who imposes the pressure? How does the university react to the pressure and what are the actions taken?		

Chang, 2007.

## APPENDIX B: INFORMED CONSENT



### Informed Consent Document

28 August 2018

Dear Participant

I, Kiran Baldavoo (971137880), am a student who is currently registered for Masters of Commerce (Accounting) research degree in the School of Accounting, Economics and Finance, Westville campus, University of KwaZulu-Natal. The topic of my study is:

An exploration of environmental management accounting policies and practices at a higher education institution in Kwa-Zulu-Natal.

I can be reached on 0845805805 or [Baldavoo@ukzn.ac.za](mailto:Baldavoo@ukzn.ac.za) for any queries related to study. My academic supervisor is Ms Mishelle Doorasamy, based in the School of Accounting, Economics and Finance, Westville campus, University of KwaZulu-Natal. She can be contacted on [Doorasamym@ukzn.ac.za](mailto:Doorasamym@ukzn.ac.za) or 031 260 2155 during office hours. The HSSREC Research Office can be contacted by reaching Ms Mariette Snyman on [Snymanm@ukzn.ac.za](mailto:Snymanm@ukzn.ac.za) or alternatively on 031 260 8350.

The aim and purpose of this research is to create awareness of having a structured approach to environmental management to achieve the strategic goals of the University of KwaZulu-Natal.

A copy of the thesis will be available at the university's main library for accessibility to respondents based on their anonymity during the study.

Please note that your name will not be included in the report. The interview schedule does not require any personal information. The information will be seen only by me, my supervisor and the examiner, your anonymity and confidentiality is of utmost importance and will be maintained throughout the study.

Your participation in this study is completely voluntary. You have the right to withdraw at any time.

I appreciate the time and effort it would take to participate in this study. I would be very grateful for your participation as it would enable me to complete my thesis.

This study has been ethically reviewed and approved by the UKZN Humanities and Social Sciences Research Ethics Committee (Approval Number: HSS/0543/018M).

---

Please complete the section below:

I ..... (full names of participant)  
hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project. I understand that I am at liberty to withdraw from the project at any time, should I so desire.

Signature of participant.....

Date .....

# APPENDIX C: ETHICAL CLEARANCE LETTER



25 June 2018

Mr Kiran Baldavoo (971137880)  
School of Accounting, Economics & Finance  
Westville Campus

Dear Mr Baldavoo,

Protocol reference number: HSS/0543/018M

Project Title: An exploration of environmental management policies and practices at a higher education institution in KwaZulu-Natal

#### Approval Notification – Expedited Application

In response to your application received 14 May 2018, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL**.

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

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

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

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

.....  
Professor Shenuka Singh (Chair)

/ms

Cc Supervisor: Ms Mishelle Doorasamy  
Cc Academic Leader Research: Professor Josue Mbanigaba  
Cc School Administrator: Ms Seshni Naidoo

---

Humanities & Social Sciences Research Ethics Committee

Professor Shenuka Singh (Chair)

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## **APPENDIX D: TURNITIN REPORT**

Turnitin Originality Report

Final Submission by Kiran Baldavoo

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# APPENDIX E: PROOF OF EDITING

## PROOF OF EDITING CERTIFICATE

### TO WHOM IT MAY CONCERN

#### Language editing

I, Jeanne Enslin, acknowledge that I did the language editing of Kiran Baldavoo's dissertation submitted in fulfilment of the requirements for the degree of Master of Commerce in Accounting.

The title of the dissertation is:

AN EXPLORATION OF ENVIRONMENTAL MANAGEMENT ACCOUNTING POLICIES AND PRACTICES  
AT A HIGHER EDUCATION INSTITUTION IN KWAZULU-NATAL.

If any significant text changes are made to the electronic document that I sent to Kiran on 31 March 2109, I cannot be held responsible for any errors that are made. The quality of the final document, in terms of language and technical aspects, remains the student's responsibility.

Detailed feedback of all the language editing done has been provided to Kiran in writing and is evident in the version of the dissertation in track changes with comments.



Jeanne Enslin  
Language editor  
082-6961224.

#### Technical editing

I, Ronel Gallie, acknowledge that I did all aspects of the technical formatting, checking of reference list and cross-referencing of Kiran Baldavoo's dissertation submitted in fulfilment of the requirements for the degree of Master of Commerce in Accounting. Detailed feedback about the work done has been provided to Kiran.



Ronel Gallie  
Technical editor  
084 7780 292

J H Enslin BA (US); STD (US); Hons Translation Studies (UNISA)